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Electric Railway Journal

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Instructions for Use of Index

This index is essentially a subject index, not an index of titles, and articles treating a number of different subjects are indexed under each of them. In addition, a geographical reference is published wherever the article relates to any particular railway company, or to the state matters of any particular state. The geographical method of grouping serves to locate in the index any article descriptive of practices, conditions, events, etc., when the searcher knows the electric railway, city or state to which the article applies. Groupings are made under the name of the city in which the main office of the company is located, but an exception is made in the case of electrified sections of steam railroads, such entries being made direct under the name of the railroad. City or state affairs appear under the names of the city or state involved.

In the subject index, the alphabetical method is followed, and if there is a choice of two or three keywords the one most generally used has been selected, cross references being supplied. Below will be found a list of the common keywords used in the index to this volume. This list has been subdivided for convenience into thirteen general subjects, but the general subject headings, shown in capital letters, do not appear in the body of the index unless, like "employees," they appear also in small type. As an example of how to use the index, if a reader wishes to locate an article on special trackwork he would obviously look in the list under the general subject Track and under this caption, only Special trackwork could apply to the article in question. The reader would therefore refer to this keyword under S in the body of the index.

In addition to the groups of articles covered by these headings the papers and reports from railway associations are grouped under the names of the various organizations. Proceedings of other associations and societies are indexed in general only in accordance with the subject discussed. Short descriptions of machine tools appear only under the heading "Repair shop equipment" and are not indexed alphabetically, because of the fact that there is a wide choice in most cases of the proper keyword to be used.

CLASSIFIED LIST OF KEYWORDS

ACCIDENTS AND ACCIDENT PREVENTION
Accident claim department
Accidents (including wrecks)
Safety work
Storm and fire damage

CARS AND OTHER VEHICLES
Automobiles
Cars (including car design)
Locomotives
Motor buses
Motor trucks, gasoline
Service and tower trucks
Trackless trolley
Work and wrecking cars

CAR EQUIPMENT
Bearings
Brakes and compressors
Current collection
Electrical equipment
Fixtures
Gears and pinions
Motors
Trucks
Wheels and axles

EMPLOYEES
Employees
Labor
Strikes and arbitrations
Wage decreases
Wage increases
Wages and working agreements

FARES
Fare collection (including apparatus)
Fare decreases
Fare increases
Fares
Traffic investigations
Traffic stimulation

FINANCIAL, LEGAL AND STATISTICS
Abandoning of lines
Accounting
Appraisal of railway property
Financial
Franchises
Insurance
Legal
Legislation for railways
Market conditions
Operating records and costs
Public service and regulative commissions
Statistics
Taxes

HEAVY ELECTRIC TRACTION
Heavy electric traction (general)
Locomotives

MAINTENANCE OF EQUIPMENT
Insulating materials
Lubrication
Maintenance practice
Painting
Repair shop practice
Repair shops and equipment
Stores
Tests of materials and equipment
Welding

POWER
Energy checking devices
Energy consumption
Fuel
Overhead contact system
Power distribution
Power generation
Power stations and equipment
Power transmission
Substations and equipment

STRUCTURES
Carhouses and storage yards
Power stations and equipment
Repair shops and equipment
Substations and equipment
Terminals
Waiting stations

TRACK
Pavements
Poles
Rail joints and bonds
Rails
Special trackwork
Ties
Track construction
Track maintenance

TRAFFIC AND TRANSPORTATION
Freight and express
Interurban railways
Merchandising transportation
Publicity
Public, Relations with
Rapid transit
Schedules and timetables
Signals
Stopping of cars
Traffic investigations
Traffic regulation
Traffic stimulation
Transportation, Metropolitan

MISCELLANEOUS
Engineers
Living costs
Management
Municipal ownership
Radio telephone for railways
Railways (general)
Snow removal
Standardization
Wood preservation

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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Volume 62
Number 1

Traffic Studies a Better Guide to Service Adjustment than Statistics Alone

THERE was a time when electric railway service was determined by the superintendent or other officer, unassisted by information of any sort. Little attention was paid to comparative statistics, such as given by the revenue per car-mile or per car-hour. If the receipts were sufficient to cover the expenses and leave plenty for return on the capital, little thought was given to such matters as analyzing the figures on any basis. That day has passed, and in its stead the auditor has come forward with periodical statements showing the revenue and expenses reduced to terms of all sorts of units, such as the car-mile, the car-hour, the mile of track, and such other things as officials of the road think are desirable. Periodically he prepares balance sheets and statements showing the income and expenditure classified with infinite detail.

It is not particularly difficult for an accountant to determine what it costs to operate the average car or to tell what the average receipts are on any desired basis. The difficulty is that the manager is likely to look over his balance sheet and spot at once the routes where the receipts do not equal the costs. Too often he comes immediately to the conclusion that the red figures represent an intolerable condition which must be eliminated at once. The result is likely to be a cut in service. On the other hand, a line which shows a good margin of receipts over expenditures is likely to be left alone, or even have its service increased.

So many things enter into the receipts and expenses that it is difficult to classify them with great accuracy on a car-mile, car-hour or other similar basis. Statistics of this sort must be used with caution, for while they give a great deal of information of much value in determining the correct service, a manager who does not go beyond what the figures show is likely to make his results worse.

A far better method of attacking the problem of giving necessary service is the traffic survey. The paper read last week at the convention of the Canadian Electric Railway Association by Alexander Jackson, superintendent of time-tables Public Service Railway, outlined a method which may be used to give real information on the necessities for each line. Analyses such as he proposes will make it possible to determine the correct service, regardless of earnings. It frequently happens that a line which is long, or which does a great transfer business, may show relatively small receipts per car-mile or per car-hour, while the service demand on it is very great. Another line that does a large cash business, or is relatively short, may show high receipts and correspondingly low expenses. The traffic survey eliminates all of the doubt and makes it possible to adjust the service to the real demands.

When it is figured that saving one car on the base schedule will cut expenses $15,000 to $20,000 a year, it is not difficult to see that even with a medium-sized property the traffic study will pay for itself handsomely. It is safe to say that practically every system operates some waste service, and that on some lines there are conditions of overcrowding. By taking a part of the saving which may be obtained from proper adjustment of the service to establish an effective traffic department, the service can be so planned that passengers will be better suited, and the revenues of the road are almost bound to increase. Attention to this will in practically every case give better and more lasting results than putting too much dependence on statistics which may or may not reveal the true state of affairs.

Is a Standard Subdivision of the Present Primary Accounts Desirable?

THE effort of the joint committee on engineering accounting of the Engineering and Accountants' Associations to prepare subdivisions for the primary accounts in the standard classification for class A roads is a step well worth while at the present time. When the original classification covering operating expenses was drafted some twenty-six years ago, and again when the classification was expanded in 1907 and 1914, several of the engineering and legal questions which are now recognized as of great importance in electric railroading had not arisen.

This does not mean that changes in the classification itself are necessary. It does mean, however, that some of the larger roads desire more information in regard to their accounts than is prescribed in the classification. For this reason it is obvious that they will divide their primary accounts into certain subdivisions, and it is well that a committee should report on those divisions which appear to it to be the most advantageous. The extent to which some companies are already following this practice is shown by the long list of sub-primary accounts in the way and structures operating expense accounts kept by a large company on the Pacific Coast and listed on page 1046 of the June 23 issue of this paper.

Of course, opinions may differ as to the basis on which these subdivisions should be made. In the way and structures operating expense or capital account, for instance, one basis might be the kind of material used in the track structure. Thus, the subdivisions for the tie account might be wood, steel or concrete, for the paving account, wood, brick, asphalt or other enumerated kinds of paving, and for the rail account, different shapes or degrees of hardness. While such figures would be of interest in giving comparative data for different materials or forms of construction, it is interesting to note that in the many subdivisions in the classification published June 23 this method has been followed only

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in connection with the paving, and there it is used to differentiate only between two kinds of paving, namely, asphalt and concrete in one group and oil macadam in the other group.

On what basis, then, should the accounts be divided? While the author of the article mentioned did not answer this question directly it is evident that the Pacific Coast classification does show a pretty consistent effort to keep the charges for material and for labor separate from each other and also to keep a separate record of the cost of the transportation of the material to the point of use, whether hauled by outside teams or in the company's own work trains. There is also the subdivision under all appropriate primary accounts of "municipal and legal requirements and property retired."

Probably one of the most important applications in the future of these sub-primary accounts will be in valuation work. Here it might often prove very convenient for a company to be able to separate the cost of labor, cost of material and transportation from the other charges, so a set of divisional accounts might bring to light items of original cost of considerable size which otherwise would be hidden. In still other cases it is easy to see that a record of expenses classified under "municipal and legal requirements and property retired" might also prove useful.

Obviously, each company will have to select the sub-primary accounts which its conditions require, but an active committee can be of great help in suggesting what sub-primary accounts are desirable.

Cultivate Tact in Enforcing the Regulations

EVERY electric railway has a set of rules governing the conduct of passengers on its cars. Spitting on the floor is prohibited as a matter of public health, smoking is forbidden or restricted to a certain section of the car, and disorderly conduct is not allowed. Just how far the railway should go in enforcing these regulations is somewhat of a problem. Experience shows that the mere posting of a notice warning passengers against these actions is not a sufficient precaution. Conductors sometimes make mild remonstrance against objectionable behavior, but how seldom it happens that a conductor takes really vigorous action to stop a nuisance.

Some curious notion seems to exist that when a railway insists upon adherence to rules of decent behavior on the part of its passengers it is meddling in an unwarranted way in their affairs and abridging their constitutional rights and privileges. There is, however, no sound basis for such an idea. The cars are the domain of the railway and the conductor is the representative of the company. As such he should see to it that the rules of the company are lived up to. For every one person who may feel injured by being compelled to obey the rules there are a dozen or a score of passengers who will feel irritated and annoyed if some one else is allowed, under the guise of liberty, to create a nuisance in the car. The enforcement of rules should therefore be strict, not only because they are fundamentally right but also because it will pay to have them observed.

In this process the conductor occupies a difficult position. It is not the desire of the company to make its regulations onerous, yet, for the sake of the protection and respect of the patrons in general, the conductor often has to take matters in hand. Here is where a tactful approach, a friendly appeal to the offender's better sense, quietly made, is usually far more effective than an abrupt command or a bullying warning. Some special attention to this matter might well be given by managements, just as another step in cultivating those qualities in the trainmen which help to build the good will of the public.

Reduction of Accidents Is Worth Paying Well for, If at All

ON MANY roads payments for accidents and damages form a not inconsiderable part of the outgo, frequently reaching 5 per cent of the gross revenue and sometimes as much as 10 per cent. In the final analysis, very few accidents are unavoidable, although not all are caused by the carelessness of the company's employees. The West Penn Railways has set as a goal the elimination of all accidents that can be charged against the trainmen, as described in an article that is presented this week.

The outstanding feature of the accident prevention campaign on the West Penn is that the company has been willing to share generously the benefits of accident reduction with the men. It may be argued that the duty of a trainman is to operate without accidents, so that there should be no special merit or consideration attached to their elimination. Acting on this, certain roads have made the attempt to get safe operation merely through appeals to the men's consciences. The appeal to conscience, however, is not nearly so great in the average individual as that to the pocketbook. The opposite argument to the foregoing is that the careful trainman ordinarily gets no more pay than the careless one, so why should he do more than keep out of such situations as will jeopardize his job?

The idea of having the men divided into groups is not new, although usually on other properties one carhouse or division has been pitted against another, while here each division is divided against itself. By this means the contest is localized so that the men know those against whom they are competing, and the spirit of rivalry is intensified.

The second part of the West Penn plan, in which each man is paid a reward in proportion to the length of time he has immunity from accidents, gives a chance for the individual to compete not only against his fellows but against himself. The rewards are substantial, and the quarterly settlement plan allows enough money to accumulate so that the payment will purchase things really worth while. There also is the feeling that if a man loses his standing by having an accident he must begin at the bottom again, and it will be ten months before he is getting the maximum payment. This should prove to be a decided stimulus to the men to keep their records clear.

The claim may be made that the payments will be burdensome in case all the men are getting the maximum bonus. This is quite true, but it is equally true that the payments for damages will be eliminated entirely in that event. It is estimated that the maximum rate of payments will be about one-third the present accident expense. If a bonus for safe operation is given at all, it ought to be a worth-while bonus. It is believed that some companies have almost aroused the contempt of the men rather than their enthusiastic co-operation by making the bonus a mere pittance.

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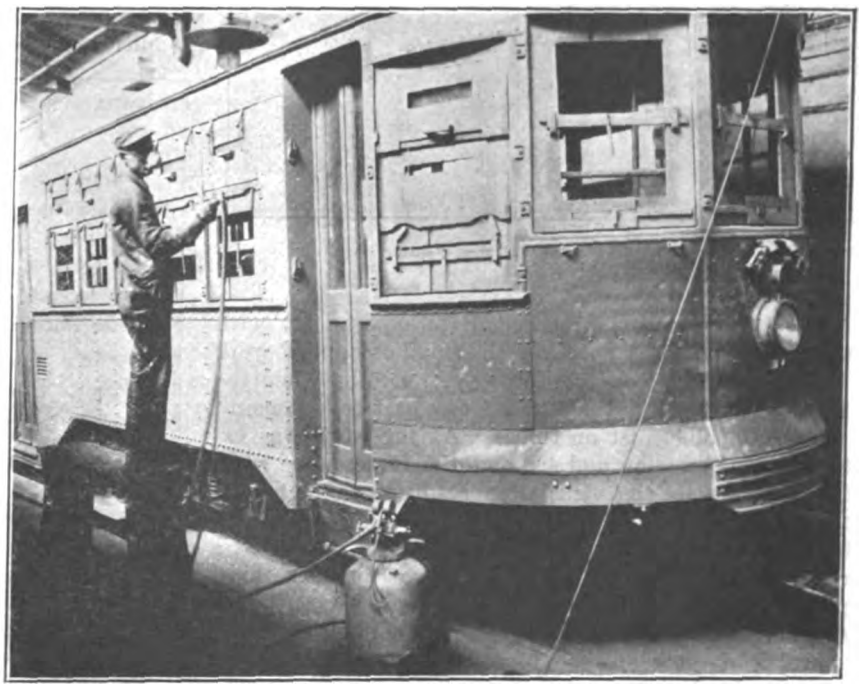
Time of Painting a Car Cut in Half

Methods Used at Cold Springs Shops, Milwaukee, Prove Effective and Economical—Guards and Accessories Are Used as a Result of Labor Time Study

By J. A. Lucas
Superintendent of Rolling Stock,
Milwaukee Electric Railway & Light Company

CONSIDERABLE interest has been shown of late in the pneumatic spray painting system as installed in the various electric railway shops throughout the country for the painting of interurban and city passenger car equipment. The change from the brush, or hand method, to the spray method was made about two and one-half years ago at the Cold Springs shops of the Milwaukee Electric Railway & Light Company, first as an experiment, and later it was adopted as the standard shop practice. Previous to this change, the method of spray painting was used somewhat at the shops on car trucks, structure and utility equipment, the small outfit for rough work not being adaptable for the heavier paint and varnishes used in repainting of cars. Information had been received by the company concerning work that was being done in other lines with the paint spraying outfit, also that car builders were using spray painting on the new cars. Claims of the manufacturers of the spraying equipment as to labor and time saved were so attractive that the company decided in the fall of 1920 to arrange for a test of this type of equipment, to determine whether it could be applied to advantage to the work at the shops. The results obtained warranted the purchase of additional equipment, and plans were extended to embody certain other work, notably the spray painting of cars.



In Spray Painting the Exterior with Sash Removed, the Windows Have Special Guards to Keep Paint from the Interior

Painting may be said to be the direct application of a liquid substance to the surface of material for the purpose of preserving and beautifying the same. The importance of painting has been more generally recognized in recent years and may be summed up in a few words adopted by the paint men—"save the surface and you save all." Of the 857 revenue passenger cars owned and operated by the company, under the present system, about 350 cars are being put through the shops per year. At this rate, repainting and revarnishing the car equipment will take about three years. By repainting and revarnishing as frequently as this it is believed that money is saved by doing less work each time the car is in the shop than would be the case if the period was much longer. The cars also appear cleaner and more attractive to the patrons. In addition to the above work, the large number of utility and express cars are painted by the same method. They are put through the shops on a regular though independent schedule.

The cost of painting work consists essentially of (1) paint materials and paint supplies, and (2) labor expended in mixing and applying the paint. The approximate relationship between the first and second items before spray painting was used is indicated below, this being the result of actual analysis of cost returns on car painting work prior to the introduction of spray painting.

1. Paint, materials and supplies.....25 per cent
2. Paint-labor .....75 per cent

It is therefore seen that about three-fourths of the car painting cost was for the labor component. At that time, the great bulk of the painting work at the Cold Springs shops was done by brush, but early in 1921, following the spray painting test mentioned, the spray method was adopted for painting the car body exterior, and has been followed with results that have been gradually becoming better as the workers became more thoroughly familiar with the method and apparatus. The application of this system has been extended until, at the present time, the entire body exterior (including the lower and upper body and roof) is being spray painted; on the interior, the floors, headlining, seats, and panels are spray painted or varnished, using special guards to protect the woodwork, sash and molding not to be coated. Likewise, the method is made effective on some other miscellaneous items of work.

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Spray Painting Seat Frames. Backs Are Protected by Covering

When the company first began its experiments with the pneumatic spray painting, the small amount of work done in the shops during the winter months when the doors were closed did not create any particular amount of objectionable mist or fumes. As the work was extended in the spring and summer the fumes were readily dispersed by the ventilation resulting from having the doors open at both ends of the paint shop. The following fall when it was necessary to close the doors, a restricted area of the paint shop was inclosed, as a paint spraying compartment, and equipped with the requisite fans and ventilating equipment. This allotted space is of such size as to accommodate six cars at one time and also room for spraying of seat cushions and other miscellaneous work which becomes necessary. The saving in our painting labor has been ample to pay for this inclosure and, in addition, the spray painting apparatus itself.

All operators of the paint spray are protected from the fumes by respirators, worn individually. There are three or four masks available for each man so that while he uses one, others can be cleaned or soaked in antiseptic solution. All painters are examined every month by the company doctor and there has been no indication of any detrimental effects on the workers resulting from the use of this method. Cleanliness is as requisite to good health with the brush method of painting as it is in the spray painting method. While some opposition was met when the system was installed on account of the old painter hands objecting to the use of apparatus, determination and insistence that the spray method was to be used finally produced results. The number of hours during which the spray method was used during a month was submitted to the superintendent of shops and equipment, and if a noticeable falling off was recorded, effort was made to correct that condition for the ensuing month. Within the last six months this record has shown a noticeable increase each month, serving to indicate that the men have accepted this method of painting.

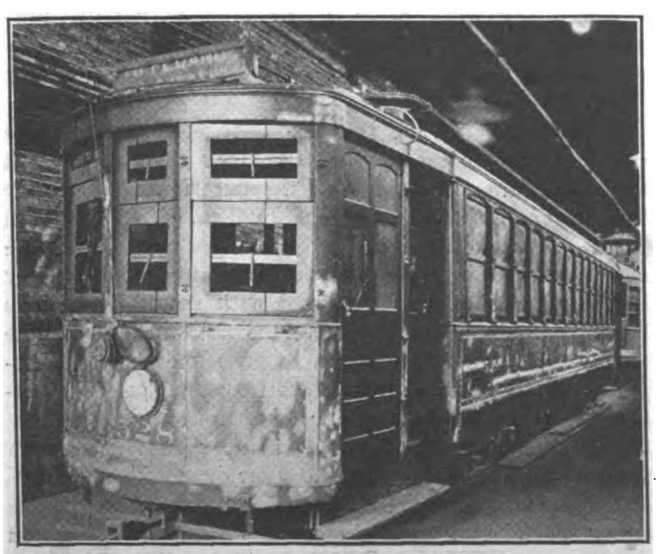
COMPARATIVE MAN-HOURS FOR ACTUAL TIME FOR PAINTING A "500"-TYPE CAR

SCHEDULE OF PAINTING

Brush Method Description of the Operation	Actual Time	*Spray Method* Description of the Operation	Actual Time
		Clean and paint trolley bases before spraying roof	0.8
		Prepare car for spraying complete	1.8
Paint first coat lead	6.8	Spray paint outside complete first lead	0.8
Paint second coat color	7.8	Spray paint outside complete second color	0.8
Paint third coat color	10.0	Spray paint outside complete third color	0.8
Paint floor	8.0	Paint floor (brush method)	8.0
Paint roof	6.0	Spray roof, upper and lower deck light frames	2.0
Varnish (outside) first coat	6.0	Spray varnish entire body first coat	1.0
Varnish (outside) second coat	6.0	Spray varnish entire body second coat	1.0
Letter and stripe	5.0	Letter and stripe	2.5
Sand, stain and touch-up	10.0	Sand, stain and touch-up*	10.0
Varnish inside compt.	7.5	Varnish inside—spray	1.5
Spray trucks	0.5		
Paint headlining first coat	7.0	Spray headlining first coat	2.0
Paint headlining second coat	7.0	Spray headlining second coat	2.0
Paint seat backs	4.5	Spray seat backs	1.0
Paint seat cushions	2.0	Spray seat cushion	1.0
		Paint outside of doors, first	1.2
		Paint outside of doors, second	1.2
		Paint outside of doors, third	1.2
		Varnish outside of door, first	1.0
		Varnish outside of door, second	1.0
		Touch-up after spraying last coat of paint (*brush work)	1.8
		Touch-up varnish	2.0
Totals	94.1		46.4

* Remain the same as under the brush method.

The photographs shown herewith illustrate to some extent the spray painting of cars as undertaken at the Cold Springs shops. Unique guards have been devised to protect the surfaces not to be coated. In spraying the exterior of cars, the car is first sanded and puttied, all sash removed, and replaced with sheet iron or cardboard sheets to protect the interior of the car. In some cases, where sash is not removed, the glass is covered with a special paste (calcium chloride and flour), which prevents the paint from becoming attached to the glass and can therefore be readily scraped and washed off. On certain types of cars an ingenious guard made up of wood strips has been devised which fits into the slot originally occupied by the window sash. These guards are readily removed and applied, a set of them comprising enough to cover one-quarter of the windows and openings in the car. Cheap labor may be used for the application of these guards, it requiring about one hour to put them up and take them down for a complete car. With one-half to one hour (average, eight-tenths of an hour) required for the actual spraying, the total time required would there-



Scheme Used to Fit Front Windows with Special Guards and Side Windows with Canvas

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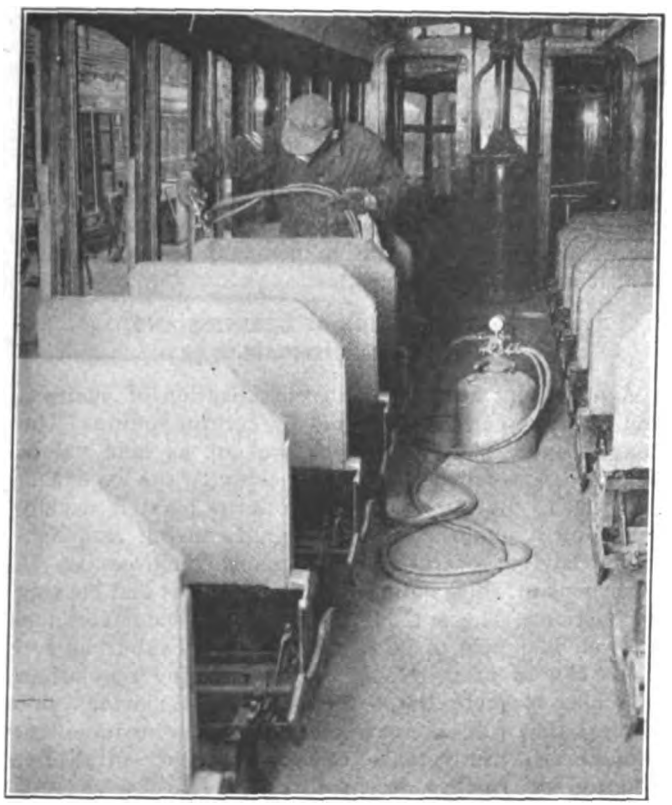
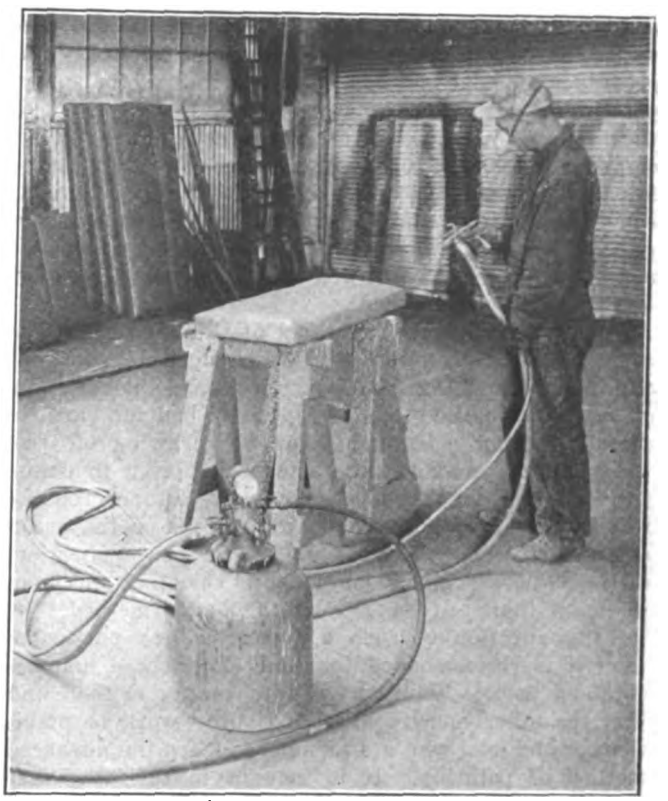


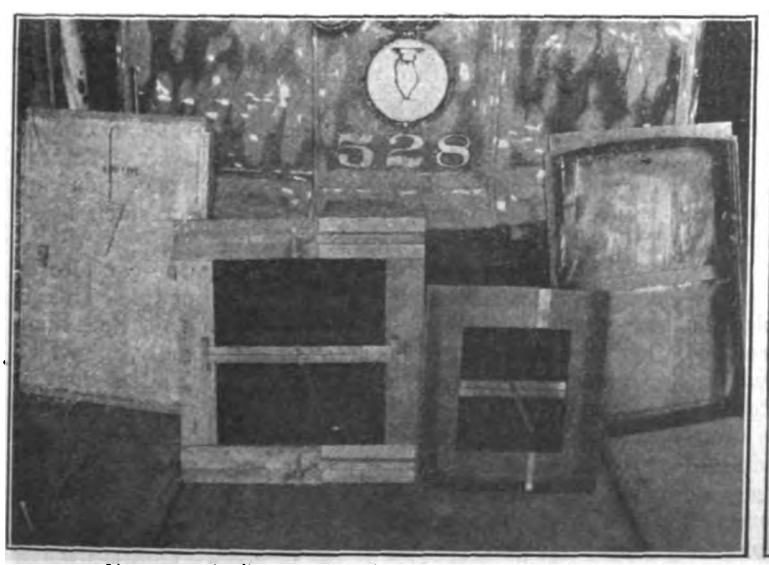


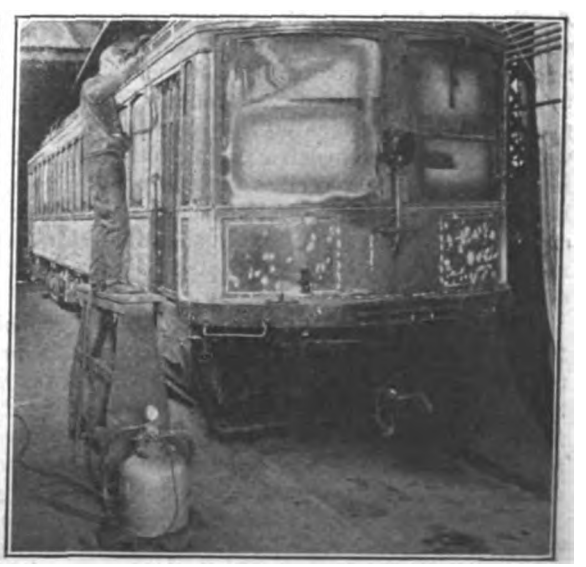
At Left—Varnishing Rattan Seat Backs Inside Car by Spray System. At Right—Method of Varnishing Seat Cushions

fore be two hours maximum for one coat of paint. To enamel the headlining a special guard to cover the molding and deck sash was constructed. For spraying seat backs and inside of the car with the tan-colored enamel, sheet-iron guards were made for the varnish woodwork of car sides. To spray the seat frames, which operation is accomplished outside of the car, it was found necessary to inclose the seat back in a sheet-iron covering of special design. The secret of the use of this method lies in the proper protection of the parts which are not to be covered with the particular coat being applied. Little concern is felt for the fact that a drop of paint of one particular color falls upon a portion of the car or seat which is later to be covered with a different color. In overcoming this difficulty as well as cases where oil or grease may be encountered, the spray method covers in a very satisfactory manner.

The advisability of installing the necessary paint spraying equipment developed into a problem of determining whether the money saved in painting labor balances favorably the fixed charges and operating costs of the necessary spray equipment and facilities combined with the increased amount of material used.

From accurate stop-watch time study observations made in connection with the premium system of wage payment used in the shop, it is estimated that 21,000 hours saving is effected yearly by the use of "spray" method of painting cars. At 60 cents per hour, which is low for this type of labor, the labor saving in dollars





At the Left, Special Guards Used in Window Openings. At the Right, in Painting Outside of Car the Windows Are Protected by Special Paste

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and cents should fall between $12,000 and $13,000 per year. The additional capital investment necessary to provide equipment and inclosure to permit of the spray painting of cars approximates $3,000. Deducting fixed charges, etc., it leaves an estimated net annual saving of about $9,000 to $10,000, which sum more than justifies the change to the spray method. The reduction in time necessary to have the cars in the paint shop relieves somewhat the crowded conditions the department was burdened with and is an argument in favor of this particular method.

One of the important features of this method is the correct regulation of the air, which must be continually in good condition. Moisture will spoil the evenness of the color coatings and is especially bad for varnish coats. Cooling coils and traps for drawing off the water have proved so satisfactory that even in damp weather little trouble is encountered. Proper regulation of the spray nozzle and air pressure on the paint reservoir is easily learned, and the proper application of the paint will give a job which is smoother and finer in finish than can be had by the brush method. In the inauguration of such a system in any particular shop it is recommended that one experienced man be obtained who is familiar with the spray method and that the other men required for spray work be ambitious young men who are anxious to learn the advanced method of painting. It is thought in this way that greater satisfaction will be obtained than where old painters are forced to use this method. There will always be a certain amount of hand-brush painting required to keep those regular employees who cannot change to the new method. In expanding the painting program the air spray will take the place of a number of new men and will materially assist in doing more work with the same number of men.

City Zoning Limits Congestion

Restrictions on Building Construction and Use Promote General Community Welfare and Tend Toward Decentralization—Careful Zoning Improves Local Transportation—Recommended for Providence, R. I.

ZONING, according to a recent report by Robert Whitten to the joint standing committee on ordinances of the city of Providence, R. I., consists in action by a community, through the enactment of an ordinance, to regulate the use of all real property in the city for the promotion of health, safety, prosperity and the general welfare. A comprehensive zoning plan divides the city into districts and prescribes the appropriate uses, building heights and yard and intensity requirements for each district. It prohibits business and industry in residence districts and prohibits industry in business districts.

With the entire city divided into districts in which the future development is fixed, a surer basis is provided for the determination of traffic streets, roadway widths, types of street paving, etc. The cleaning of streets is facilitated and the hazard of fire is reduced. By assuring the permanency and integrity of the character of districts, zoning conserves the value of buildings and land, preserves taxable values, promotes convenience, comfort, contentment and a more attractive environment in residence districts and maintains and protects the home and civic welfare.

Congestion is one of the most vital and difficult problems confronting cities at the present time—street congestion, transit congestion, land overcrowding and the congestion of population. Zoning can make a very great contribution to the reduction or prevention of these congestion evils. In the first place, zoning and regional planning can do much to lessen the increasing concentration of business and industry in the central part of the city. This concentration means increased traffic, transit and housing congestion.

Decentralization of Business and Industry Desirable

A movement toward the decentralization of business and industry can be furthered by careful zoning. The heavier industries naturally move out as land values near the center increase and opportunity for expansion is blocked. But the place of the large plant is usually taken by a number of light manufacturing establishments having several times as many employees as the former plant, thus adding greatly to transit and housing congestion. The spreading out of the industries and the establishment of industrial centers in suburban sections can be promoted by zoning. Zoning regulations can also promote the development of important subcenters that will take care of much of the business that would otherwise increase congestion in the central area. Zoning can further decentralization:

1. By providing in the zoning plan for large business districts around a number of the most important traffic and focal points throughout the city.
2. By providing for local or suburban industrial centers and for the extension of the industrial areas far out into the suburbs along most of the railroad lines.
3. By limiting the expansion of the central business and industrial areas, and thus tending to crowd out business and industries that can be more economically and appropriately located away from the main business, traffic and high value center.
4. By limiting the height of buildings in the central business and industrial area. This limits expansion vertically and has to a slight degree at least the same effect as the limitation of expansion horizontally, above referred to.

The decentralization of business and industry, as above outlined, is also essential in order to prevent the congestion of population in the residence sections adjacent to the central area. Employees working long hours at low wages can afford neither the time nor the money to live far from their work. In New York City it has been shown that a very large proportion of such employees will live within walking distance of their work, even though this necessitates their living in the most congested and unwholesome quarters. The movement of industries and places of business away from the center will make it easier to prevent congestion and secure better housing conditions in the residence sections adjacent to the central area.

The problem of congestion of population can also be directly attacked under a zoning ordinance. This is accomplished through the requirement of a certain number of square feet of lot area for each family, for which a tenement is arranged. Without such control there is a continual tendency in tenement construction to increase the number of stories and families and to decrease the size of rooms and the number of rooms per family. Congestion breeds congestion. Under a zoning plan, congested conditions already existing in any section of the city cannot be helped, but the extension of such conditions to other areas can and should be prevented.

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Safety Pays Men Real Money

West Penn Railways, in Drive for Reduction of Accidents, Inaugurates Team Rivalry Among Trainmen, with Prizes Quarterly—Cash Awards Are Also Paid Individuals on Scale Increasing with Length of Clear Record—Bonus May Amount to $150 a Year

A SYSTEMATIC drive is being made for the reduction of accidents on the West Penn Railways. While this road has had an excellent accident record in the past, the management has felt that it could be bettered and, beginning with the first of the current year, has inaugurated an intensive campaign for the elimination of every possible accident.

Two plans have been worked out for the reduction of accidents, under the leadership of Daniel Durie, general superintendent of Territory "A," with headquarters at Connellsville, and Joseph Black, general superintendent of Territory "B," with headquarters at New Kensington. One is a contest between teams and the other is an individual campaign with a cash reward, with increasing payments depending on the length of immunity from accident.

The West Penn Railways operates some 200 miles of interurban railway lines in the Connellsville coke region and in the Allegheny Valley. The lines are largely on private right-of-way and the cars run at fairly high speeds, although the grades are heavy on some of the divisions and the curves are sharp.

Contest Between Teams Induces Rivalry

The first plan, which has been in effect since the first of the year, is a contest among the trainmen, who are all enrolled in the competition. The trainmen in each operating division of the road have been placed in groups of from twelve to eighteen men, so as to have the number in each group as near alike as possible. In order to prevent any charge of favoritism in making up the teams they have been picked arbitrarily. In the Connellsville division, for instance, three teams were made up from the fifty-three trainmen by first allotting the motormen in alphabetical order to the three groups. The conductors were then placed on the same teams with their motormen, while the extra men and the one-man car operators were apportioned among the three teams.

Only such accidents were considered in the contest as it was felt the trainmen could prevent. It was not thought advisable to include other incidents that must be reported on the accident record, such as ejections, disturbances on the car and others of similar character. Had they been included it was felt that possibly a conductor might not do his duty to the extent of ejecting a passenger for non-payment of fare. The classification of the accidents that are included as the basis of the contest are as follows:

(a) Collisions with vehicles.
(b) Collisions with persons.
(c) Collisions with animals.
(d) Collisions with electric and motor vehicles.
(e) Collisions with cars.
(f) Cars left track.
(i) Boarding and alighting from moving cars.
(k) Boarding and alighting from stationary cars.
(l) Fell in, on or off car.
(m) Fell off car on curve.

When an accident happens that falls in any one of these classifications it is counted as one point against the crew in charge of the car on which it occurs. The conductor and motorman each takes half the responsibility. When two men from different teams are in charge of a car involved in an accident one-half is charged against each man. In the case of work cars or one-man cars the full accident is charged against the man operating the car.

When an accident report has been turned in and has been classified it is recorded on a large form which is posted in the carhouse. The record of the Connellsville division for the first quarter of 1923 is reproduced as typical. Each accident is denoted on this record by the letter corresponding to the classification under which it falls, as explained previously, being entered in the block for the date of its occurrence. In case men on different teams are involved in one accident, it is shown as two half accidents by the diagonal lines dividing the squares.

At the end of three months the accident record is cast up. The team having the smallest number of accidents charged against it is given its reward in the form of a banquet, at which the men are the guests of the company.

As a result of the posted record, the men are able to compare their standings day by day, so that an intense rivalry has developed among the teams in each division. This is indicated by the fluctuations in the standing of the teams from day to day through the quarter. The first one, for instance, had a perfect record for January and but two accidents during February, while for March it had the high record, with five and one-half accidents. The other teams, while behind in the first month, had relatively better showings in February and March. In several cases men have been transferred from one run to another, and extra men assigned to one team have worked with regular men on other teams, so accordingly some half accidents appear on the record.

Individual Accident Campaign

The second method for the reduction of accidents is entirely independent of the team contest just described, although supplementary to it. This is an individual campaign among the trainmen, which was begun May 1 in order to give an incentive to the individual to prevent accidents, even though the team to which he is assigned in the contest may be at the bottom.

The plan consists of a series of cash rewards paid each man who is able to go through an entire month or longer without an accident. In case his record is clear for one month his account is credited with $1. A second consecutive month without an accident gives him an additional credit of $2, while a third month with no accident gives a further credit of $3. For each successive month in which his record is free from any accident he is given a credit, increasing at the rate of $1 a month, until the tenth month is reached, for

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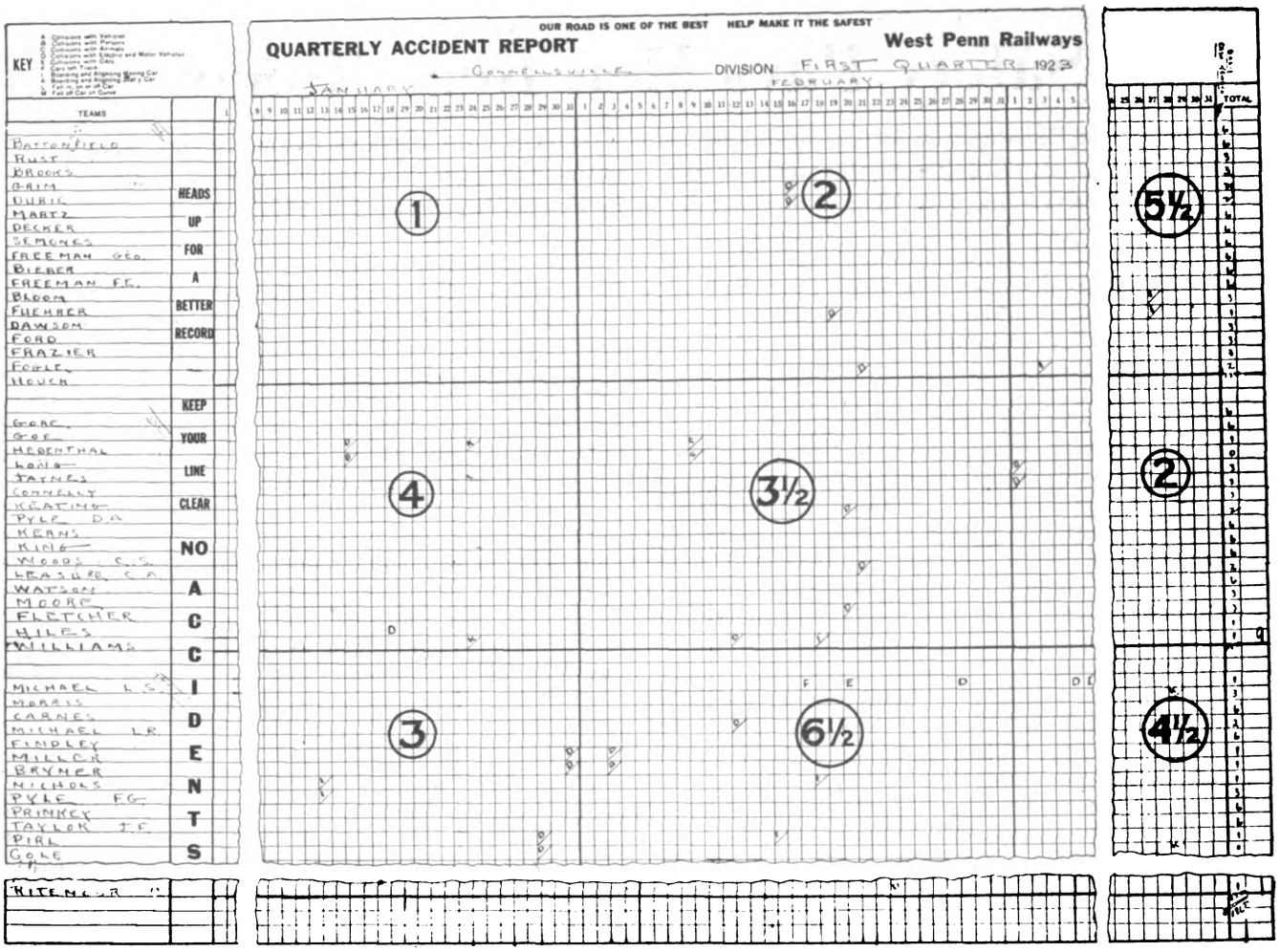

This Record Is Placed on a Bulletin Board in the Division Carhouses, and the Individual Accident Reports Are Posted on It

which the amount will be $10. For each consecutive month thereafter in which his accident record is clear he will get a credit of $10.

In order to have a sufficient amount of money accumulated that it will mean something worth while to the individual, settlement is made quarterly instead of monthly. That is, when a man has gone through the first three months without an accident he is paid $6. If he continues through the next three months without an accident his payment is $15. At the end of the ninth month with a clear record he gets $24 for the third quarter. At the completion of the twelfth consecutive month free from accidents the amount due for the fourth quarter would be $30, but in addition a cash prize of $25 is included for the full year with a perfect record, making a total payment of $55. Each man who goes through an entire year without an accident thus gets a cash reward of $100 for his accomplishment.

If the same man should continue through a second year with a clear accident record he would get $30 at the end of each quarterly period, but at the end of the twenty-fourth month he would be entitled to an extra $30 for completing a second accidentless year, making a total payment for this year of $150. It is planned to follow the same schedule of payments for each subsequent year a trainman has a clear accident record.

When a man has an accident charged against him he automatically loses his standing, but is paid according to the schedule for all previous months during which he had a clear record. Then he has to begin all over again, starting with the $1 payment for his first clear month and working up as before.

For consideration as a full month, a regular man has to work a total of 225 hours, and an extra man 200 hours. Most of the men, however, work nearly every day on the cars. If a man is off duty a part of the month and has no accidents during the time he is at work that month is dropped out of the calculation and the record is continued with the next full month.

These two methods of accident prevention have not only developed a spirit of rivalry among the men, but have made them exceedingly careful to avoid unsafe practices. There was some fear before the contest was begun that there would be a tendency to neglect in the reporting of accidents, but this has not been borne out in practice. There are too many chances that the "blind" accident may become known if a claim is filed against the company for the trainman to risk his own and his team's record by neglecting to report an accident. It is found that the company gets better accident reports now than formerly, and that in addition all accidents are investigated.

Shops and Other Departments Enlisted

First-aid teams also have been recruited among the crews and in the shops. These first-aid crews look over the unsafe practices of the company. They investigate all accidents in the shops and do their best to determine the causes, so that future accidents of the same character may be avoided. This has resulted in the

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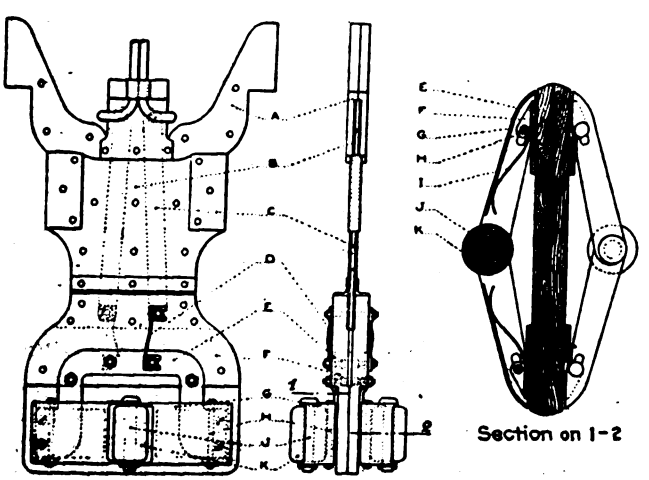
men examining every potential accident breeder in and about the shops. Bad practices of all sorts have been eliminated. Another effect has been that everything in the shop that might be dangerous is well guarded. The men, both on the cars and in other departments, have come to do safe things automatically. Conductors, for instance, help old people on and off the cars. Flagging of railroad crossings now really means something. Whereas in the old days this was merely perfunctory, and gave only a false sense of security, the conductor now looks both ways to see if the track is clear before he signals the motorman to cross. Such things as this indicate that the campaign really has been worth while.

Results of the Campaign

The work which has been done up to date and the results obtained by the men indicate that these contests will cut the number of accidents for this year to about one-half of what they were last year. Serious accidents are reduced, as well as minor ones. It is difficult to give any figures for the cost of the plan or the amount it will save, as the work is just well under way and the results in both accounts depend on continuous freedom from accident. It has been figured, however, that if all the men are free from accident a sufficient number of months to be drawing the maximum reward, the total expenditure on this account will be between one-fourth and one-third the present payments for accidents and damages, while the latter will be reduced to nothing. This of course represents an ideal impossible of attainment in practice, but it goes to indicate that the possible savings to the company are large compared with the cost of the plan.

Novel Conduit Plow Used in Nice

IN A recent article in *L'Industrie des Tramways, Chemins de Fer et Transports Publics Automobiles*, Jacques Schopfer, superintendent of equipment of the Nice, France, tramways, has described a novel form of contact plow for conduit railways which was designed by an employee of his company. This plow has been used successfully in Nice, even with the local conduits in a run-down condition resulting from the war.



Plow for Use on Conduit Railways. Contact Devices Are Rollers Rather than the Shoes Generally Employed

KEY TO LETTERS ON DIAGRAM:
A. Steel ears for use in attaching plow to car.
B. Thin steel plates forming shank.
C. Flat insulated electric conductor.
D. Fuse.
E. Support for roller, bolted to insulating block.
F. Block of wood or fiber supported from shank and carrying rollers.
G. Link for carrying roller.
H. Bearing pin for links, which are slotted near end.
I. Spring for pressing roller against contact bar.
J. Roller axle.
K. Steel roller.

The novel feature is the use of contact rollers in place of the shoes customary in this country. The rollers are mounted on steel links as shown in the diagram, being pressed outward by strong springs. Each roller with its links is mounted on a sheet steel piece of the form shown at *E*, which is bolted on one side of a double insulating block of impregnated wood or fiber *F*. The upper part of the plow is built up of sheet steel, the shank being made of two thin plates separated by a space to accommodate the flat electric conductors.

After a trial of the plows on twenty-five cars for some time, the Nice company decided to install them on all city cars and later to extend their use to all of the rolling stock.

Transfer Abuse Reduced in Boston

Good Results Follow the Introduction of a Type of Transfer Which Has a Time Limit but Requires No Punching by the Conductor

BY J. H. MORAN
General Auditor Boston Elevated Railway

UNTIL recently the transfer used in Boston was similar in general type to that used in a great many cities in this country, but as the number of routes and transfer points increased, this form became more complicated. It was difficult for conductors, no matter how conscientious they might be, to punch the transfers properly, and it was equally difficult for the collecting conductors to make a proper examination of them, particularly during heavy traffic hours and at prepayment stations. A typical transfer of this type is reproduced in the first cut on page 10. A glance will show that there was some foundation to the claim of a newspaper paragrapher who declared that he was using one in his office as a calendar, since it contained everything a calendar did and more as well. To show that the railroad difficulties with this transfer were great it need only be pointed out that four separate punching operations were required before the conductor could properly issue the transfer.

With the increase in traffic and the seating capacity of cars, and later with the introduction of one-man cars, the burden of issuing and checking these transfers naturally became a large one. In its study of this problem the company made a canvass from time to time of the transfers collected at various points. Table I gives a typical example of conditions found to exist. It will be seen that nearly 25 per cent of the transfers received had no time limit and were in effect unrestricted passes.

The actual loss in revenue resulting from such an opportunity for misuse cannot of course be accurately determined. However, the Boston Elevated Railway operates at present approximately 5,000,000 round trips per year on its surface lines, and if only one transfer is fraudulently used on each of these trips, the loss in revenue would be $500,000 a year.

To relieve this situation some means of reducing the defects in the existing transfer system had to be devised. It was plainly evident that a transfer, to be effective, must be one that would combine simplicity

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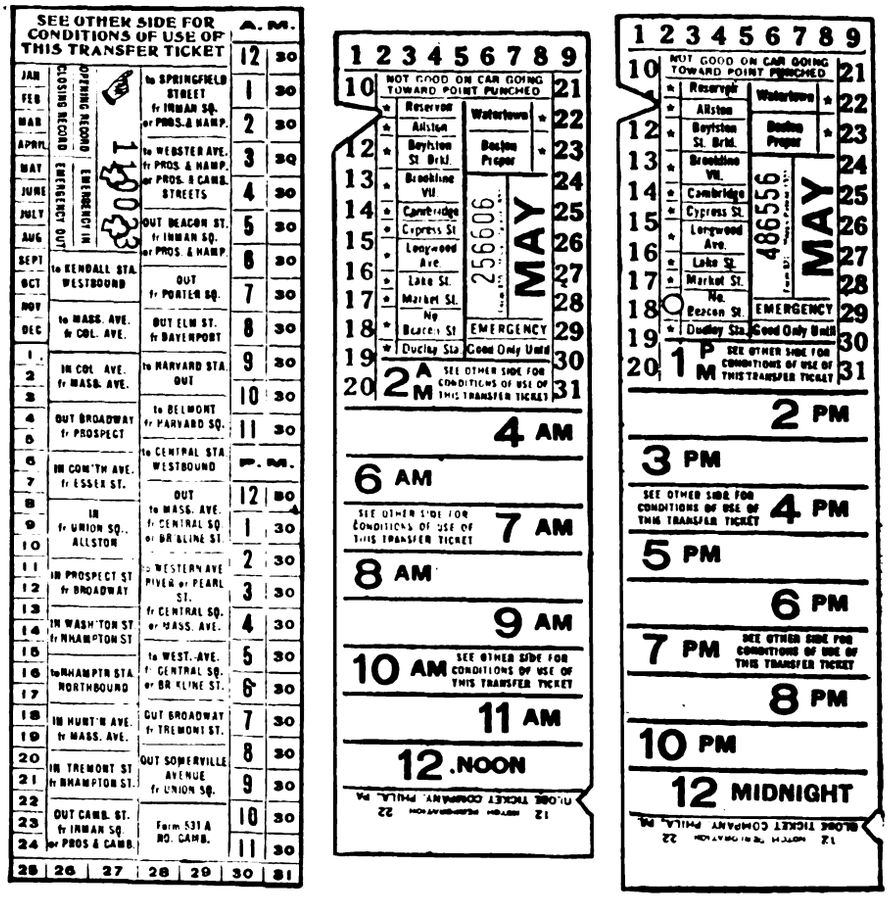
TABLE I—RECORD OF OLD TYPE OF TRANSFERS RECEIVED AT DUDLEY STREET TERMINAL—WEST LOOP—JAN. 5, 1922

Time A.M.		Total Transfers Received	Wrong Date	No Date	Expired Time Limit	No Time Limit
5:15	5:30	...	..	..	..	...
5:30	6:00	3	..	..	..	...
6:00	6:30	5	2	..	..	...
6:30	7:00	16	..	..	..	1
7:00	7:30	38	2	..	1	2
7:30	8:00	33	2	..	1	7
8:00	8:30	38	..	..	..	6
8:30	9:00	77	..	..	..	19
9:00	9:30	13	1	..	..	1
9:30	10:00	36	..	..	1	14
10:00	10:30	54	..	..	1	13
10:30	11:00	28	..	..	..	1
11:00	11:30	22	..	..	..	3
11:30	12:00	35	..	..	..	4
P.M.						
12:00	12:30	25	..	2	..	4
12:30	1:00	33	2	1	2	7
1:00	1:30	16	..	..	2	2
1:30	2:00	73	1	1	..	11
2:00	2:30	33	1	..	1	8
2:30	3:00	59	..	..	1	9
3:00	3:30	64	2	2	3	9
3:30	4:00	72	..	1	1	14
4:00	4:30	78	..	..	3	19
4:30	5:00	75	..	..	2	20
5:00	5:30	165	..	2	1	13
5:30	6:00	114	..	..	5	10
6:00	6:30	69	2	..	7	6
6:30	7:00	68	..	..	2	9
7:00	7:30	98	4	..	11	8
7:30	8:00	77	1	..	5	4
8:00	8:30	65	5	1	..	13
8:30	9:00	63	1	..	3	11
9:00	9:30	41	..	..	..	9
9:30	10:00	51	3	..	9	14
10:00	10:30	35	2	..	..	3
10:30	11:00	45	..	..	..	10
11:00	11:30	25	..	..	1	3
11:30	12:00	44	..	..	..	17
A.M.						
12:00	12:30	20	..	..	1	1
12:30	1:00	64	..	..	..	45
Total.....		1,970	31	10	64	350



At Left, Old Transfer. In Center, New A.M. Transfer. At Right, New P.M. Transfer

of issue with possibility for careful but rapid scrutiny at the time of its collection. With these ends in view, the types of transfer shown in the second and third engravings have been adopted and are now in general use throughout the system.

A distinctive color is used for the A.M. and P.M. transfer in each of the four operating divisions. The month is printed in large type and contrasting color on the face of the transfers, and the date is notched at the station before transfers are issued to the conductors. The time limit is indicated by perforated coupons, and the transfers are stapled at the bottom so that the conductor in issuing tears them off at the proper perforation, leaving on the stub the remainder of the ticket. Before starting on his trip the conductor punches the starting point, so that when issuing the transfer to the passenger no further operation is required than to tear the ticket off at the proper place. These features have made it possible for the conductor or station attendant collecting the transfers to determine readily whether the transfer is valid and is being presented for fare before the expiration of the time limit, since it presents for his examination a ticket varying in size at different hours of the day.

TABLE II—RECORD OF NEW TYPE OF TRANSFERS RECEIVED AT DUDLEY STREET—WEST LOOP—THURSDAY, APRIL 5, 1923

Time A.M.		Total Transfers Received	Wrong Date	No Date	Expired Time Limit	No Time Limit
5:00	6:00	4	..	..	..	...
6:00	7:00	33	..	..	..	...
7:00	8:00	89	..	..	..	...
8:00	9:00	128	2	..	..	...
9:00	10:00	71	..	..	..	...
10:00	11:00	50	1	..	..	...
11:00	12:00	52	..	..	..	...
P.M.						
12:00	1:00	69	..	..	..	...
1:00	2:00	70	..	..	1	...
2:00	3:00	133	2	..	..	...
3:00	4:00	93	1	..	..	...
4:00	5:00	137	1	..	3	...
5:00	6:00	326	..	..	7	...
6:00	7:00	238	..	..	4	...
7:00	8:00	113	2	..	9	...
8:00	9:00	70	1	..	8	...
9:00	10:00	87	1	..	8	...
10:00	11:00	83	..	..	5	...
11:00	12:00	76	..	..	..	...
A.M.						
12:00	12:40	30	..	..	2	...
Total.....		1,952	11	..	47	0

That the adoption of this type of transfer has to a considerable extent resulted in the correction of the widespread opportunity for abuse which previously existed is shown by Table II, which is a tabulation of transfers collected after the new transfer was put in use.

In addition to minimizing the abuse incidental to their use the decrease in the number of forms required under the new type and the elimination of waste brought about by the improved method of dating has resulted in a saving to the Boston Elevated of $25,000 in the cost of printing transfers this year.

The success attending the use of this transfer on the Boston Elevated Railway has come to the attention of other railways and arrangements have already been made for its adoption on other systems.

Tests of Hydraulic-Turbine Draft Tubes

THE UNITED STATES War Department, Corps of Engineers, has recently made a series of tests of the efficiency of draft tubes for hydraulic turbines. The tests were under the direction of Col. Hugh L. Cooper and were made in the I. P. Morris laboratory of the William Cramp & Sons Ship & Engine Building Company, Philadelphia, which was loaned to the War Department for the purpose. The equipment for the tests consisted of a standard model turbine installation of the usual mixed-flow type, the turbine being direct-connected to an Alden dynamometer. A series of different draft tubes was successively inserted, affording a direct comparison of efficiency for different designs. It is understood that a full report will soon be published.

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Carrying Safety to the Public—IX*

The Police Are an Important Factor in Any Safety Program—Methods of Organizing the Traffic Men and Instructing Them Are Discussed—A Traffic Survey Is Also Essential

By C. W. Price

Vice-President in Charge of Public Safety, Elliott Service Company, New York City

THE police force in any community, large or small, constitutes a unique group of citizens which is placed in a strategic position to do more to safeguard the streets than any other like number of persons. In most cities the police are under a constant fire of criticism and attack, and by the majority of citizens are held responsible for many conditions over which they have little control. The fact that the records of accidents in all cities indicate that only a small percentage of accidents happen at or near a point where a traffic officer is located is convincing evidence that the officers are at least endeavoring to do their duty.

The great majority of citizens do not appreciate the fact that in the last analysis the traffic officers on the streets are able to regulate traffic and to enforce the laws only in so far as, first, public opinion will allow them to enforce the laws, and, second, only in so far as the people will back them up in the enforcement of the law. In other words, the police are merely servants and not masters of the people and do only what the majority of the people want them to do. In every city where, through a safety campaign, public sentiment has been awakened on safety there has followed immediately an improved law enforcement by the police.

In the initial stages of organizing an accident prevention movement it is essential that the chief of police and the chief of traffic should be given recognition and places on the executive committee. They should be made to feel that the police force is to play an important part in the safety campaign, and that the safety council proposes to back the department in its efforts to enforce the law. In the publicity campaign every opportunity should be utilized to express proper recognition and appreciation of the efforts of the police department. This will help to counteract unfair criticism and to encourage the department to co-operate wholeheartedly in the campaign. The following has proved to be a most successful method of reaching quickly all of the members of the police force and securing their intelligent co-operation. Through the chief of police arrangements should be made for a ten or fifteen-minute safety program in each of the police stations at rollcall once a month. At these meetings the chief should speak and should urge his men to go the limit in enforcing the law. A representative of the safety council also should speak and emphasize the following:

A community-wide education campaign is the only solution of the accident problem.

The scope and purpose of the campaign that is under way.

The campaign is backed by the best citizens and the co-operation of all the civic agencies has been secured.

The success of the campaign will mean a changed attitude on the part of the public toward the police officers. The police officers will come to be respected as useful servants of the people, and the backing of public opinion will make their work much easier and more pleasant.

*Ninth of a series of ten articles.

The Traffic Police Are a Vital Factor in the Work of Accident Prevention

In a number of cities the safety council has offered a gold medal for the police officer who did the most heroic act during the year in saving human life. The presentation of the medal is made a public occasion and the presentation is made by the Mayor with a brief address reciting the heroic deed which merited the medal. This, of course, offers a good story for publicity in which an encouraging word of recognition of the work of the police department properly can be spoken. During the Safety Week campaign each policeman should wear a button on which is inscribed, "We are helping to make —— (the name of the city) safe." The police should also be given a prominent place in the safety parade.

The safety council can render a valuable service to the police department by furnishing information from time to time in regard to what the police departments in other cities are doing to promote safety. The chief of police will always appreciate help of this kind.

Detroit furnishes a good example of the service which a police department can render in promoting public safety. Not only has the police department co-operated with the safety council, automobile club and other or-

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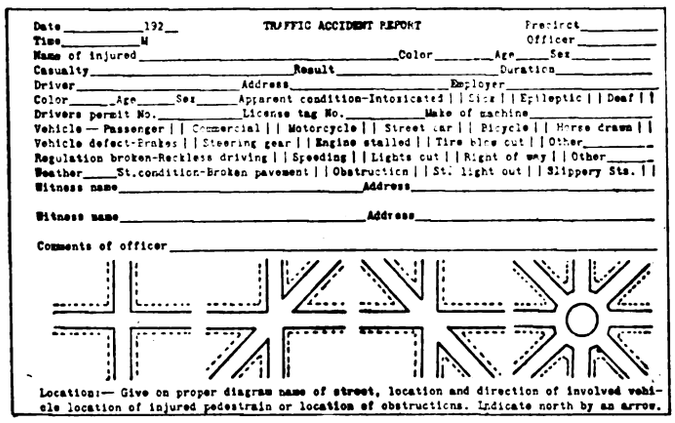
ganizations which have united in a great community effort, but the police commissioner, Dr. J. W. Inches, has been one of the leaders in the safety campaign since its inception. Through his leadership the police department has worked in the closest co-operation with the schools in promoting safety among the children. The department has distributed hundreds of thousands of pieces of safety literature; has installed an efficient block system with towers, flashlights and bells at the street intersections; has established an accident bureau with twenty trained traffic men, who, the moment an accident occurs, immediately go to the scene and ascertain the cause of and the responsibility for the accident. The police department has established a light testing laboratory which gives free service, and has done some pioneer work in developing better parking conditions, in laying out one-way streets and in installing safety islands, beacon lights and other safety devices at important street intersections.

In most cities the records of the police department furnish the most reliable source of information regarding the accident experience. However, in many cities there is a lamentable lack of adequate statistical information regarding causes of accidents. Just as it was true in accident prevention work in industries that the proper analysis of the accident experience by causes was absolutely indispensable to any intelligent and constructive effort toward prevention, so it is equally true that in an organized community effort to prevent public accidents it is necessary each month to have a complete analysis of the accident experience of the previous month. In making this analysis, this one point should be kept in mind: the figures should always point to the remedy. For instance, in a given case where a child was killed, you need to know that the child was killed by a truck; that it was killed while chasing a ball into the street; that the child was a boy five years of age; that it was 8 o'clock in the evening and dusk; that the street was slippery, and that it was not the fault of the driver.

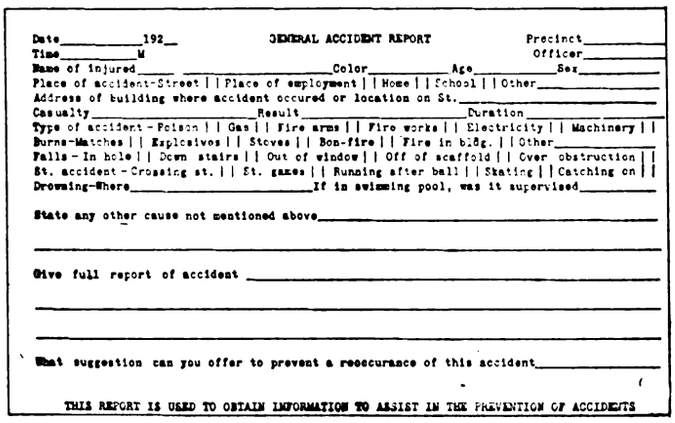
For instance, how illuminating is the analysis made by Dr. E. George Payne of the accident experience in St. Louis. He found that there were four principal causes of accidents to children on the street: Dashing out into the street after a ball, catching onto motor vehicles or street cars, playing in the street and crossing the street without looking to the left or right. With this information in hand, the mother or the teacher can instruct and train the children much more intelligently because their efforts can be concentrated upon these four causes.

An analysis of the accident experience in New York city in 1922 revealed that 85 per cent of the deaths on the street occurred at other points than at street intersections. A study made of the accident experience in the State of Connecticut for 1922 established that 91 per cent of the accidental deaths on the streets and highways were due to "jaywalking." These two facts instantly dispel a lot of the loose talk about its being "up to the police," and point unmistakably to the need of an educational campaign which will reach the individual pedestrian and the individual driver, and make them appreciate their responsibility in safeguarding their own lives and the lives of others.

On this page is shown the report form prepared by W. Graham Cole, secretary Washington Safety Council, and recommended for use by the police department in obtaining accurate information to serve as a guide in the prevention of accidents. This form includes every item that is needed by the Safety Council in promoting educational safety and in suggesting traffic regulations. The form is convenient for use by the policeman because it calls for the minimum amount of writing, practically all of the items needing only to be checked. The forms used by the policeman are printed on paper, and these are copied on cardboard duplicates which become a part of the permanent file in the police department. At the end of each month it is a simple matter to tabulate on a form the entire accident experience of the previous month.



Date_____192__ TRAFFIC ACCIDENT REPORT Precinct_____
Time_____M Officer_____
Name of injured_____Color_____Age_____Sex_____
Casualty_____Result_____Duration_____
Driver_____Address_____Employer_____
Color_____Age_____Sex_____Apparent condition-Intoxicated | | Sick | | Epileptic | | Deaf | |
Drivers permit No._____License tag No._____Make of machine_____
Vehicle — Passenger | | Commercial | | Motorcycle | | Street car | | Bicycle | | Horse drawn | |
Vehicle defect-Brakes | | Steering gear | | Engine stalled | | Tire blow out | | Other_____
Regulation broken-Reckless driving | | Speeding | | Lights out | | Right of way | | Other_____
Weather_____St.condition-Broken pavement | | Obstruction | | St. light out | | Slippery Sts. | |
Witness name_____Address_____
Witness name_____Address_____
Comments of officer_____
Location:— Give on proper diagram name of street, location and direction of involved vehicle location of injured pedestrain or location of obstructions. Indicate north by an arrow.



Date_____192__ GENERAL ACCIDENT REPORT Precinct_____
Time_____M Officer_____
Name of injured_____Color_____Age_____Sex_____
Place of accident-Street | | Place of employment | | Home | | School | | Other_____
Address of building where accident occured or location on St._____
Casualty_____Result_____Duration_____
Type of accident - Poison | | Gas | | Fire arms | | Fire works | | Electricity | | Machinery | |
Burns-Matches | | Explosives | | Stoves | | Bon-fire | | Fire in bldg. | | Other_____
Falls - In hole | | Down stairs | | Out of window | | Off of scaffold | | Over obstruction | |
St. accident - Crossing st. | | St. games | | Running after ball | | Skating | | Catching on | |
Drowning-Where_____If in swimming pool, was it supervised_____
State any other cause not mentioned above_____
Give full report of accident_____
What suggestion can you offer to prevent a reoccurance of this accident_____
THIS REPORT IS USED TO OBTAIN INFORMATION TO ASSIST IN THE PREVENTION OF ACCIDENTS

Front and Reverse Sides of Form for Reporting Accidents. This Form, Carried by the Policeman, Is Designed to Provide Full Information with a Minimum of Writing

In most cities a revision of traffic regulations is either under way or is contemplated. The analysis of accident experience, covering a period of one or more years, will furnish invaluable data on which to base new traffic regulations. As suggested in previous articles, this analysis of accident experience should be given wide publicity in the newspapers, should be placed in the hands of all teachers and presidents of women's clubs, and should be used in the school for drivers and in the school for foremen.

In line with this consideration of the need of complete information in regard to accident experience should also be mentioned the need of a traffic survey by some one who has the education and experience to make it. The profession of traffic engineering is as yet in its infancy. Only in a few cities has there been any attempt to make scientifically a thoroughgoing survey of the traffic situation. Just as it is true that a complete

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analysis of accident experience is indispensable, so is it true that a thoroughgoing and scientific study both of the physical conditions on the streets and of the movement of traffic must be made before it will be possible to work out a final solution of the traffic problem. For instance, one of the most pressing questions in the average city is that of diverting heavy traffic away from the more congested sections. Before this can be answered it will be necessary to make a very careful study of the movements of heavy traffic, the starting points and the destinations, and so to reroute that not only will it cause a minimum of inconvenience, but that in general the movement of all traffic will be facilitated. In this connection a rerouting of the street cars may sometimes be made to reduce the congestion at some of the most dangerous intersections.

The problems of parking, of one-way streets, installing beacon lights, iron policemen or other devices at street intersections properly to direct the traffic, all call for not only a careful but a scientific study before any satisfactory solution can be offered. The recommendations of the police departments and others in many cities for changes in traffic regulations or improvements in street conditions many times have failed to be adopted, or when adopted have not secured the support of the public, because the recommendations were not based upon a careful study of conditions. In many cities the people are alarmed because of the increase in accidents, and all sorts of half-baked remedies are being offered. It is highly important that the officers of the safety council should endeavor to call a halt on all of these sporadic efforts at reform and to insist, before any steps are taken to remedy the situation, that an intelligent and thoroughgoing effort be made to get at the facts regarding the accident experience, the street conditions and the movement of traffic.

Making Daily Service Reports Accurate

New Methods Will Be Tried for Checking Headways, and New Forms Used for Tabulating Delays and Gaps

EVERY electric railway keeps some sort of record of delays and interruptions to service. In the case of a street railway operating numerous lines on short headways, it becomes a rather complicated matter to secure complete and accurate information concerning the service, and to present it quickly and in a convenient form. One large company in the East has just finished a careful study of this problem, and has made extensive changes in the methods of collecting and tabulating such information.

A general impression among the officials of the railway in question had existed for a long time prior to the change that the daily car service reports were not entirely accurate and adequate. As an initial step toward improvement, it was decided to find out exactly how bad the situation was. Two Nachod headway recorders which had been installed, one on each of two important city lines, were utilized in the work. The daily recorder charts showing the exact time every car passed the instrument were preserved for a month and a list was prepared from them of all interruptions to service greater by five minutes than the scheduled headway. This list was then compared with the daily car service reports which were supposed to explain all gaps of five minutes over headway, to determine what proportion of the actual number of gaps were shown on the latter and to see how well the cause was explained in each case.

The only uncertain element that entered into the question was due to the fact that it is not possible with the

DAILY REPORT OF INTERRUPTIONS TO CAR SERVICE MON DAY

MARKET ST. CAR HOUSE FOR 24 HOURS FROM 12:01 A. M. April 1 TO 12:01 A. M. April 2 1923

LINE	TIME OF GAP From	TIME OF GAP To	LOCATION REPORTED	CAUSE	TIME OF DELAY From	TIME OF DELAY To	PLACE WHERE DELAY OCCURRED	DIRECTION	CAR No.
	AM	AM			AM	AM			
Broadway	710	721	B'way & Bridge	Wire down	708	715	B'way & 22nd	W	7007
"	809	817	" " "	Crip. Car	809	817	" & Bridge	E	7086
"	1046	1056	" " "	Auto stalled	1043	1051	" & 19th	W	7002
	PM	PM			PM	PM			
"	254	317	" " "	Fire – Cars rerouted via Park Ave.	253	315	B'way & Washington	E & W	
"	511	519	" " "	Congestion-Main St.				E	7101
"	930	946	" " "	Accident	919	935	B'way & 33rd	W	8067

SIGNED: John Smith DAY DEPOT MASTER
Wm Brown NIGHT DEPOT MASTER

STANDARD ABBREVIATIONS

N for North: S for South: E for East: W for West: P. O. for Pull-Out: P. I. for Pull-In: T. B. for Turnback: CRIP. for Crippled: O. T. for On Time: — for Late: + for Ahead: T. O. for Turn Out: SIG. for Signal: O. O. for Out of Order.

New Form Designed to Facilitate Preparation of Reports of Car Delays or Interruptions to Schedule

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Nachod headway recorder to identify the individual cars. The passage of a sand car may be mistaken for the passage of a regular passenger car. But an interval in which no cars whatever pass, on the other hand, can mean only an actual interruption to service. By the use of such a mechanical recording device the chance of human error is eliminated. Inasmuch as the purpose of the investigation was only to make a comparison of the actual gaps with those reported by the carhouses, and not to compare the service with the schedule, the instrument was well suited to the work.

At the end of the month it was found that approximately one-third of the gaps were thoroughly explained, one-third were more or less admitted but only vaguely explained, and one-third were not mentioned at all in the daily car service reports. It was therefore evident that the reports as then prepared possessed little value. The principal reason why the records did not explain more exactly the irregularities of operation during the period of the test seemed to be that there was no comprehensive system of reporting gaps and delays to the various carhouses.

These reports were made sometimes verbally, sometimes by telephone, and sometimes in writing. They were made either by the car crew or by a street inspector, or by both. The amount and accuracy of the information given depended upon the individual. Either the station master, an inspector, or a clerk, received and noted the report. After midnight a summary of the interruptions to service during the day was telephoned from each carhouse to the general office, where it was typewritten. Thus there were many chances for errors to occur, not only of commission but also of omission, and the investigation showed that as a matter of fact they were occurring very frequently.

Real Purpose Is to Show Gaps

As a first step in the direction of better daily car service reports, it was essential that the real purpose of the reports should be thoroughly understood. Confusion had existed as to whether they were "delay" reports, or "gap" reports. Some carhouses were habitually noting a situation where all cars were delayed by general conditions and were running several minutes behind schedule, although the headway between any two cars was about right. Other carhouses took note only of the actual gaps. It was immediately decided that the primary object should be to record interruptions to service. Delays that caused no gaps on the line were ruled out of the picture.

It became clear, as a consequence of this decision, that an efficient method of checking headways would have to be devised. While it may be possible to get an accurate report from trainmen of all serious delays, no motorman with the best intentions in the world can always tell exactly how long a headway he has. An accurate headway check can be made only by observation at a fixed point. A strategic point was chosen where each line was to be checked for twenty-four hours a day. By locating the checking point at the carhouse in some cases, and in other cases at an intersection where there was already a street inspector on duty, it was possible without greatly increasing the personnel to arrange for all lines to be checked. The responsibility of the checker is to include not only an accurate headway record but also a comprehensive explanation of the reasons for all interruptions to service.

Careful thought was given to the preparation of a suitable printed form upon which to summarize the reports of the individual lines, as it would be quite useless to make strenuous efforts to gather the information fully and accurately, unless provision were made also for presenting it quickly and clearly. It was believed that the following items were the most important: Time and duration of gap; location where reported; cause; time and duration of delay, if any; location of delay; direction and car number.

A form shown in the accompanying illustration was designed and printed in pads of handy size.

The procedure of preparing the daily car service report is now as follows: The actual headway record taken on the street by the checker is handed in at the carhouse when he goes off duty. The depot master notes on the daily sheet every gap five minutes greater than scheduled headway, together with all pertinent information concerning it. Not all of the columns of the form are necessarily used because a gap may sometimes occur without any actual standing delay. For example, the failure of one car to pull out from the carhouse in its proper place might give the scheduled following car a double headway without there being any delay to that car at all. Similarly, a delay affecting only one car might occur without any corresponding interruption to service if remedial measures were promptly taken. It is not the plan, however, to devote attention to delays that cause no interruption to service.

Each carhouse prepares the daily car service report covering the twenty-four hours from midnight to midnight in triplicate, each copy being of a color different from the others. The forms are filled out shortly before the end of the period, and as soon as the last word has come in from the man on the street, two copies are put into the special railway mail, one for the division superintendent and one for the general superintendent. The reports are on the desks of the officials early the next morning.

The introduction of this system has assured that practically all interruptions to service will be reported, and that an adequate explanation of the cause of each one will accompany the report. Moreover, the convenience of the form increases the likelihood that all the information will be included in the record, and the substitution of mail for telephone has eliminated a fruitful source of error without seriously delaying the hour of presentation of the report.

Long 33,000-Volt Cable in Scotland

A 33,000-VOLT cable, 15½ miles long, has recently been installed on the Clyde Valley System and is used as an interconnection between the Yoker and Clyde Mill power stations near Glasgow. This cable was constructed by the Pirelli General Cable Works, Ltd., a subsidiary of the General Electric Company, Ltd., Southampton.

The cable is three-core, each core being 0.2 sq.in. in cross-sectional area. The cable is paper insulated around individual conductors, with an outside belt of impregnated paper. It is lead-sheathed, compounded jute served, double steel-tape armored, and compounded jute served over all.

Protection against the development of a fault in the cable is provided by the installation of the "G.E.C. biased differential protective system," which automatically cuts out the cable when a fault causes a predetermined percentage difference in current at the two ends.

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Since This Summary of Improvement Suggestions Was Published Six Months Have Passed. How Many Items Can You Now Check Off, and How Does the Number of Blank Squares Compare with Your Standing in January? Only Six Months Remain in Which to Make Your Record for 1923 One of Accomplishment

Proven Improvements Available for Bettering Operation

How many of these economy and betterment measures can you check off ☑ as done? How many can you check off ☒ as thoroughly considered and found not applicable to your conditions? How may blank squares remain to indicate backwardness or to show where your studies should be directed in 1923, if you are to keep pace with progress?

☐ Have you inaugurated a system for the periodic checking of traffic and the rescheduling of cars on all lines, so that service will follow changing traffic, avoiding wasteful car-miles but providing all the transportation that will be bought?

☐ Have your cars been rerouted to better serve traffic as material changes in course of travel have taken place?

☐ Have you discarded the ponderous obsolete cars and substituted the use of light-weight one-man cars in light interurban service?

☐ Are you making full use of one-man safety cars in city service?

☐ Have you entered upon a program of revision of the better existing cars for operation with one man on light interurban and suburban lines and the lighter city lines, utilizing safety devices to improve safeness of such operation and for psychological effect on the public?

☐ Have you substituted modern for ancient motors, saving weight and energy consumption, maintenance expense and road delays?

☐ Are you using a modern fare collection system with approved fare box and a modern system of fares, eliminating a lot of ticket printing costs and accounting expense?

☐ Have you gone after freight business, including through service with other lines?

☐ Have you looked into the possibilities of hauling livestock?

☐ Are you using modern turbine equipment in your power plants, or are you retaining obsolete prime movers, reciprocating engines, or early type turbines, dissipating profits in wasted heat units?

☐ Have you modernized your generating plant by the installation of economical auxiliary equipment, metering devices and automatic control and test equipment?

☐ Have you begun the installation of automatic substation control to reduce labor charges, save energy and free the system from possibility of shutdown on strike of a handful of men?

☐ Have you given your line materials the same careful attention that you have rolling stock, track and power system? Many improvements in line materials and construction have been made which increase the life of the overhead and decrease the work and number of trouble crews.

☐ Are you utilizing modern steel poles in the cities for economy, permanence and appearance?

☐ Have you substituted machines for hand work and saved labor costs to the great extent possible in the track department?

☐ Are you using the highest development in special trackwork to reduce the maintenance charges on both track and cars?

☐ Are you utilizing substitute ties where they would decrease the first cost and possibly extend the life of new and rebuilt track in paved streets?

☐ Are you using electric welding in connection with trackwork maintenance, but not carrying the welding to the point that it is more expensive than replacements?

☐ Are you employing the latest developments in rail joints?

☐ Have you substituted modern machine tools for obsolete tools, and improved methods in the shop department.

☐ Are you conserving the time of shop labor, of track storage yard labor, and the storeroom help by use of proper material handling equipment?

☐ Are you using an energy-saving device to reduce power bills, maintenance bills, and improve the general handling of cars?

☐ Are you deriving the saving in energy possible from the use of thermostatic control of electric heat in the cars?

☐ Have you looked into the savings possible from inspection of cars on a kilowatt-hour basis, particularly as against a periodic inspection, but also in comparison with inspection on a mileage basis?

☐ Are you utilizing the practice of dipping and baking armatures and field coils to reduce the number of electrical failures?

☐ Have you adopted spray painting, together with a fixed schedule for keeping cars brightly painted for the sales value therein?

☐ Have you gone into the reclamation of oil and waste?

☐ Are you using electric, thermit and gas welding and cutting equipment in the shop to reclaim worn or broken parts?

☐ Are you using closed vestibules to reduce accident expenditures?

☐ Are you using automatic door engines to shorten the standing time?

☐ Have you installed automatic electric switches to facilitate the movement of cars and eliminate the delays that aggravate passengers?

☐ Are you employing train operation to handle rush-hour traffic or all-day traffic on extremely heavy lines, using motor and trailer or multiple-unit cars?

☐ Are you using automatic couplers to save time at the terminals, to reduce maintenance costs on inter-car connections and reduce hazard to trainmen?

☐ Are you using automatic slack adjusters to minimize inspection and brakeshoe wear?

☐ Are your cars cleaned periodically, other than merely swept out at night?

☐ Have you made use of improved metals for bearings in brake rigging and truck parts?

☐ Are you using anti-freeze devices to eliminate pull-ins and delays due to frozen air?

☐ Have you made operation at railroad crossings safer by the installation of trolley guards?

☐ Have you installed signals to protect operation at dangerous points where the view is obstructed; and also where their application would increase schedule speed and reduce car-hour costs?

☐ Have you taken reasonable precautions to avoid damage claims by protecting grade crossings with automatic crossing signals?

☐ Have you minimized your insurance costs and fully protected your property by co-operating with insurance representatives competent and equipped to advise?

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Various Valuation Points Considered

In Its Recent Decision on Value for Rate-Making Purposes of the Philadelphia Rapid Transit Property, the Pennsylvania Commission Expresses an Opinion on Many Disputed Points in Valuation

THE general conclusions of the Public Service Commission of Pennsylvania in the Philadelphia Rapid Transit rate case were published on page 1101 of last week's issue of this paper. The hearing conducted by the commission was not definitely to determine the valuation of the property, but whether the present 7-cent cash fare with four tickets for 25 cents was unreasonable, as charged by the city. Hence the commission did not consider it necessary to determine the exact fair value of the property, but did so sufficiently to find that the present fares are not so high but that they may be continued. Consequently the complaint was dismissed.

Fair Value Is Present Value

The commission first points out the purposes of a valuation for rate making and declares it is clear that what is to be protected by constitutional guarantees against confiscation is the present value of the property. This means, the commission says, its value at the time of the inquiry, or more properly at the time the rates under consideration are to apply. In defense of this opinion the commission quotes approvingly, among other cases, Minnesota rate cases (230 U. S. 352, 454): "The property is held in private ownership, and it is that property and not the original cost of it, of which the owner may not be deprived without due course of law."

In discussing methods, the commission says:

> While original costs and all these elements have proved probative value, the extent to which they are adopted as controlling is dependent upon the light they throw upon the present fair value of the property, as distinguished from the value at the time of its original construction and acquisition or at any intervening period. . . .
>
> Such change of emphasis as the law has shown in dealing with these two principal indices of present value is due necessarily to the very great change brought about by the war in all price and labor conditions, which up to the present time show little if any tendency to return to their former status. While we must be careful not to accept reproduction costs minus proper depreciation as the sole determining factor and must give due consideration to the possibilities of at least some measure of return to former conditions, we do find that in the late decisions substantial weight is accorded to reconstruction costs as an indication of present fair value.

In defense of this position the commission refers to Missouri vs. Southwestern Bell Telephone Company, decided by the United States Supreme Court May 21, 1923, and Bluefield Water Works vs. Public Service Company of West Virginia, decided June 11, 1923, both yet not reported.

The commission finds that the Pennsylvania Supreme Court has also upheld this position and it quotes from the case of Mercersburg, Lehmasters & Markes Electric Company vs. the Public Service Commission (76 Pa. Sup. Ct., 58), including the following paragraph:

> When the Commonwealth, or the duly authorized donee of its power of eminent domain, actually takes over or injures or destroys private property because of public necessity, the measure of damages of the owner of the property is obtained by well-established rules. Among the items of evidence, relevant and useful to enable a jury to measure those damages, it has not been considered that the original cost of the property to the owner could or should be considered of much if of any importance. A man may acquire property by inheritance or by gift, so that it cost him nothing. That fact can scarcely be considered relevant in a proceeding to ascertain its value at the time it was taken, injured or destroyed. So when the Commonwealth, acting through its agent, the Public Service Commission, undertakes to fix a value upon private property for the purpose of ascertaining its just rental or usable value, it seems to us to be plain that too much consideration of the element of original cost is just as likely to mislead an administrative tribunal as a jury.

Cumulative Investment Considered

The city engineers presented data on costs under headings "Original Cost," "Historical Cost" and "Cumulative Investment." As to the first two, the commission declares no extended comment is necessary. Despite the diligence and skill used in compiling these estimates, it was admitted by the experts who presented them that it had been found largely impossible to locate accurate or complete data as to the actual cost of constructing a large part of the property now operated by the company, so that these figures were largely in the nature of estimates of past conditions.

In the third retrospective study, entitled "Cumulative Investment," the engineers compiled data of the money which had flowed into the property by way of capital expenditure through the sale of bonds and from the amount paid in upon capital stock, reaching a total at the time of the argument of slightly more than $131,000,000. While this figure, in the opinion of the commission, doubtless is not mathematically accurate, it does not contain such degree or risk of error when considered as the value of the property as the figures purporting to represent historical or original cost.

At the same time the commission points out that the sale of stock and bonds does not by any means constitute the only sources from which property is built up, as it does not include capital expenditures made out of net earnings. The books of the company and its lessees show a total invested surplus of over $11,000,000, and there may have been additional amounts made in the days when corporate accounting was not an exact science. This basis also does not take into cognizance many intangible items of value, including "going concern value," which is inherent in consolidated and organized properties and which must be given due consideration by a tribunal passing on fair value.

Principal Items in Dispute on Basis of Present Cost of Reproduction

The commission then points out that on a basis of present cost of reproduction the city and the company generally agree in the matter of quantities and unit prices, but there is a difference in position as to the right of the company to include certain items and the basis of estimating others. The principal disputed items are four in number, comprising "paving," "interest during construction," "loss of interest in early years" and "cost of financing." There is also the matter

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of going concern value. These items are considered by the commission as follows:

Paving.—As a condition of the franchises, the company or its predecessors was required to pave from curb to curb the city streets occupied by its lines. In its historical studies the city determined to its own satisfaction that the actual cost of this paving was in excess of $14,000,000. The company claimed for this item of paving nearly $26,000,000, basing its claim upon its estimate of what it would cost at present prices to pay for the present paving upon the streets originally paved by it. In this matter the commission declares the position of the company to be an extreme one, believing that while the enhancement over the original cost of the company's property must be protected, the commission cannot accept the same rule as applied to property in which the company has no useful ownership. In such cases all that the company can claim to have protected is the original investment or price paid for the franchise.

Interest During Construction.—The difference between the company and the city on this item is $6,000,000. The company's estimate is based upon a classification of the property into several groups, assigning to each group a construction period and computing interest on the full cost of each group at the rate of 8 per cent for half the period of construction in each case. The result is a figure for interest during construction amounting to 11.9 per cent of all accounts other than the cost of financing, working capital, development cost and going concern cost. The city's engineer simply submitted an estimate of 10 per cent on the cost of physical items as the probable amount of interest. The commission says it is compelled by the record to give the greater weight to the company's estimate.

Loss of Interest During Early Years.—This item, which represents the "lag" in the development of patronage and earning power, is placed by the company at the equivalent of one full year's interest at 8 per cent, to wit, $15,000,000. It is entirely ignored by the city. The company relies in support of its claims not only on engineering testimony as to probable loss of interest in the early years of the street railway, but also because a constitutional amendment passed in 1915 and dealing with the construction of transit facilities in Philadelphia authorizes the city to capitalize not only the actual cost of construction and interest during the construction period, but also of interest "until the expiration of said period of one year after the completion of said work." The principle was also accepted by the engineering board in the Pittsburgh valuation case. It is approved by the commission, except to say that it is inclined to restrict the interest rate to 7 per cent, and that as the item is really one of the elements of what is commonly termed "going concern value" it must not be duplicated when that question is considered.

Cost of Financing.—The company's estimate of this item was 10 per cent of the entire reproduction costs, exclusive of going concern value. The city's estimate was 5 per cent of reproduction costs. The commission approved 7½ per cent, based on a previous finding, approved by the Superior Court of Pennsylvania in the Ohio Valley Water Company's valuation.

The commission then points out that in view of the discussion on these four disputed items, the city's admitted figure of reproduction costs of $187,000,000 must be very materially increased, certainly to a point substantially upward of $200,000,000.

It then goes on to consider the question of (1) accrued depreciation, which the city claims should be deducted, and (2) going concern value, which the company claims should be added.

Accrued Depreciation

On the matter of accrued depreciation, the city offered no proof that the property is not being currently maintained at a high standard of operating efficiency. On the contrary, as the commission points out later, the city's contention is that too great a portion of the company's revenue is being devoted to this purpose. Hence the commission took up the subject of whether an operating company's property, in a high state of maintenance and efficiency for operation, should be depreciated for rate-making purposes because various physical items which go to make up the property are necessarily in various periods of their service life, although retaining to a full degree their original usefulness. On this point it says:

> With regard to physical items of property not subject to repair and renewal, such as water pipe buried in the ground and with an assumed service life of a certain number of years, there would necessarily have to be applied depreciation in reaching its current value, which in a well-managed property would be offset by a renewal or reserve account set up to take care of the situation. But where composite property is being properly maintained and renewed, so as to be kept at all times in a high state of maintenance, a different question arises. No property can be born overnight, and in a system such as this one, which it would take many years to reproduce, we cannot fairly say on the first day of operation that the property must be drastically depreciated when we ascertain its fair value.

After quoting various Pennsylvania cases applying both small and considerable percentages of depreciation, the commission says that it might be well to consider accrued depreciation and going concern value together, as each is intangible in its nature and difficult of accurate ascertainment. The Pennsylvania courts have made allowances for going value, and as the commission declares that in the present case the evidence establishes a minimum of depreciation and a maximum of going value, the latter substantially offsets the former in any adjustment of figures obtained by physical valuation, so that the net result would be to increase rather than to diminish the physical valuation figure. For this reason, as the commission was not attempting to find the exact value, it did not pursue its discussion further.

Operating Expenses

These also were considered because they gave an index of proper net return. The company submitted a budget for 1923, showing operating revenue $44,736,000, operating expenses $30,868,000, taxes $2,818,000, operating income $11,050,000. To this budget the city offered but two criticisms. The first was by the city engineer in which he claimed that in a period of decreasing cost the allowance for maintenance was $2,500,000 too high, but as there is no indication yet of decreasing costs, the commission found nothing on the record to show that the allowance claimed by the company was excessive. Nevertheless if the company's figure was accepted the commission would expect it to provide a high and strict standard of maintenance.

The other objection raised by the city to the budget was that two items of taxes should be eliminated. The first was the amount paid upon property, the fee ownership of which is in lessor companies, but the commission did not see that the existence of the amount of

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the taxes was affected by the identity of the owner of the property. The other question was in regard to the federal income tax, which the Pennsylvania commission has uniformly excluded from operating costs. In the light of the U. S. Supreme Court decision in Galveston Electric Company vs. City of Galveston (258 U. S. 388, 399), the commission feels now that it is better advised, but adds that the inclusion of these taxes will make no difference in the final result, as the allowable revenue under any valuation set up would be in excess of the amount produced by the present rate of fare. Possibly a different question would arise with respect to the same taxes levied upon the income of the lessor companies, which the lessee undertakes to pay as part of the consideration for the use of the property, but as this would not affect the question at issue, this question was not pursued further.

Other Methods of Judging Reasonableness of Rates

Finally the commission applied other bases to determine the reasonableness of the rates charged in Philadelphia. It found on comparison of Philadelphia with Boston, Cleveland, Detroit, Chicago, St. Louis, Kansas City and Pittsburgh that the service in Philadelphia was faster, more direct and more frequent than in the majority of the other cities, and the present rate of fare was 6.6 cents per revenue passenger, as compared with 7.9 cents in the average of the cities cited. Tested by this standard the rate is not unreasonable or excessive.

It also applied the index figure of the United States Department of Labor for "all commodities" for April, 1923, or "159," to the 5-cent base fare prevailing throughout American cities in 1913, showing that a fare of 7.97 cents would be necessary today in order to equal the purchasing power of 5 cents in 1913. It points out that it is interesting to observe that 7.9 cents is exactly the average fare in the seven cities cited for comparison, although but 6.6 cents is now realized in Philadelphia.

Need of Increased Service

Finally the commission says that perhaps the most important single consideration which it is its duty to weigh in the determination of reasonable rates is the paramount public need of increasing and improving service. At one time there was criticism of the retrenchment policy of the Philadelphia Rapid Transit Company, and for the ten years preceding the inauguration of the case there was little evidence of any tendency toward expansion. There has been a marked change, however, since the establishment of the higher fare, indicated not only in an expansion and improvement of its existing property but in taking over the city built elevated railway to Frankford, involving an operating loss. This the company would have been financially unable to do had it not enjoyed the revenue produced by the present fares. Similarly the company has arranged for the purchase of more than 500 new passenger cars and is planning expansion by additional street railway lines, buses and trackless trolleys. Finally, the city is considering the expenditure of more than $100,000,000 for further high-speed lines and is negotiating with the company to find a basis under which it will undertake the operation of the lines. For these reasons, and wishing, within the limits of its power, to give the city of Philadelphia the best transportation facilities in the country, the commission would be reluctant to make any order that would impair the financial strength of the company upon which devolves so great a portion of this task, unless impelled thereto by the paramount interest and rights of the car rider. Indeed this policy is urged by one of the provisions of the public service commission law, which gives to every public service company the right:

"To participate, to such an extent as may be permitted by the commission, and deemed by the commission wise, for the purpose of encouraging economies, efficiencies or improvements in methods of service, in the additional profits which will be afforded by such economies, efficiencies, or improvements in methods of service."

Such economies and efficiencies, the commission thinks, have been carried out by the company, notably in its plan of co-operation between men and management and in accident prevention work.

Definition of Duties an Essential to Organization

Power and Equipment Division of Connecticut Company Has a Plan that Insures Each Man Knowing Just What He Is Expected to Do

THE Connecticut Company, the headquarters of which are in New Haven, operates city and interurban properties which are scattered over a large area. Together they comprise twelve divisions. Each division is operated with considerable autonomy, but the general departments function for the company as a whole, with subdivisions to correspond to each of the operating divisions.

The power and equipment division operates the company's power house, substations, distribution, shops and carhouses. It is under the charge of P. W. Ripple, who has the title of chief engineer power and equipment. Mr. Ripple has studied the organization of his department with a view to the elimination of lost motion, and as an engineer has found exact definition and the graphical presentation of facts and figures most helpful.

To assist in this work the department has drafted a series of charts covering the functions or duties of the various departments and the heads of these departments. By having these duties carefully defined, the members of the power and equipment staff know just what they are responsible for and they avoid duplication of effort. The purpose of this article is to describe the organization and the organization charts of the department. These are illustrated on the following page. Other data and charts of this department will be made the subject of a subsequent article.

The first chart shows the eight department heads who report to the chief engineer of the power and equipment department, with the duties of these eight departments. In addition to this chart, which applies to the department as a whole, detail charts have been prepared for each of the sub-departments or organization divisions.

Thus, the second illustration shows the chart for the operating barns and shops of the New Haven division, with the master mechanic of that division at the top. Under the present organization of the company, the master mechanic of each division reports on engineering and mechanical subjects to the chief engineer and on

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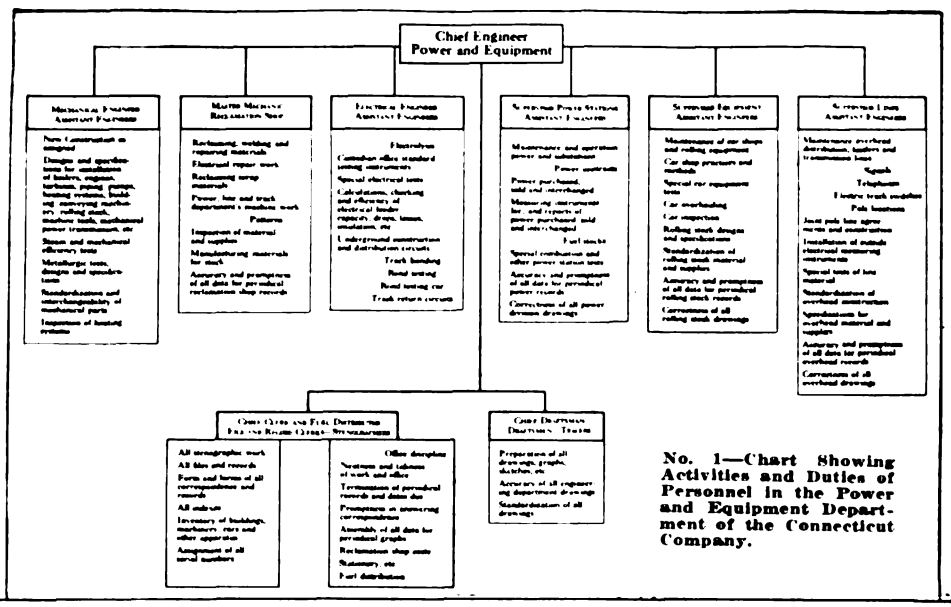
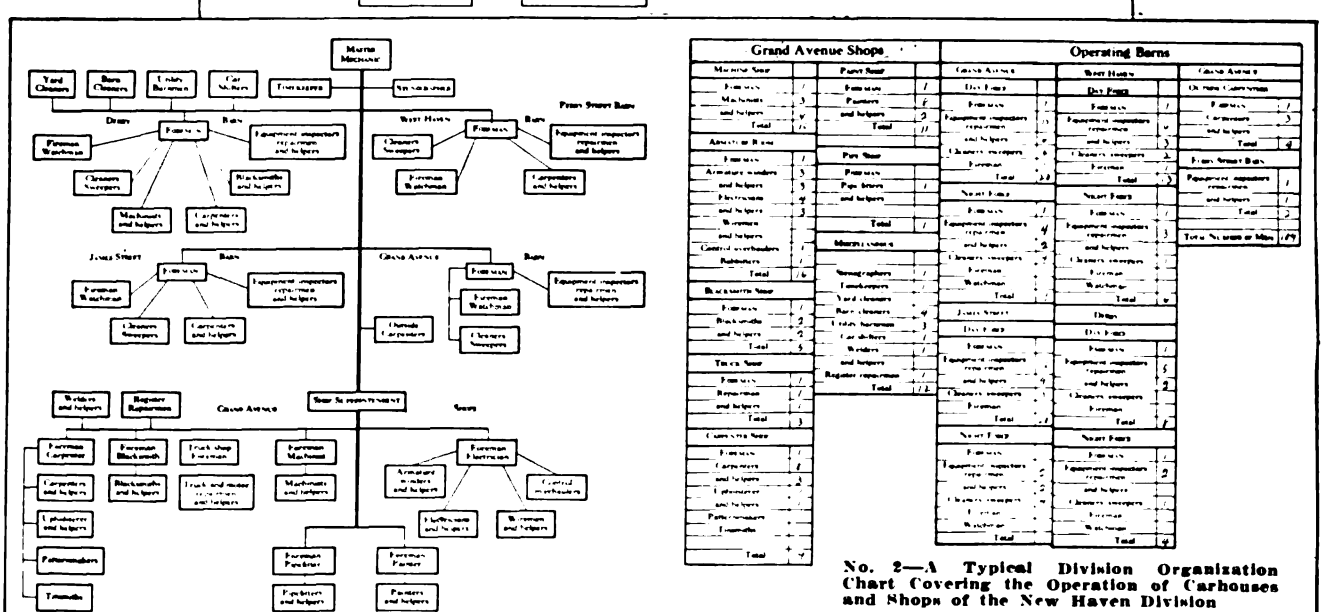
operating matters to the division superintendent and through him to the general manager. It will be noticed that this chart, like the others, showing the organization of a division, carries a list of the number of employees in the division, but the chart is so arranged that these numbers are put in by ink so that no change in the drawing is required to bring it up to date when there is a change in the number of men employed in any division. The number of employees given in the reproduction of this and subsequent charts is of course simply the number at the time that the chart was obtained from the company.

As will be seen, in the New Haven division there are five carhouses or "barns" with one shop, the latter in charge of a shop superintendent. There are similar charts for the other divisions.

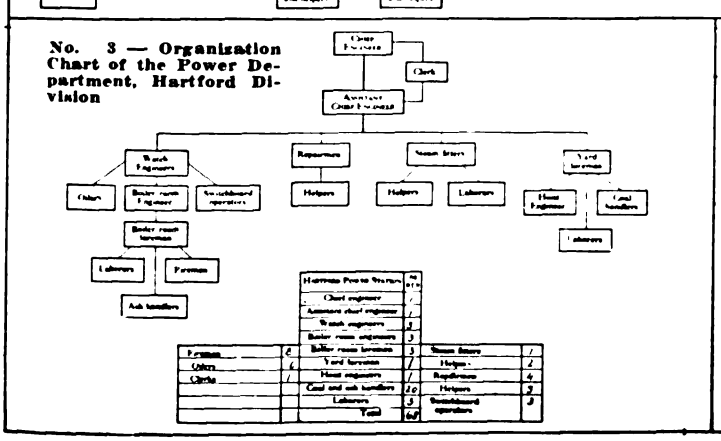
Typical power stations and line department charts are shown in the third and fourth illustrations. The former is for the Hartford division and the latter is for the Bridgeport division.



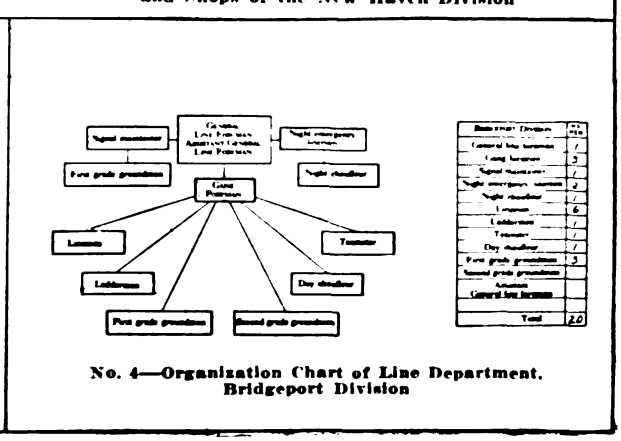
No. 1—Chart Showing Activities and Duties of Personnel in the Power and Equipment Department of the Connecticut Company.



No. 2—A Typical Division Organization Chart Covering the Operation of Carhouses and Shops of the New Haven Division



No. 3 — Organization Chart of the Power Department, Hartford Division



No. 4—Organization Chart of Line Department, Bridgeport Division

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Association News & Discussions

Canadians Discuss Operating Problems

Four-Day Convention of Canadian Electric Railway Association at Toronto Considers Traffic Studies and Motor Performance—Valuation, Standardization and Public Relations Are Discussed—Social Features Assist Greatly in Making a Successful Gathering

THE nineteenth annual convention of the Canadian Electric Railway Association was held June 27 to 30 in the Music Building of the Canadian National Exposition at Toronto, Ont. The convention, which was one of the most successful in the history of the association, was attended by between 200 and 300 members and guests. In the absence of the president, Major F. D. Burpee of Ottawa, the meetings were presided over by H. H. Couzens, vice-president, and he also was toastmaster at the annual banquet Thursday evening. The manufacturers' exhibit, a feature which was inaugurated last year for the first time, was continued this year and proved one of the features of the convention.

Technical sessions were held each morning. On Wednesday the subject matter was confined to a meeting of the executive committee, followed by the presentation of the secretary's and treasurer's reports. The Thursday morning session was confined to a paper by Alexander Jackson, superintendent of time-tables Public Service Railway (N. J.), on "The Operation of a Scientific Survey of Traffic Movements on Urban Railways," abstracted elsewhere in this issue. At Friday's session, W. G. Gordon, railway and traction engineer Canadian General Electric Company, presented a paper entitled "Deciding on the Proper Motor for a Given Cycle of Duty," which will be printed in a later issue. Saturday's session was confined to the presentation of the report of the committee on "valuation, maintenance and depreciation of street railway assets," and the election of officers for the coming year.

A luncheon was given each day at Sunnyside Pavilion, some distance from the convention hall. The members were transported to and from the pavilion through the courtesy of the Toronto Transportation Commission and the White Motor Company. The Transportation Commission furnished two double-deck buses which were taken from service in Toronto and reserved for the use of members and guests. These were augmented by a demonstration bus provided by the White Motor Company.

At the luncheon on Wednesday the report of President Burpee was read in his absence by Mr. Couzens. It was stated that according to the last published government reports the Canadian electric railway industry operates between 5,000 and 6,000 cars on nearly 2,500 miles of track, and the total investment reaches into hundreds of millions of dollars. "During the past decade in Canada there has been a pronounced movement toward public ownership of electric railways," the report stated. "I am glad that our association is big enough and broad enough to include all the electric railways of Canada and that quite a number of the publicly-owned railways have become members. The Toronto Transportation Commission, which, under the management of the vice-president of the association, controls one of the largest Canadian systems, is giving a splendid example of what can be done under public ownership and is rapidly producing here one of the model traction systems on the North American continent."

The luncheon on Thursday was featured by an address of welcome, on behalf of the Mayor of Toronto, by Controller Hiltz. The feature at Friday's luncheon was an address by Sir John Gibson, who recounted some of his early adventures in the development of hydro-electric power in Ontario.

A spirit of optimism pervaded the annual banquet on Thursday evening. After the conventional toast to the King, proposed by Vice-President Couzens, and which was followed by the national anthem, a program of toasts and vocal selections was begun which lasted on toward midnight. In responding to the toast "Canada," proposed by Lt.-Col. G. C. Royce, George Wright of the Toronto Transportation Commission outlined the country's possibilities, the responsibilities of its people and the conditions handed down to them by their ancestors, which he felt should be their guide in meeting their problems. Canada, he declared, is the white man's last prospect. The immigration policy should be such as to keep it a white man's country. Mr. Wright briefly reviewed the potential wealth of the country and stated that he regarded Canada's future to be industrial rather than agricultural.

In proposing the toast to "Our Industry," G. Gordon Gale declared that electric transportation has become the backbone of the community life of cities. C. B. King, London, Ontario, in response, spoke of the development of the electric railway and some of the problems which must be faced by those in charge.

F. A. Gaby, Toronto, proposed the toast "Our Guests," to which response was made by Morris Buck, associate editor ELECTRIC RAILWAY JOURNAL. "The Ladies" was proposed by Hugh Millar, and responded to by Don M. Campbell, Preston. "The Technical Press" was proposed by E. P. Coleman, Hamilton, who paid tribute to Acton Burrows, editor *Canadian Railway and Marine World*. The latter in his response wittily replied, explaining briefly the purpose and work of the technical press.

ENTERTAINMENT FEATURES

Numerous features were provided for the entertainment of the ladies. The trip about the harbor which had been scheduled for Thursday afternoon was cancelled on account of rain, but a visit to the Royal Canadian Yacht Club was made instead, tea being served on the club verandas. On Friday the ladies had a motor trip about the city, with a tea at the Old Mill on the Humber River.

A baseball game was played between the company representatives and the manufacturers, which was called on account of darkness and inability of the players to continue, the final score being Members 7, Manufacturers 3. A dance was held Friday evening at the King Edward Hotel, and it was in every sense an enjoyable affair.

OFFICERS ELECTED

At the Saturday morning session, the report of the nominating committee was received and accepted, the following officers being elected for the ensuing year:

Honorary President, Sir John M. Gibson.

Honorary Vice-President, Acton Burrows.

Honorary Counsel, T. Ahearn, Ottawa; George Kidd, Vancouver; Col. J. E. Hutcheson, Montreal; F. A. Gaby, Toronto.

The active officers are:

President, H. H. Couzens, general manager Toronto Transportation Commission.

Vice-President, D. E. Blair, Montreal.

Treasurer, E. P. Coleman, Hamilton.

Auditor, Lt.-Col. G. C. Royce, Toronto.

The executive committee consists of the president, the vice-president, the immediate past-president (F. D. Burpee, Ottawa), and the following: C. L. Wilson, Toronto; W. S. Hart, Quebec; H. E. Weyman, Levis; G. Gordon Gale, Hull; C. B. King, London; M. W. Kirkwood, Galt; A. W. McLimont,

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Winnipeg; D. W. Houston, Regina; H. K. McLean, St. John, N. B.; W. R. Robertson, Toronto.

Don M. Campbell, representing the manufacturer members, recommended that the next annual meeting of the association be held in Ottawa. The manufacturers also recommended that a permanent secretary be appointed, who would devote at least one-half of the year to association duties, and the other half to attend state conventions, getting such ideas from them as he could. G. Gordon Gale recommended that it would be better to have a combined convention with the other electrical associations. This would give the manufacturers a chance to prepare better exhibits, which would be available to the members of all such associations. It was decided that steps should be taken to see what possibilities exist for co-operation between the different associations leading to a joint convention. On this account no decision was made as to the place for the next convention.

Timely Topics

Prior to the convention a leaflet was circulated among the members containing a number of questions on points connected with transportation and maintenance problems. The time available was so short that only a small amount of discussion was possible. On the question of the advisability of redipping old armatures in dipping varnish, Mr. Robertson said that this is a questionable value, because the maintenance cost of old motors is so high. He said that a careful study frequently will show that it would pay better to scrap the old equipment and buy new on account of the lower maintenance cost and the smaller number of failures. Different methods for dipping armatures were described by Messrs. Weyman, Royce and Blair.

It was decided that the questions listed in the "Timely Topics" should be sent out to the members in the form of a questionnaire, and then should be returned by mail to the secretary.

Discussion on Technical Papers

The discussion on Mr. Jackson's paper was led by N. D. Wilson, engineer on traffic studies of the Toronto Transportation Commission. He agreed with all the main points in the paper, stating that he takes his facts into account and draws his graphs in much the same manner. He illustrated his discussion with some of his charts, pointing out the differences between his method and that of Mr. Jackson, which he stated did not affect the general value of the information. In Toronto, two independent departments make traffic counts. The traffic department takes its counts at the controlling points, where the loads are maximum, making a check on each main route every two weeks and on each minor route every month. The traffic study department handles the outlying areas, making special counts looking toward the end of determining the direction of growth and possible changes in routing. It was pointed out that the graphs do not show where routes should be short-lined. It is Mr. Wilson's impression that this information can be obtained only by personal canvasses.

Mr. Robertson, general superintendent of the Hydro-Electric Railways, stated that on small lines traffic checks are not of such great value as on city systems. He suggested that headway recorders are of great value in checking up schedules on the street.

Mr. Wilson stated that in Toronto the checks are made by two men assigned to each street corner, one man at a time being on from 6 a.m. to midnight. These checkers estimate the passengers as the cars go by. On heavy corners one man can get data for one direction only, taking the time, the car number, the route number, the destination and the number of passengers on board. The field data are totaled in the office by fifteen-minute or half-hour periods. Particular attention is paid to the car number, to get the seating capacity, from which the overload on each car can be determined. Short-lining is not determined from these counts, but riding counts are made by observers stationed on the cars, to determine the number of passengers getting on or off at each stop.

Mr. Couzens stated that Mr. Jackson's paper covered all the principal points in traffic checking, being remarkably complete. He brought out the point that traffic checking paid for itself. One value of the checks is the exploding of various ideas, not only those of citizens but also in other departments of the railway. The checks show at a glance the whole situation, and this information assists greatly in silencing complaints. He does not think that trainmen can get the information to compare with that which can be obtained by a traffic checking department. He states that saving one car on the base schedule is worth some $15,000 to $20,000 a year, which probably will be equal to all the cost of checking traffic for this period.

In summing up the discussion, Mr. Jackson stated that considerable amounts of money are spent by companies to tell where and when the cars should be placed for the public's benefit. He pointed out that it is equally necessary to follow this work up and see that the schedules are actually carried out on the streets.

Standards Committee

The report of the standards committee, G. Gordon Gale chairman, states:

About six years ago the Canadian Engineering Standards Committee (now Association) was formed in Canada, and following this the American Engineering Standards Committee was organized by the national associations of the United States. The newly formed standards committee of this association has found it desirable to follow the practice of the standards committee of the A.E.R.A. In this committee, the C.E.R.A. now has an official medium of co-operation with the standards committee of the A.E.R.A., and with the Canadian Engineering Standards Association.

The secretary of the C.E.S.A. has called upon this committee for representation on sectional committees engaged in drafting standard specifications on the following: Wire strand; signals on highways; overhead crossings. These projects are in various stages of completion.

Public Relations Committee

The committee on public relations, A. W. McLimont, Winnipeg, chairman, reported that its work during the past twelve months has been largely confined to interchange of opinions among the various members. Local conditions must be the governing factor in all public relations work. There are well established and well defined policies for the advancement of good public relations, such as frank and open policy in dealing with the public; proper publicity, backed up by a performance of good service; investing the railway with a personality which makes itself felt in all movements for the public good; systematic and continuous education of employees.

The individual opinions of certain members of the committee, while it is stated that they are not necessarily shared by all, are included. George Kidd, Vancouver, stated: "Where cities are served by private companies, and such cities have grown to a size where they consider the ownership of their own utilities desirable, that the public should be educated to treat the existing company, which has done the pioneer work, fairly, and should buy it out, rather than enter into a campaign of competition, which would be injurious alike to the public and the shareholders. In other words, these companies are not prepared to enter into competition with municipalities, for, as you are aware, such competition is extremely unfair."

W. J. Lynch, Quebec, stated: "It is my opinion that a blanket policy of advertising as regards public relations cannot advantageously be adopted. Moreover, I have found that there is a great deal to be derived from 'leaving well enough alone.' It is my opinion that unless a public utility company has some request to make of some regulatory body and its operations are running along smoothly, it is better to refrain from any policy of publicity, it being most important that public utility officials do their utmost to prevent occurrences that irritate the public, and further, to do all that is possible to promote public relations and good will."

Depreciation and Classification of Accounts

A special committee was appointed at last year's meeting to consider and report on questions of valuation, maintenance, depreciation and classification of accounts. This committee, H. E.

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Weyman, Levis, chairman, reported that it had confined its work to the last two of these topics. At present there are numerous classifications in use in Canada, both by regulatory bodies and the electric railway industry. This necessitates more or less extra work beyond what would be required if a uniform classification were in force. There are two recognized classifications, the Interstate Commerce Commission classification and that of the Canadian Minister of Railways. The committee recommends a uniform Canadian classification to be recognized and adopted by the industry and public regulatory bodies, in which provision should be made for all of the standard accounts, with such modifications as are necessary to cover Canadian conditions. It is also recommended that the Canadian regulatory bodies be requested to permit the industry to make the returns for the calendar year.

In the portion of the report on depreciation, the fundamentals of the subject are reviewed, followed by an outline of the I.C.C. classification rules. It is stated that considerable confusion exists between such items as "repairs," "renewals," "depreciation," "replacements," "deferred maintenance," "reconstruction," "accrued maintenance" and "accrued depreciation." It is recommended that a definite distinction should be made and adopted between maintenance and depreciation, as different commissions and classifications give different rules. The committee submits for consideration that depreciation, in relation to the electric railway, is not necessarily a loss in value; it is purely an operating expense. The definition of the term "depreciation" should be clearly stated and agreed upon by all regulatory bodies and the industry at large. Distinction should be made and agreed upon by all interested parties between ordinary maintenance and renewals and replacements (depreciation). Obsolescence is considered to be an expense chargeable to future income.

The discussion was led by Mr. Couzens, who considered depreciation especially in connection with publicly owned enterprises. Obsolescence he holds to be a different item from depreciation. The problem in that case is whether the economy to be obtained from the replacements of antiquated parts will pay in, say, five years for the expenditures to be made for the new parts. If it cannot be paid for from savings in that length of time, it is very questionable whether an existing part should be retired and replaced. There is a problem in connection with the depreciation problem, depending on whether the amount charged to it is to be invested in securities or reinvested in your own enterprise, thus reducing the amount of capital which must be raised. He pointed out that putting the money raised from the depreciation account in a trust fund will bring only a relatively low rate of interest, which is in practically every case less than can be earned by putting the money back into the property. In case the latter is done, he thinks the depreciation fund should be credited with the interest earned on the new investment.

Mr. Robertson, in commenting on the fact that the land values should not be depreciated, raised the question of whether advantage should be taken of appreciation of land values.

Mr. Couzens pointed out that where new capital has to be raised for an enterprise there is always present the question of whether the securities issued should be sinking fund debentures or serial debentures. He prefers the serial type, because then the principal is being retired and advantage taken of reducing the amount of interest which must be paid, in a manner similar to the reduction of interest by putting money back into the property. In this way, he gets rid of capital bearing a high interest rate, whereas the sinking fund usually brings only a low rate of interest.

EXHIBITS

A very attractive display of electric railway material was presented by the exhibitors. Among the principal exhibitors were Allen General Supplies, Ltd., Toronto; Don M. Campbell, Ltd., Preston, Ont.; Canadian Car and Foundry Company, Montreal, Que.; Canadian-Cleveland Fare-Box Company, Preston, Ont.; Canadian General Electric Company, Ltd., Toronto, Ont.; Canadian National Safety League, Toronto, Ont.; *Canadian Railway and Marine World*, Toronto; Canadian Steel Foundries, Ltd., Montreal; Canadian Westinghouse Company, Ltd., Hamilton, Ont.; C. E. A. Carr Company, Toronto; Differential Steel Car Company, Findlay, Ohio; Dominion Wheel and Foundries Company, Ltd., Toronto; *Electrical News*, Toronto; ELECTRIC RAILWAY JOURNAL, New York; *Electric Traction*, Chicago, Ill.; English Electric Company of Canada, Ltd., St. Catharines, Ont.; Ferranti Meter and Transformer Manufacturing Company, Toronto; Lyman Tube and Supply Company, Ltd., Montreal; Nachod Signal Company, Inc., Louisville, Ky.; Metal and Thermit Corporation, Toronto; Ohio Brass Company, Toronto; Railway and Power Engineering Corporation, Ltd., Toronto; Sarnia Bridge Company, Sarnia, Ont.; Southam Press, Ltd., Montreal; United States Steel Products Company, Toronto; Witherow Steel Company, Pittsburgh, Pa.; White Motor Bus Company, Toronto.

A Traffic Survey for Urban Railways*

BY ALEXANDER JACKSON
Superintendent of Time-Tables, Public Service Railway, Newark, N. J.

THE frequency of car service should be determined by the riding habits of the patrons along the route, first consideration being given to lines of heavy travel, thereby accommodating the largest number. It should be borne in mind that the riding habit of patrons along a line of light travel can be discouraged by curtailing the service and thus causing long waits between cars. Close observation must be made to keep in touch with and to meet every changing riding condition and the car service arranged accordingly. In many cases the members of the operating department can obtain information in advance that will enable them to anticipate some of the changes and have the car service lined up ready for the change.

*Abstract of a paper presented at the convention of the Canadian Electric Railway Association, Toronto, Ont., June 28, 1923.

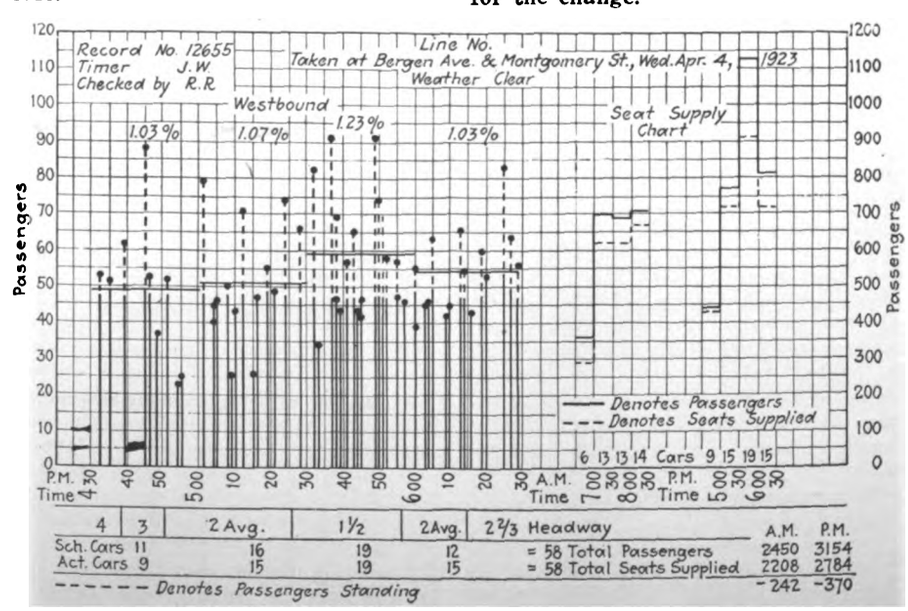

Fig. 1—Portion of Typical Traffic Chart

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I will give you a description of the methods employed by one of the large railway companies for taking, recording and filing its traffic records. The traffic department is in charge of a traffic engineer who employs about twenty traffic checkers. These men are assigned to designated points on

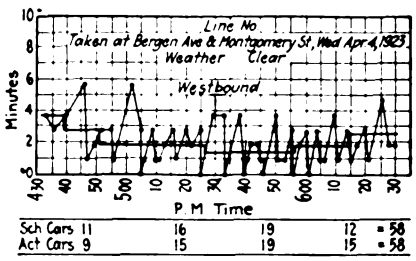

Fig. 2—Chart Showing Deviations in Running Time

the line to be checked. The locations chosen are at points of maximum load. To enable the checker to count the number of passengers on the car while it is standing, the points chosen are usually at streets where a compulsory stop is made. The men are furnished with slips showing the seating capacity of each type of car in service. They record on a standard printed form the car or the train number, the time and the number of passengers on each car as it arrives, or if the location is where a heavy pick-up is made the leaving load is recorded. By furnishing the checkers with slips, showing the seating capacity, they are enabled to make a fairly accurate count during the rush hours on a line operating a short headway, by simply counting the number of passengers who are standing and then adding to this number the seating capacity.

This company endeavors to make a check during the rush hours morning and night on the heavy trunk lines once a week and on other lines once every two weeks. More seats being supplied than passengers carried during the non-rush hours, the off peak period being almost constant, all-day records of eighteen hours are only made periodically on week days, but quite frequently on Saturdays and Sundays, especially during the summer months, or during the transitory periods, when these checks are necessary for the rearrangement of time-tables to take care of the park and summer resort travel. Other points at which passenger counts are taken are intersections with other lines and at transfer points, also at the point of divergence when two or more lines run jointly over the same track. This location also applies to a line with several terminals.

The Traffic Chart

After completing their check on the street the checkers come into the office and make graphic charts of their work. A specimen chart, Fig. 1, shows the line and location where the record was taken, together with the weather conditions. The checker spots the car on this form according to the time and the number of passengers. For example, if a car arrives at 7 a.m. with sixty-five passengers a spot is made on the line opposite 65 and on the line directly above 7 a.m. If the car should be one of the type seating forty-eight passengers a solid line is drawn from zero to 48 with a broken line to 65, showing seventeen passengers standing. The average number of passengers per car is shown by a horizontal line opposite the number of passengers for each half-hour period.

Along the base of the chart, directly under the time, is shown the scheduled headway, the number of cars called for on the time-table to pass in each half hour period, and the actual number passing. These charts, when completed, will show at a glance each and every car, its time of arrival, seating capacity and the number of passengers it carried. Any break in the headway or interval between cars or bunching will stand out prominently. To the right is shown the total number of seats supplied and passengers carried in each half hour period.

Running Time Check

This is another form developed from the checkers' traffic data. The chart, Fig. 2, is made up in the same manner as the traffic check except that headway in minutes is shown on the left in place of passengers. The headway that is scheduled to pass the point where the checker is stationed is shown by a horizontal line drawn opposite the minutes. All cars on scheduled headway show on the line, those on shorter headway below, and those with a longer headway above the line. All bunching of cars will also show below the line.

Another form of traffic study developed showing where business originates and where distributed is known as the distribution chart, Fig. 3. To procure the data required two observers are placed on a car, one at the front platform and the other at the rear platform. At each stop throughout the trip each observer records the street, time and the number of passengers boarding or leaving the car. One of these observers with a stop watch records the length of each stop in seconds. From this data each trip is charted. The length of trip in miles is shown on the horizontal scale, the passengers boarding and leaving being shown in vertical scale. Those boarding are shown above the base line and those leaving below the line. The num-

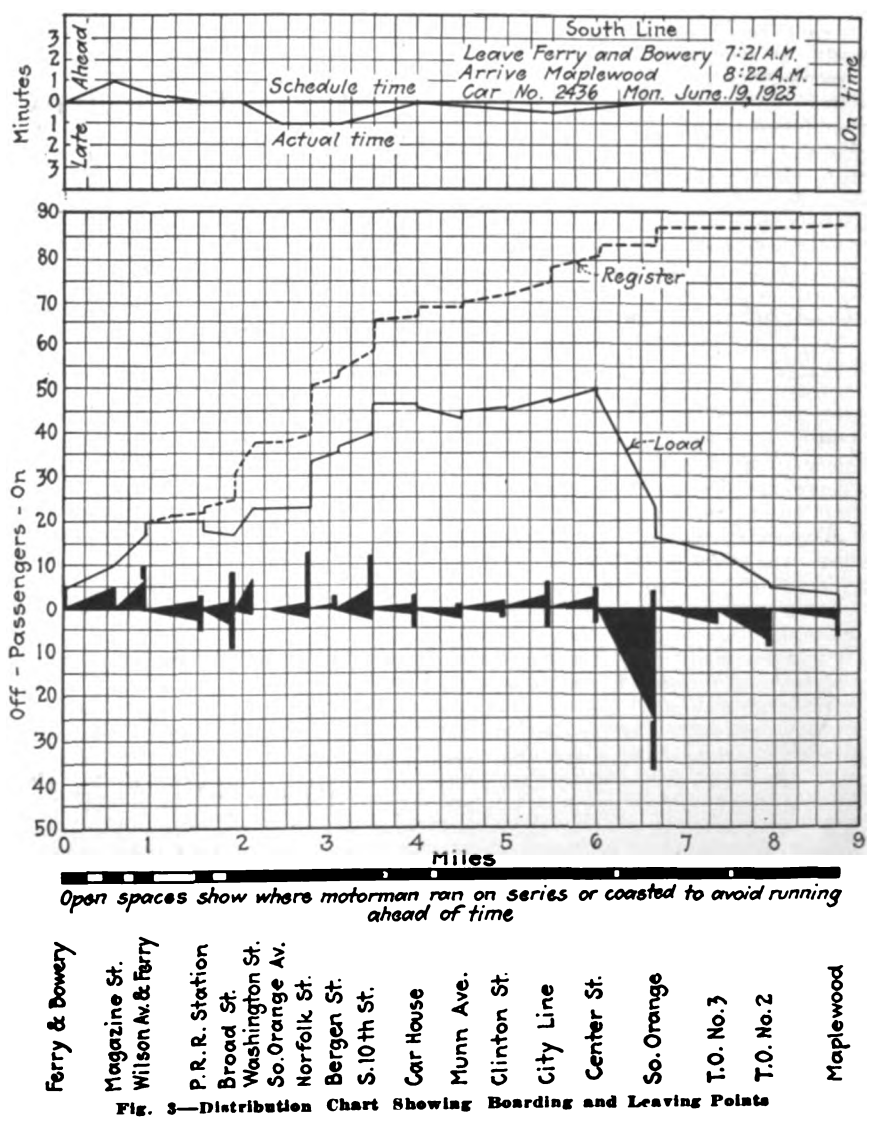

Fig. 3—Distribution Chart Showing Boarding and Leaving Points

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ber of passengers on the car at each point is obtained by taking the continuous algebraic sum of the ons and offs, and connecting the points thus obtained.

A line should be drawn through the chart showing the seating capacity. Those above the line being standing passengers, this will show the distance and length of time passengers were compelled to stand on each trip recorded. From this chart a study can be made of the possibilities of establishing a short line service, thereby obtaining the maximum use of equipment at minimum cost, as the data will enable you to make a close estimate of the amount of business picked up and discharged at each stopping point on the route, together with the location and duration of your maximum load. By obtaining the area of the close curve formed by the load line the passenger miles for the trip is given, which divided by the total passengers carried will give the average ride per passenger.

The question regarding the looping or turning of cars in the congested district is one that cannot be settled without a complete study of existing conditions; while through routing could be worked to advantage in some localities it would not accomplish the best results in others. This study can also be made from the distribution chart.

The running time points on each line should be checked up at frequent intervals and the trainmen impressed with the importance of getting their cars over the line as called for by the time table. Intermediate time points should be of five minutes or less. All transfer points, intersections, railroad stations or principal locations on the line should be established time points. Check should also be made periodically of how cars are leaving the car house on the pull-out trips, commencing the day's work. Many of the irregularities in headway during the rush hours are traceable to a crew pulling out late. Another condition causing bad headways is created by one crew leaving a terminal a minute ahead of time while the following crew leaves a minute late. This is a condition created by lack of supervision which should be corrected as soon as discovered and action taken that will cause the trainmen to be particular in the strict observance of schedule.

Delays caused by congestion in the business district should be analysed and steps taken to get the co-operation of the municipal authorities with a view of reducing them to a minimum by reducing the number of loading and unloading points and establishing trolley station stops. Delays at turnouts on single track lines should be given study. On account of the longer headway of this character of line, riding can be discouraged if the delays are too frequent. Delays at intersections with main lines, transfer points and those at heavy loading points, due to passengers not having exact fare ready and being compelled to get change, should be eliminated or brought down to a minimum. All of these delays have a direct bearing on operating expenses and by making a saving in the time lost at these points and speeding up the operation, a saving in the number of cars required to handle the rush hour can be made, or the cars saved can be added, increasing the service without additional cost.

Central Electric Railway Association Entertainment

THE committee on arrangements of the Central Electric Railway Association, of which S. D. Hutchins, Westinghouse Traction Brake Company, Columbus, Ohio, is chairman, has completed arrangements for the entertainment of delegates to the summer meeting at Cedar Point, Ohio, July 18, 19, 20. The business program was published in these columns last week.

On Wednesday forenoon, July 18, there will be cards for the ladies in the lobby of the Breakers Hotel.

Wednesday afternoon, arrangements have been made for a water polo game between teams to be selected. There will be a trip to Put-in-Bay for those who desire to go, leaving Cedar Point on the *S.S. City of Erie* at 12 o'clock, arriving at Put-in-Bay at 1 o'clock and returning at 2:45.

Wednesday evening there will be a dance for convention delegates in the pavilion.

Thursday forenoon, cards again for the ladies.

Thursday afternoon is left open.

Thursday evening there will be a 6 o'clock dinner, for which speakers and entertainers will be provided.

Arrangements have also been made so that delegates may have the privileges of the Plum Brook Golf Club.

President J. P. Barnes is planning to bring the Louisville Railway Quartet as one of the entertainment features.

Bus Law Main Topic of Iowa Convention

Commissioner Indicates that Law Is Approved by the Iowa Railroad Commission—The Pass System and Publicity Are Discussed

THE new motor vehicle law recently passed by the Iowa Legislature was the main topic under discussion at the Iowa Electric Railway Association meeting held at Mason City, Iowa, on June 28, in conjunction with the Iowa Section of the National Electric Light Association. Speaking at the joint session of the two associations, Charles F. Webster, member Iowa Railroad Commission, stated that the new motor vehicle law had the hearty support and approval of the railroad commission. His interpretation of the law indicated that it was not the intention of the Legislature to put the buses out of business, inasmuch as the legislators appreciated the fact that buses have a place in the transportation field. However, the bill was framed in order to protect the rider and to pay for the use of the highway.

Diverging from the subject of motor vehicle law, Mr. Webster spoke briefly on general conditions throughout the country, and in particular, Iowa. He indicated in his address that service as well as rates of fare will determine the condition of the railroads, both steam and electric, and in conclusion urged that there be more business in politics and less politics in business.

A brief outline of the work done by the Iowa Committee on Public Utility Information during the eighteen months of its life was given by Joe Carmichael, director. During this period the committee has won the respect and confidence of the newspaper men throughout the state and has become a consistent advertiser in all the papers of the state. No criticism of any kind has been made by any of the papers. News space was obtained in the eighteen months which if rated at the customary advertising rate would amount to $70,000. An actual expenditure of $20,000 in advertising space had been made. The committee plans to provide speakers to give brief addresses in various communities on public utility activities.

A discussion of recent court and commission decisions concerning "Fair Value, Depreciation and Rate of Return" was given by John A. Reed, Cedar Rapids, Iowa. This discussion is in printed form and may be obtained from the Iowa Committee on Public Utility Information, Des Moines. That the utilities stand on a firm foundation, with the courts serving as a stone wall between them and attacks by politicians, was the concluding opinion of Mr. Reed after discussing a few of the outstanding cases printed in the pamphlet.

Following President H. E. Weeks' address at the afternoon railway men's meeting, C. D. Cass gave a brief discussion of the new motor vehicle regulatory law which has recently been passed by the Legislature. While the bill was not wholly satisfactory to the railway men, he felt that it contained some of the fundamental principles desired. Interpretation of various portions of the law were given by several of the railway men present. The principal provisions of the law are given in the following:

The Iowa bill places intercity motor carriers, hauling either freight or passengers, under the supervision of the State Railroad Commission. Not only will buses and motor trucks be subject to regulation as to rates and charges, but they will be compelled to pay taxes for the upkeep of the roads over which they travel.

The law affects all motor carriers traveling over definite routes hauling either persons or property. It is specifically worded to include gasoline trucks which follow a fixed route but excludes trucks used for carrying farm and dairy produce.

According to the terms of the law the Railroad Commission is authorized to fix rules for the operation of buses for the protection of the public and also to investigate and determine reasonable rates. Before an operator can place a bus or truck

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in service he must first obtain a certificate for doing business from the Railroad Commission. The bus men succeeded in killing by amendments some of the most drastic features of the bill as originally introduced, but were not strong enough to smother the bill.

In addition to vesting the railroad commission with authority to supervise and regulate motor vehicles not operated wholly within the limits of any city, the law requires them to obtain from it certificates of convenience and necessity. It imposes the following taxes in addition to the regular license fees or taxes imposed on motor vehicles in the state:

Motor vehicles having pneumatic tires, one-eighth cent per ton-mile of travel over and along the public highways.

Motor vehicles having hard or solid tires, one-fourth cent per ton-mile of travel over and along the public highways.

Passenger ton-miles are to be figured by taking the maximum seating capacity of the vehicle, including trailers, at 150 lb. per passenger seat, plus the weight of the vehicle; while freight ton-miles are to be found by taking the maximum freight carrying capacity of the truck plus the weight of the vehicle.

The maximum weights permitted, including the weight of the vehicles, are 16,000 lb. for vehicles with solid rubber tires and 20,000 lb. for vehicles with pneumatic tires.

The taxes collected are to be used in the maintenance and repair of the highways and streets over which the carrier operates. The law provides that the money shall be allocated to the various city and county road districts in the same proportion as the mileage operated is distributed among the districts.

All motor carriers are required to file with the Railroad Commission liability insurance bonds, in form and amount to be determined by the commission, to provide compensation for injuries and damages for which they are liable, and also a bond satisfactory to the commission to guarantee payment of all fees, taxes or charges due to the state and for the faithful performance of the service it undertakes.

The commission is authorized to adopt and enforce such safety rules and regulations as in its judgment may be necessary. The act prescribes that drivers of motor carriers must be more than twenty-one years of age, of good moral character, fully competent to operate a motor car and hold a regular chauffeur's license from the state motor vehicle department. The speed is limited to 25 m.p.h. for passenger vehicles and 20 m.p.h. for freight carriers.

Mr. King, Rock Island, described the monthly identification card as it is used in Mason City and Rock Island. Mr. King presented figures which tended to show that the pass had the result of bringing back the riding habit among the people, it being particularly successful in the Tri-Cities, where the railway system serves 80,000 people in two distinct business districts. On that particular property the average receipts per revenue passenger were a little less than 7 cents. Figures indicated that the pass was used for a little less than two rides per day, which amounted to about fifty-nine rides per month. By way of comparison, in Mason City and Muscatine, cities of 20,000 population, the average receipts per revenue passenger have amounted to 7.5 cents, the average number of rides per passenger per month in Mason City being seventy-seven and in Muscatine, fifty-four. Discussion following Mr. King's talk seemed to indicate that the identification card system will increase riding.

The officers elected for the ensuing year are: F. C. Chambers, president Des Moines City Railway, president; R. A. Leussler, Omaha, Neb., vice-president; and H. E. Weeks, Davenport, Iowa, secretary and treasurer. Announcement was made by John Sutherland that the fall meeting of the Iowa Electric Railway Association will be held Aug. 30 and 31 at Davenport, Iowa.

American Association News

Good Exhibit at Atlantic City Assured

At Its First Meeting to Assign Space, the Exhibit Committee Finds More than 100 Applicants and Applications for 52,000 Square Feet of Space

THERE was a well-attended meeting of the exhibit committee at association headquarters on July 2, when the first allotment of space for exhibits at the Atlantic City convention was made. F. C. J. Dell, director of exhibits, reported that the applications for space already received were 50 per cent greater, both in number and in space desired, than at this time for the last Atlantic City convention in 1922. This assures a successful exhibit. It is believed that the absence of an exhibit feature this year at the N. E. L. A. convention and at the convention of the Mechanical Division, A. R. A., has helped to make this demand for space at the A. E. R. A. convention.

Members of the committee in attendance at the meeting in New York were: L. W. Shugg, chairman; Clinton E. Morgan, vice-chairman; T. W. Casey, George Keegan, J. C. McQuiston, L. H. Palmer, A. M. Robinson, E. P. Waller and J. W. Welsh.

After a discussion on various details of the exhibit, Mr. Shugg, the chairman of the committee, surrendered the chair to Mr. Morgan, vice-chairman, under whose direction actual assignment of space took place. Following is a list of the exhibitors with their space as assigned by the committee:

Firm Name	*Space Numbers*
American Motor Truck Company	300-302
American Abrasive Metals Company	538
American Brake Shoe & Foundry Co.	500
Anaconda Copper Mining Company	525
Bethlehem Steel Company	562 to 567 incl.
Bates Expanded Steel Truss Company	207
The Buda Company	172
The Baldwin Locomotive Works	148-150-152
The J. G. Brill Company	8 B
Bridgeport Brass Company	149
Bethlehem Ship Building Company	568-569
Consolidated Car Fender Company	506
Barron G. Collier, Inc.	606
Chicago Pneumatic Tool Company	101, 103, 105, 107
The Curtain Supply Company	610
Cheatham Electric Switching Device Co.	516
Consolidated Car Heating Company	22
Chillingworth Mfg. Company	503
Carnegie Steel Company	416
Day & Zimmermann	412
The Drew Electric & Mfg. Co.	576-577
Duff Manufacturing Company	571
ELECTRIC RAILWAY JOURNAL	7
Electric Service Supplies Company	414
Economy Electric Devices Company	616
The Elicon Company	602
Elliott Service Company	559-561
The Electric Railway Improvement Co.	200-C
The O. M. Edwards Company	527-529
Electric Traction	10
Fageol Motors Company	304-306
Foamite-Childs Corporation	521-523
General Electric Company	20-10B-10C
Galena Signal Oil Company	24
Griffin Wheel Company	612
Garford Motor Truck Company	310-312-314
Gold Car Heating & Lighting Co.	579-581
Globe Ticket Company	572-573
Hale and Kilburn Corporation	406-408
Haskelite Manufacturing Company	608
Heywood-Wakefield Company	520-522-524
Hyatt Roller Bearing Company	614
Illinois Steel Company	416
International Steel Tie Company	121, 123, 125
Ingersoll-Rand Company	200B
The Lorain Steel Company	546-547-548-549
Morton Manufacturing Corporation	602
Metal & Thermit Company	13-116-118-120
More-Jones Brass & Metal Company	554-555
McCardell & Co., J. R.	200-D
National Railway Appliance Company	620
National Tube Company	550-552
R. D. Nuttall Company	17
The National Lock Washer Company	541
National Pneumatic Company	12-14-16-18
Nachod Signal Company	512-514
National Brake Company, Inc.	513
Naugle Pole & Tie Company	560
National Carbon Company	604
The Okonite Company	534-536
The Ohio Brass Company	23
Ohmer Fare Register Company	558
The Pantasote Company	400
Pratt & Lambert, Inc	501
The Rail Joint Company	403
Root Spring Scraper Company	575
Railway Track-work Company	171-173
Rail Welding & Bonding Company	201-205
Reade Manufacturing Company	505-507
Reo Motor Car Company	124 to 136 incl.
Railway Utility Company	502-504
Railway Improvement Company	508-510
The Railway Materials Company	531-533
St. Louis Car Company	540
Safety Car Devices Company	19
Simmons-Boardman Publishing Co.	10A
Star Brass Works	574
A. Stucki Company	528
Sattley Company	582
George W. Saums Company	511
The Peter Smith Heater Company	583
Standard Underground Cable Company	405
Stafford Roller Bearing Car Truck Corp.	104-106
The T. H. Symington Company	570
S. K. F. Industries, Inc	215
The Sherwin-Williams Company	578-580
Taylor Electric Truck Company	111-113-115
The Timken-Detroit Axle Company	584-585-586-587
The Texas Company	8A
Transit Equipment Company	532
The Trolley Supply Company	556-557
Tuco Products Corp.	526
Tool Steel Gear & Pinion Company	618
United Lead Company	518
The United States Graphite Company	530
The Universal Lubricating Company	509
Wheel Truing Brake Shoe Company	513
Western Electric Company	515-517-519
Westinghouse Traction Brake Company	144
Westinghouse Companies	21-15A
Westinghouse Electric & Manufacturing Company	15B-216
William Wharton, Jr. & Company, Inc.	588-589
The White Company	133 to 147 incl.
Waukesha Motor Company	117-119

Entertainment Committee

A MEETING of the committee appointed by President Emmons to plan for the entertainment at Atlantic City convention was held in the office of the association on July 2. Those in attendance were: J. C. McQuiston, chairman; William Arthur, C. H. Beck, E. C. Faber, J. H. Hanna, George R. Lyman, L. H. Palmer, L. W. Shugg, K. A. Simmon, E. P. Waller, H. W. Blake for H. L. Brown, and George L. Draffan for E. F. Wickwire.

While it is too early yet to outline the entertainment features considered, the committee gave full consideration to afternoon entertainments for the ladies and evening programs. Chairman McQuiston reported a visit to Atlantic City with Mr. Welsh, and that the various principal hotels had expressed a willingness to co-operate.

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Maintenance of Equipment

Air-Operated Scarifier and Ice Cutter

AN ICE CUTTER and scarifier which was constructed by the Easton division of the Lehigh Valley Transit Company has proved a great convenience and labor saver. A Brill-21 truck was used, but an additional pedestal opening was installed in each of the side frames to provide clearance for operating the teeth.

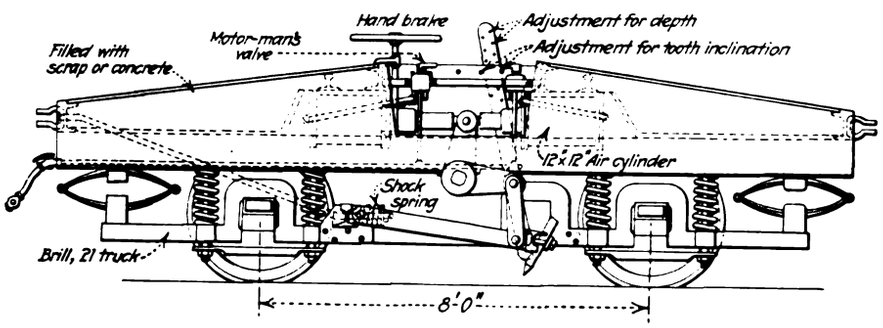
The wheelbase was made 8 ft. The steel teeth are supported by a rail with slotted recesses to receive them, and they are held in position by a steel bar which passes back of the teeth and is bolted to the web of the rail. This supporting rail fulcrums about a point just ahead of the rear pair of wheels. An additional cross-rail has been installed at this point for strength and to give the necessary support. The arms connecting the rail which hold the teeth to the fulcrum point are fitted with a shock-absorbing spring.

The raising and lowering of the teeth, together with the supporting rail and mechanism, are accomplished by means of two 12-in. x 12-in. air cylinders. These are placed in tandem with a bell-crank lever fastened to the middle of the connecting rod. This bellcrank lever fulcrums about a support at the top of the truck, and the movement of the air-cylinder pistons back and forth causes the opposite end of the bell crank lever to rise, thus raising or lowering the steel teeth.

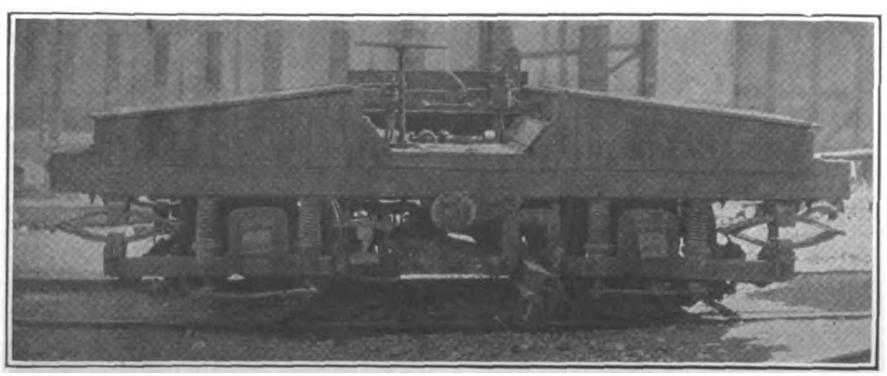
A standard motorman's valve controls the air pressure to the operating brake cylinders. The car is not equipped with a compressor, but through an air-hose connection receives its air supply from the car which hauls the scarifier.

When the steel teeth are lowered into position they are held by vertical adjusting bars which are bolted into position to regulate the depth of cut. This vertical bar can also be adjusted to give different tooth inclinations. Various holes are provided in the bar and in the cross support for bolting. The top part of the scarifier is filled in with concrete to give the desired weight for holding it in position during operation. The draft rigging is connected direct to the arm which supports the teeth, so that none of the strain is transmitted through the truck framework.

This scarifier was designed by M. C. Garlick, supervisor of tracks for the Easton (Pa.) Transit Company, and has proved economical for ripping up asphalt and macadam paving. It also was of considerable use for removing ice from between the rails and for a distance outside the rails during the past winter. The accompanying drawing shows details.



Details of Construction of Air-Operated Scarifier and Ice Cutter

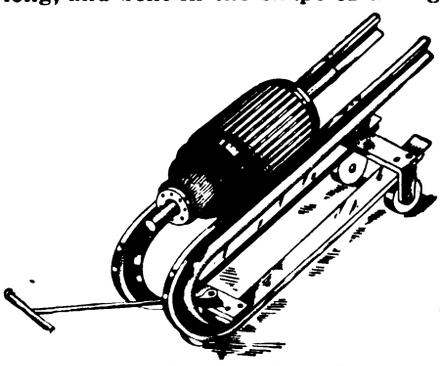


The Scarifier and Ice Cutter Equipped for Operation

Unique Armature Truck Made from Old Rails

IT IS the practice in the shops of the Buffalo & Lake Erie Traction Company, Erie, Pa., to store upon two racks about 12 in. above the floor the armatures awaiting repair. As a means of transporting the heavy armatures, a simple truck has been made of old rails.

Two rail sections, each about 11 ft. long, and bent in the shape of a long narrow letter U, form the framework of the truck. The U rests upon one of its arms with the curve at the front end of the truck and the upper arm in the same vertical plane as the lower arm. The other rail is similarly shaped and placed about a foot distant from the first. Thus an armature can rest securely between the two upper arms, with its axis parallel to the length of the truck.



Armature Truck Made of Rails

Under the lower arms are fastened three 6-in. cast-iron wheels. At the front end is a hinged tongue by which the truck is moved. The particular advantage of this shape of vehicle for carrying armature lies in the fact that it can be backed in

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at right angles to the repair rack, with its lower arms just under the iron frame of the rack and its upper arms just above. Heavy armatures can then be rolled sidewise onto and off the truck with little effort.

Different Colors for Tools Prevent Misplacement

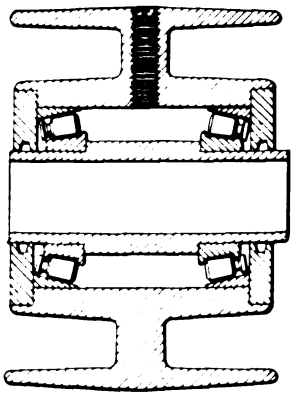
AT THE Connellsville, Pa., shops of the West Penn Railways a number of portable tools are in use that help greatly to speed up work. These belong to various shops, but may be taken out on special jobs anywhere about the shops or yards. In order to prevent misplacement of such tools after the completion of such work, they have been painted with separate distinctive colors for each shop. Thus, for instance, a tool painted brown is seen at once to belong to the carpenter shop, and there can be no argument regarding the ownership.

The adoption of this plan has made it much easier to keep the tools on hand in their proper places, so that they are always available when they are needed, and in this way emergency work about the shops is facilitated greatly.

New Equipment Available

Taper Roller Bearings Applied to Loose Pulleys

ADJUSTABLE taper roller bearings with provision for taking the end thrust have been applied to loose pulley construction by the St. Louis Machine Tool Company, St. Louis, Mo. Roller bearings have been tried previously in loose pulley construction, but several disadvantages were found. The use of straight



Loose Pulley with Taper Roller Bearings

roller bearings did not provide the necessary features of wear adjustment and end thrust to make a good pulley, and the outside diameter in relation to the bore was so large as to eliminate this type of construction from use in the usual arbor pulleys on high speed machines where the pulleys were necessarily small.

With the construction now introduced by the St. Louis Machine Tool Company, the races can be made exceptionally thin so that loose pulleys can be made down to 2½ in. diameter by mounting the bearings directly on the shaft. This type of construction, however, is not preferred by the manufacturers, as they recommend mounting them on a sleeve as shown in the accompanying illustration. With this type of construction old and worn shafts or arbors can be saved, which frequently are worth as much as the pulley.

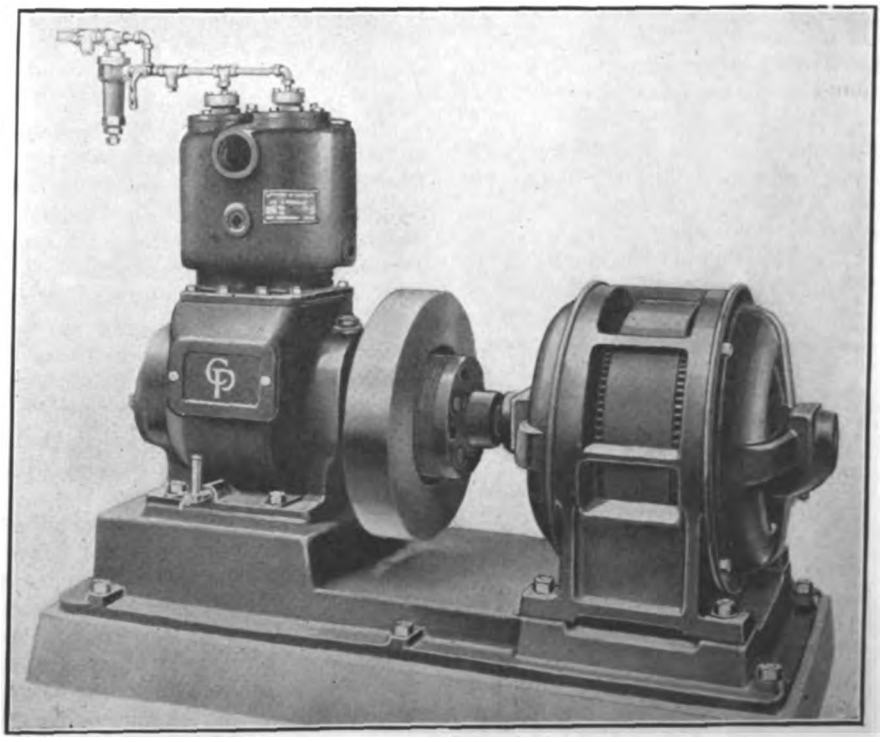
Pulleys of this new type are being supplied by the St. Louis Machine Tool Company for replacement on all classes of machinery in sizes from 2½ in. to 26 in. diameters. Hanger boxes and countershafts can also be equipped with this type of bearing.

Small Direct-Connected Compressor

THERE has always been a demand for small air compressors which can be directly connected to an electric motor, but, because of the speed restrictions imposed by the limited area of the compressor valves used, such combinations heretofore have been unavailable. As a result, belt drive and, in some instances, gear drive have been employed. The Chicago Pneumatic Tool Company, New York, N. Y., has recently developed a line of high-speed compressors which can be directly connected to electric motors or internal combustion engines by means of flexible couplings. The compressors are of the vertical, duplex, single-acting, water-cooled type, fitted with Simplate flat disk inlet and discharge valves. The straight and uniform lift of these valves affords a maximum of effective valve area which makes possible the speed at which these compressors operate.

These machines are built in three sizes, having piston displacements of 128, 160 and 215 cu.ft. per minute, and are suitable for working pressures of 150 lb. per square inch. The standard speed of these sizes is 600 r.p.m. Standard equipment includes hand starter for the motor and an inlet valve unloader for the compressor.

For places where the demand for



High-Speed Compressor Which Can Be Directly Connected to Electric Motors or Internal Combustion Engines

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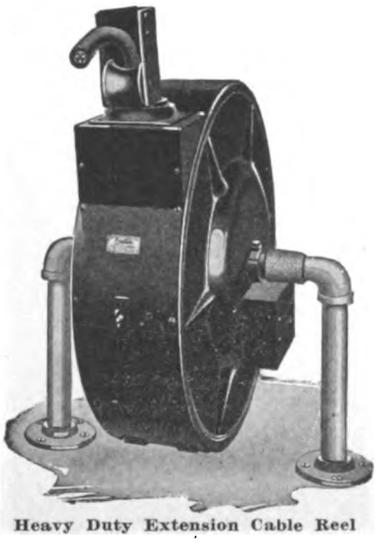
air is intermittent, the motor can be furnished with an automatic starter which starts and stops the unit within predetermined pressure limits. When this type of starter is used, the compressor is equipped with a centrifugal unloader which automatically relieves the compressor of its load while the motor is starting up or shutting down. A water control valve is also furnished which is operated by air pressure governed by a centrifugal unloader, and since the lubrication is accomplished by a combination pump and splash system, the unit is automatic, as it accurately controls the electric current, air delivered, circulating water, and lubrication. The arrangement of drive makes these units very compact and eliminates transmission losses and troubles.

Extension Cable Reel

A NEW extension cable reel designed for laying out and automatically retrieving large sized electric conductors is being marketed by the Appleton Electric Company, Chicago, Ill. This device is particularly adapted for supplying current to machinery which requires a varying cable length, such as electric welding equipment and circuit breaker testing outfits.

The heavy duty "Reelite" is furnished without brackets but with

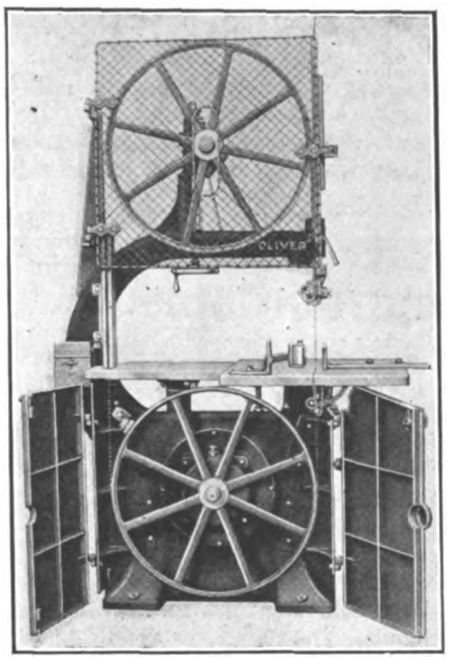


Heavy Duty Extension Cable Reel

1-in. male threaded hubs so that it can be mounted conveniently. Connections are made from the cable to heavy brushes, and the current is conducted through these and slip rings. The reels are furnished in different widths and with two- or three-wire commutator. This form of cable reel protects the cable and at the same time gives uninterrupted service.

Shaftless Motor-Driven Bandsaw

A DIRECT motor drive for a bandsaw has recently been placed on the market by the Oliver Machinery Company, Grand Rapids, Mich. The illustration gives an idea as to how the rotor of the motor is mounted



Bandsaw with Ball-Bearing and Motor Drive

directly on the lower wheel shaft, which runs in ball bearings. The ball bearings are supported by two end bells, which have finished concentric tongues to fit accurately inside of the finished rings of the bandsaw frame, as well as the stator. This assures necessary alignment and easy access.

The motors are fully inclosed and built in. When 1,700 to 1,800 r.p.m. motors are used, the company recommends the "attached belt drive" which supports the motor on a self-contained bracket bolted to the frame on a finished square pad and fitted with wire-mesh belt guards, endless leather belts and slide base with screw to take up for the belt stretch. With 600 r.p.m. motors, the company recommends the newly-created ball-bearing fully-inclosed drive as illustrated.

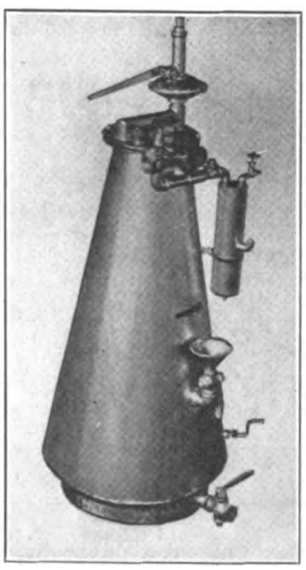
An important feature is the method of safeguarding the operator. Two safety guards are provided, one at the rear, which is U-shaped and made of wood, and one at the front which is L-shaped and made of steel with wood facing. These cover the blades at all points except the part doing the sawing between the guide and table. The lower wheel is incased by two iron doors which prevent danger to the operator and confine the sawdust to a limited area. The upper wheel is covered by a heavy wire-mesh door or guard, which is supported on a cast-iron hinged bracket attached to the column of the machine and is locked with a spring clasp.

The illustration shows the No. 16 bandsaw, which requires a motor of from 3 to 5 hp. and runs at a speed of 600 r.p.m.

Portable Welding Gas Generator

A PORTABLE acetylene welding generator designed to obviate the use of high-pressure cylinders has recently been placed on the market by the Alexander Milburn Company of Baltimore, Md., manufacturer of oxyacetylene welding and cutting equipment. The generator is of 30-lb. carbide capacity, or the equivalent of 50 cu.ft. cylinder gas. It has few parts, operates automatically with no clock or motors, and has a steel body welded throughout.

This generator fills a demand for a source of acetylene gas without the transportation delays and higher costs of cylinder gas. It may



New Welding Gas Generator

be handled by two men, two handles welded to the machine being provided for this purpose. The generator has a device for locking the carbide in place while it is being moved. The hopper and cast head which houses the feed control are assembled in one unit. The equipment weighs approximately 200 lb., and has a diameter of 2 ft. at the bottom, 1 ft. at the top and is 5 ft. 3 in. high.

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The News of the Industry

Wages Advanced

New York & Queens County Employees Receive Increase as Well as Share in Increased Revenue

In accordance with an announcement of Lincoln C. Andrews, receiver of the New York & Queens County Railway, employees' wages were increased effective on July 1. The new scale in cents per hour for motormen and conductors is as follows:

First year	47
Second year	49
Third year	51
Fourth year	52
Fifth year—ninth year	5[illegible]
Tenth year and thereafter	55

Operators of one-man cars will receive 5 cents an hour in addition to the regular rate.

The scale just mentioned amounts to an increase of 2 cents an hour for all other than first-year men. This increase of 2 cents an hour will be given to all employees of the shop and line departments who are paid on an hourly basis.

In addition to the increased pay scale the receiver announced a plan of the company for sharing the increased car revenue with the employees. He explained that for the past year the passenger revenue per car-mile had averaged a little more than 29 cents, and since the receivership it had averaged just under 31 cents. He said that taking the receivership average of 31 cents as the base, the company proposed to increase the regular pay of the men each month by as many cents an hour as they could make the average car-mile revenue of the month before greater than 31 cents. For example, he said that if the average car-mile revenue for June was 32 cents the July pay would be increased by 1 cent an hour. If during July there was an increase in car-mile revenue to 34 cents, then the monthly pay in August would be increased by 3 cents an hour. Simplified, it meant that if each operator would pick up only one more fare for each car-mile of his run then the average car-mile revenue would be increased by 5 cents, and the employees' pay also by 5 cents.

The plan, which was launched not only for the purpose of giving the men an increase in pay but also for increasing the revenue of the company, went into effect on July 1, and during the month of July all the men included in the plan will receive, in addition to their regular hourly rate, an increase equal to the excess of the average car-mile earnings for June over 31 cents.

Mr. Andrews further went on to explain how every man in the company, the transportation man, the shop man, the line man, and every employee, could help to increase the car-mile earnings in his own particular job. There are two restrictions, however, on the plan for increased pay. The first is that a man must work at least 150 hours during the month in which the increased earnings are created in order to receive the increased rate during the following month. Further, where a liability accident has resulted in a settlement in favor of the claimant and where investigation has shown that the accident was the fault of the motorman, upon the decision of the general manager, the motorman in question shall forfeit thirty days of his increased pay, effective immediately after the decision of the general manager. These are the only restrictions.

The New York & Queens County Railway went into receivership five months ago. Mr. Andrews stated that during these months, thanks to the help of the many loyal employees, conditions have gradually improved until it seemed almost possible that the railway could be made a successful venture again. The management, he says, wanted increased revenue which it could get only by having more car riders and car fares. He said that the management would do all that it could, but the employees could do even more in securing increased income.

Service Improvements in Peoria

The city of Peoria put into effect a new car routing Sunday morning, July 1, in accordance with the plans and recommendations submitted some time ago by John A. Beeler, New York. The lines changed were Knoxville Avenue and Garden Street. The Elizabeth and Hurlburt lines and the Second and Sixth Street lines were combined. No changes were made on the Main, Bradley, Lincoln, Adams or East Peoria lines.

Street collectors are to be stationed in the Loop district during the rush hours to collect fares and assist in more rapid loading at the heavy load points in the business district. They will be placed at Fulton and Adams, Main and Adams, and Main and Jefferson Streets.

The approval of the Beeler plan, which provided for the rerouting and wiped out a number of out-of-date franchise requirements such as fixed headways established a generation ago, was recently approved by the City Council by a vote of fifteen to two. The cars are now operating on new schedules where they better fit the present day traffic requirements. An enlarged use of one-man cars was recommended.

Electrification Must Wait

President Rea in Discussing Changes Incident to Philadelphia Fire Opposes Any New Work Now

Further electrification of lines of the Pennsylvania Railroad system in and about Philadelphia or elsewhere is something to be hoped for but not realized for some time to come.

Cost Prohibitive Now

In a letter sent on June 28 to William R. Tucker, secretary of the Philadelphia Board of Trade, Samuel Rea, president of the railroad, made it quite clear that the matter of electrified improvement of the lines of the Pennsylvania system cannot be considered as a possibility for some years. He said:

> The cost is prohibitive at this time, and, aside from that, the regulatory policies of both the Federal and State Governments do not leave sufficient balance in the company treasury to warrant the carrying out of any expensive reconstruction plan.

Electrification of the Chestnut Hill branch running out of Broad Street Station and also of the Main Line branch as far west as Paoli was completed some while ago. Since then nothing further in the way of operating trains electrically has been done in and about Philadelphia.

Mr. Rea's letter to Mr. Tucker was in response to a communication from the Secretary of the Board of Trade, as to just what the company's expansion plans provided in connection with the reconstruction of the damaged section of the Broad Street Station plant, which was partially destroyed by fire some weeks ago.

Enhanced Earning Power Necessary

In the course of his comments on the matter Mr. Rea said in part:

> So far as Philadelphia is concerned, the Pennsylvania Railroad has endeavored to give it the best local and through service at three important centers — Broad Street, West Philadelphia, and North Philadelphia. The company, likewise, has proceeded, as far as its earnings have permitted, with electrification of its various suburban lines, and, if the war had not intervened, electrification would have been materially extended on all of our important divisions reaching Philadelphia. We are certain that West Philadelphia is a most important center, which requires extensive station enlargements, yard improvements, and electrification, and it has one city rapid transit line and needs more. Then, North Philadelphia is also very important, showing a healthy traffic growth which will materially expand upon the completion of the Broad Street subway when it will only be six or eight minutes from City Hall.
>
> While all of these questions must have careful consideration it is needless to say that the immediate execution of any plan is, I regret, impossible. One of the reasons is that construction costs are out of all reason; and there is a considerable labor shortage. Our company could not undertake such a huge improvement until the future is clearer and its position with reference to railroad earnings power is materially enchanced, and is more nearly in accord with what it was many years ago.

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Chicago's Mayor for Municipal Ownership

Says 1907 Settlement Franchise Has Failed—Wants Local Ownership and Operation at Fare that Will Meet Carrying Charges—Through Routes Should Be Diverted from Business Center.

MUNICIPAL ownership and operation of Chicago's surface and elevated lines was advocated as an immediate necessity by Mayor Dever in a special message to the City Council on July 2. The Mayor stated that in municipal ownership and operation of the city's local transportation systems lies the city's only hope for reduced fares, much needed extensions and improvements in service.

Purchase of All Lines Advocated

He proposed the purchase of the surface and elevated lines by the issuance of special bonds, to be retired by a fund derived from the companies' earnings. This plan, he declared, would make possible the acquisition of the lines by the city without the imposition of an additional burden upon the taxpayers. The proposed municipal system would include all lines of transportation now operating and would be designed to include subways when built.

The Mayor made it plain in his message that he would insist upon the municipal lines paying their way without loading an additional burden upon the taxpayers. He declared that improvements and extensions necessary to give Chicago adequate service would cost millions of dollars and that a privately owned company operating under a twenty-year franchise, which is the longest franchise permitted by law in Illinois, would not finance these requirements. He insisted, therefore, that the only solution of the local transportation problem is municipal ownership and operation.

The Mayor then proposed that the local transportation committee of the Council open negotiations at once in order that a detailed plan may be submitted to the Council when it reconvenes on Oct. 17. He wants a referendum vote of the people as soon as possible thereafter.

Principles of Settlement Stated

The basic principles of a proper settlement as outlined by the Mayor for the guidance of the City Council are as follows:

1. The traction properties should be municipally owned and municipally operated in such a way as to insure efficient service. The management and operation of the municipally owned properties should be placed in the hands of men of the highest qualifications and the employees should be selected in strict accord with the efficient enforcement of the civil service law.

2. The properties should be purchased at a fair price to the owners' but no more. This price should not be so low as to be confiscatory, nor so high as to be unjust to the car riders.

3. The properties should be so acquired and operated as to impose no burden upon the taxpayers. The purchase price of the properties and the interest, on the securities given in payment of this price should be paid solely out of the earnings of the properties.

4. The properties should be acquired with due regard to the necessity for a comprehensive engineering and financial plan for the building of the necessary extensions of and additions to the surface and elevated lines and for the construction of subways, as and where required, all with the least possible delay.

5. Improvidence in the building of additions and extensions and of subways must be avoided, so that the transportation system will be self-sustaining.

6. Any plan for traction settlement must be submitted to a referendum vote of the people.

While certain items of a complete program of traction development may be otherwise financed, there are only two methods by which the program outlined above can be accomplished in its entirety; first, by the issue of general corporate bonds payable out of moneys raised by general taxation, and, second, by the issue of special bonds or certificates of the general character described in the report of Alderman U. S. Schwartz dated Dec. 19, 1921.

The first method cannot be used, for the reason that the city has practically exhausted its general debt incurring power and, without amendment to the state constitution, cannot borrow by that method such sums as would be necessary to acquire a complete and adequate transportation system.

The second of the two means above mentioned presents a more feasible method for accomplishing municipal ownership of the lines. Moreover, this method insures the economic operation of the lines without recourse to general taxation. The municipal ownership act of 1913 expressly requires that the principal of, and interest on, such special bonds shall be paid solely out of the earnings of the transportation properties.

In 1920, our Supreme Court held that the charges for services rendered by a municipally owned public utility are simply to be high enough to produce revenue sufficient to bear all costs of maintenance and operation, to meet interest on bonds, and certificates issued on account thereof, and to permit the accumulation of a surplus, or sinking fund sufficient to meet all outstanding bonds or certificates at maturity.

With all politics eliminated, the fares can be substantially lower than those now exacted by the private companies. Indeed, the car fares must be the lowest possible without resort to taxation.

1907 Ordinances Have Failed

Mayor Dever declared that the 1907 ordinance of the railways had failed of enforcement and that the whole theory of the 1907 ordinances had been upset by the passage of the state public utilities act in 1913, which deprived the city of home rule. By acquiring the ownership of these lines, the Mayor pointed out, Chicago would again secure home rule as municipally owned properties are not under the jurisdiction and control of the state commission.

The Mayor also said that no plan should be considered which involves a continuation of private ownership or private operation under the guise of municipal ownership and operation.

Britton I. Budd, president of the Chicago Elevated Railroads, announced the day after Mayor Dever presented his message to the Council that the elevated lines were open to negotiations. He said:

In suggesting unification of the local transportation lines, with needed extensions and development of a rapid transit system, Mayor Dever has voiced the needs of the city. So far as the elevated railroads are concerned, they will have no objection to any reasonable proposition from the city for acquiring the properties. The crying need is for further rapid transit development, including subways in the central district of the city. We are ready to negotiate with the city on any basis it may wish. We are principally interested in seeing a solution of the transportation problem which will allow Chicago to grow and which will be fair alike to the people who have invested their money in the properties and to the city.

Mr. Dever in his message to the Council said that the private companies operating the surface and elevated lines had failed to furnish adequate service or to develop their properties to keep pace with the growth of the city. He then outlined some of the things he thought should be done such as the construction of rapid transit lines, building of extensions, planning for the future, etc.

President of New York Central Questioned on Schenectady Strike

A. H. Smith, president of the New York Central Railroad, was questioned for an hour recently by Bernard L. Shientag, State Industrial Commissioner, on the Schenectady Street Railway strike, in effect since May 16. Mr. Smith said he was not familiar with any contract the company might have with its employees, and did not have much time to watch traction operations. He promised, however, to look into the matter.

Wage Difference Adjusted in Muskegon

The Muskegon Traction & Lighting Company has settled its differences with its platform men.

The difficulty arose over recognition of the union. Two years ago the agreement between the company and men terminated and there has been much discussion over the question. Two weeks ago the men demanded action and at a special meeting of the board of directors it was voted to enter into agreement again. At a second meeting the agreement was approved.

The Muskegon men at first asked for an increase of 2 cents an hour rather than the bonus put into effect on Jan. 1. The bonus amounts to about 2 cents an hour providing the maximum is paid. Later the employees waived the wage question and said that they were well satisfied with the bonus plan once it had been explained to them.

With respect to the bonus practically all of the seventy platform men of the company will share in the full amount of the bonus provided by the company in April. The first bonus was payable on July 1, having been retroactive from Jan. 1. The maximum bonus is $40 semi-annually.

The company issued a rule book at the time the bonus plan was placed in effect, setting forth the number of points that are to be deducted for violating the various rules. The company announced that its one desire in granting a bonus was to improve the service to the public. Every employee starts with 1,000 points and those having 800 points at the end of six months are paid the full bonus announced by the company.

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Railway States Wage Facts

Crisis in Transportation Confronts Chicago, According to Surface Lines President, Who Appeals to Public in Wage Controversy—Many Interesting Tables.

Henry A. Blair, president of the Chicago Surface Lines, recently published in the daily papers as a display advertisement an open letter addressed to Mayor Dever setting forth the pertinent facts in the wage controversy which at that time threatened to reach a crisis in a strike. The letter stated that for a number of years the surface lines have been forced to fight for their very existence.

Mr. Blair sees the surface lines harassed by unfriendly interests and much of their corporate energy expended in an attempt, thus far successful, to protect the rights of the public they serve and of the investors whose millions have made the great system possible. He says that during these trying years the searchlight of an antagonistic foe has been turned upon the companies and that every phase of their operations has been analyzed.

The facts in regard to the high hourly wage paid by the company as presented by the company for comparison were as follows:

	Increase Over 1914
Trainmen, Chicago	119 per cent
Carpenters	92½ per cent
Structural iron workers	84 per cent
Sheet metal workers	82 per cent
Painters	79 per cent
Bricklayers, electricians, plasterers, hoisting engineers, plumbers, steamfitters and tile setters	66½ per cent
Building laborers and plastering laborers	81 per cent

Mr. Blair said that although the ordinance specifically provides that the city's traction fund may be used to reduce rates of fare, not one dollar of the more than $30 500,000 accumulated since 1907 has been spent by the city for the benefit of the car riders. Figures for three years showing the volume of transportation by classes were presented to show the vastness of the system and its importance as a means of transportation to Chicago car riders. The figures follow:

Year ended Jan. 31	1921	1922	1923
Revenue passengers	769,025,413	750,515,622	762,629,211
Employees, policemen and firemen carried free under the ordinance	32,469,288	35,724,585	38,801,339
Transfer passengers	551,676,792	547,522,102	557,331,999
Total	1,353,171,493	1,333,762,409	1,358,762,549
Per cent of transfer passengers to revenue and free passengers	68 83	69 64	69 54

In the nine years of a unified system the surface lines poured more than $45,600,000 in public benefits divided as follows:

	Nine Years	Average Per Year
Cleaning right-of-way, including sprinkling and removal of snow and ice	$5,026,615	$558,512
Street paving	5,157,881	573,097
Maintaining paving	2,837,162	315,240
General taxes	14,673,008	1,630,334
Track and overhead removal and replacement account sewer installation, etc.	388,449	43,161
City's proportion—55 per cent of net earnings for traction fund	17,588,453	1,954,272
Total	$45,671,572	$5,074,619

With reference to the wages paid to trainmen in other cities the following table was included in the statement to "indicate how far in the lead we are in Chicago":

City	Rate	Time to Reach Maximum
Chicago	65 70	1 year
New York	45-61	9 years
Philadelphia	59-64	1 year
Detroit	55 60	1 year
Detroit Municipal	$4.50 to $5 per day	1 year
Cleveland	55 60	1 year
St. Louis	50 65	3 years
Boston	48 61	1 year
Pittsburgh	61-67	1 year
Buffalo	50-55	1 year
San Francisco	46-54	2½ years
San Francisco Municipal	$5 a day	
Milwaukee	50 56	2 years
Washington, D. C.	50 56	1 year
Cincinnati	43-48	1 year

Mr. Blair says:

A public service, like a public office, is a public trust. And the public should resent any interference with the proper and orderly conduct of its business.

Justice and fairness demand that a service like this should receive a fair return upon its investment. The surface lines, since the 7-cent fare was established, are earning on the basis of 5.7 per cent on the capital account. The gross revenue in the last fiscal year was $56,103,061.

The following table was presented to show how each dollar of revenue was distributed:

		Cents	Cents
Operating Costs	Wages	50 08	80.28
	Material, power, taxes and all other operating expenses	30 20	
Sinking fund and interest obligations			14 78
55% to city of Chicago			2.97
Remainder for distribution to the companies			1.97
			100.00

In conclusion Mr. Blair said that the company was ready and willing to submit the whole question of wages and working conditions to disinterested arbitration. An arrangement to this effect has been made, as noted previously in the ELECTRIC RAILWAY JOURNAL.

One-Man Car Operators in Dayton Receive Increase

The Oakwood Street Railway, the City Railway and the Dayton Street Railway, all operating in Dayton, Ohio, have entered into contracts with their employees whereby the men will receive increases in pay.

One-man car operators of these lines, effective May 15, will receive 51 cents an hour for the first three months, 53 cents an hour for the next nine months and 55 cents an hour thereafter. The scale on the City Railway and Oakwood lines prior to the starting of one-man car operation was 41, 43 and 45 cents an hour. When the new type of cars was placed in operation these rates were advanced to 46, 48 and 50 cents an hour, which was similar to the scale being received by employees of the Dayton Street and People's Railways.

This scale is still in force on the People's lines. Under the terms of the contract, if any of the three other roads in the new agreement operate two-men cars, the 46, 48 and 50 cents an hour scale will prevail.

Announcement was also made of a wage increase granted the employees of the Dayton & Western traction line. Retroactive to May 16, their scale will be 43 cents an hour for the first year, 45 cents for the second year and 47 cents for the third year, with 50 cents an hour for the fourth and each succeeding year.

Settlement to Be Reached Without Strike

Although no settlement has been reached in the wage controversy of employees of the Des Moines City Railway threats of a strike which a week ago seemed imminent have apparently subsided.

The company is standing on the arbitration award made by Rev. Elmer Nelson Owen and the men temporarily at least are not pressing the demand that the question of the wage award be submitted to the five judges of the Polk County District Court to decide whether it was a matter for arbitration.

The men have submitted a communication to the company stating that they would agree to abide by the arbitration award if the back wages of $59,000 in a previous arbitration were paid.

F. C. Chambers, president of the railway, then replied to the men declining to act upon the proposal for the reason that the Kirbey award, under which the men demand the back pay, is a claim against the receiver of the Des Moines City Railway rather than the company and that it is a matter now before the United States Court and that the decision which Judge Wade will make must be final. He further points out that the company has no moral or legal right to make such a settlement as demanded by the men, and if it did it would be in direct violation of the obligations of the company under the terms of the present franchise.

Mr. Chambers also calls attention to the fact that the men have been paid and still retain $59,000 more than was due them in view of the fact that the Ladd arbitration committee handed down an award which as a matter of contract must be held effective as of March 1, 1921. Mr. Chambers cites that even though the present demand for back pay was a just one it would not equal the amount paid in excess of the Ladd committee award.

The union men have announced through the daily press that they will make every effort to settle the controversy without a strike.

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Scranton Wages Advanced

Arbitrators Fix Scranton Railway Employees' Wages at 55, 60 and 63 Cents—Company Dissents

The arbitrators appointed to decide the wage issue between the Scranton Railway and its Amalgamated employees have submitted their findings, which give the platform men an increase of 3 to 5 cents an hour. The new rate will be 55 cents for the first three months, 60 for the next nine months and 63 cents after one year.

The issue between the railway and its men was one of wages. The company was paying the motormen and conductors 50, 55 and 60 cents an hour, but the men were demanding 60, 65 and 70 cents. The fifth arbitrator or referee was Bishop M. J. Hoban, who signed the award.

The second demand of the men was that dispatchers and cash and ticket receivers should receive $200 a month. The award gave these employees an increase of 5 per cent on their present monthly wages. A third demand was that the wages of all track men should be 65 to 85 cents an hour according to the scale offered, and in the award these trackmen were allowed an increase of 7 per cent on the present hourly rate of wages. It was also demanded that carhouse men, shop men and power-house men should receive 65 to 85 cents an hour as per scale offered. In the award these men are granted an increase of 7 per cent on their present hourly and monthly rate.

The award specified that the back pay of each class of employee should be allowed on the basis of the wages awarded from April 1, 1923. The company was allowed ninety days from the date hereto for the payment of the back pay.

Will Accept Decision

Bishop Hoban, chairman, in his award complimented the members of the board of arbitration on the kindly feeling that had existed and acknowledged the ability of the counsel who prepared and offered in evidence a remarkable array of exhibits, which was of great value to the arbitrators in making their award.

The award was signed by the arbitrators for the men, but dissented upon by the arbitrators for the company.

The company, though dissenting from the arbitration awards, announced that it would stand by Bishop Hoban's findings.

The company in its dissenting opinion states that it disagrees with the award because it places upon the company a burden that must eventually be borne by the traveling public. In 1920 the conductors and motormen received a 20 per cent increase, and other employees 12 per cent. Since the present management acquired control of this company in 1906 there has not been a reduction in wages.

The company further contended that under the evidence the wages of the conductors, motormen, trackmen and laborers in the shops should not have been changed, and that the company should have an opportunity to provide for the large outlays which are absolutely necessary to placing property in shape to serve the public safely, efficiently and adequately. The company takes this stand, it says, particularly in view of the fact that for the past six years at least the earnings have at no time reached the amount fixed by the Public Service Commission and approved by the Appellate Court as a fair return from the property.

Wages Increased Five Cents an Hour.—As the result of a wage increase amounting to 5 cents an hour, employees of the Hudson Valley Railway, Glens Falls, N. Y., will receive the basic rate hereafter of 50 cents. The line operates from Troy northward to Warrensburg and several other points.

Settlement Reached.—The controversy between the linemen employed by the Springfield Street Railway, Springfield, Mass., and the management has been settled, it is announced by Manager Flanders, through a compromise arrangement by which the linemen receive a smaller wage increase than they had sought. This is believed to have removed all danger of a strike.

Franchise to Be Granted.—The Lake Shore Electric Railway, Cleveland, Ohio, will be granted a new twenty-five-year franchise through Sandusky County as a result of a conference between county and railroad officials held at Fremont on June 29. The railroad is to pay $12,500 to the county and make an annual payment of $1,000 during the life of the franchise.

League for Safety Formed.—Employees of the Morris County Traction Company, Morristown, N. J., have formed a Safety League, the object of which is to reduce the number of accidents to men connected with the road and to the public as well. Their slogan is "Safety first. Safety always." Later the league will organize a junior league for school children. The league will display placards in the trolley cars.

Wages Advanced.—Trainmen of the Nashville Railway & Light Company have been granted an increase in wages of 2 cents an hour. The scale in cents per hour is as follows: First three months, 40 cents; next nine months, 42 cents; second year, 44 cents; third year, 46 cents; fourth year, 48 cents, and after the fourth year 50 cents. The rate for operators of one-man cars will be 5 cents an hour above the regular scale.

Wages to Go to Arbitration.—After several conferences employees and officials of the Cincinnati Traction Company have failed to come to an agreement in the settlement of the employees' demand for an increase in the wage scale amounting to 17 cents an hour for all "platform" men. The matter now must go to an arbitration board, according to the existing agreement between the two bodies. According to the agreement a representative will be selected for the employees and one for the traction company and these two, in turn, will choose a third member.

Accidents Decrease Where Employees Are at Fault.—Statistics for the first five months of 1923, just compiled by the Georgia Railway & Power Company, Atlanta, show an increase of 25 per cent in traffic accidents in the city during that period as compared with the first five months of 1922. The company states, however, that there was a notable decrease in the number of street car accidents where the motormen or conductors employed by the company were totally or partially to blame.

Last Year's Reduction Canceled.—An agreement has been reached between officials and the "blue uniform" employees of the Cumberland County Power & Light Company, Portland, Me., whereby the men will have restored to them the 10 per cent wage reduction which they voluntarily accepted last year in order to help wipe out the company's deficit. The men recently petitioned for a wage increase of 20 per cent. With the new scale in force the men will be receiving 55 cents and 60 cents for two-man cars and one-man cars respectively. The demands of the men were referred to in the ELECTRIC RAILWAY JOURNAL, issue of May 19, 1923.

Safety Council Graduates Receive Diplomas.—The Chicago Elevated Railroads has the largest group of any organization in the graduation class of the Chicago Safety Council of the Chicago Association of Commerce this year. Diplomas were awarded to a record class of 750 men and of these 104 were employees of the Chicago Elevated Railroads and sixteen employees of the Chicago, North Shore & Milwaukee Railroad. The graduation banquet, held at the Hotel Morrison, was attended by more than a thousand persons and was the biggest party ever held by the Safety Council. The men who received diplomas were graduated from the council's foremen's instruction course.

Improvements Depend Upon Franchise Extension.—Extensive improvements and extensions to the service and system of the Virginia Railway & Power Company, operating the railway system in Richmond, are planned in the event a franchise of sufficient tenure of life is granted by the City Council. E. Randolph Williams, counsel for the company, said recently that the information on contemplated extensions was before the City Council, but that the work could not be undertaken unless the life of the franchise asked for was reasonable in length. The plans include a new Barton Heights line to the Ladies' Mile Road; a new South Richmond line, a line out Broad Street Road to Westhampton, and an entirely new line to the National Cemetery out Williamsburg Avenue.

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Financial and Corporate

Oppose Abandonment

Communities Urge Continuance of Jersey Central Traction Line—Condition of Property Unsatisfactory

A strong sentiment in favor of continuance of the operation of the Jersey Central Traction Company was shown at the hearing of the Public Utility Commission, June 11, by the representatives of the various municipalities served. No way was suggested, however, to make the operation of the railway a paying proposition. It was shown that large losses have been incurred during recent years and the company is disinclined to continue.

C. L. S. Tingley, vice-president of the American Railways, which controls the Jersey Central Traction Company, stated that the valuation of the property as of Dec. 31, 1922, was claimed to be $1,882,582. A valuation was fixed by the Board of Public Utility Commissioners as of Dec. 31, 1915, amounting to $1,851,422 and additions from that date until Dec. 31, 1922, amounting to $31,160, making a total valuation of $1,882,582 upon which the company is entitled to receive a reasonable return, which at the rate of 7 per cent per annum would amount to the sum of $131,780.74.

The property of the Jersey Central Traction Company was taken over by the American Railways in the spring of 1917 and since then the revenue of the company has not been sufficient to provide for any dividend on the outstanding securities and for the past few years has not been sufficient to meet even the operating expenses. Various rates of fare, ranging from a 5-cent flat fare to a 10-cent flat fare, the latter being charged in conjunction with a special commutation rate, have been tried on the property in the hope of producing at least sufficient revenue to meet operating expenses, but without success. Since Jan. 1, 1923, a flat rate of 8 cents per zone has been in effect. The six months' experiment with a 10-cent flat rate in combination with a commutation rate, which was tried from June 1, 1922, to Dec. 31, 1922, inclusive, proved to be a failure in the matter of increasing revenue and even with the existing 8-cent fare the traffic is gradually falling off and the revenue correspondingly decreasing, whereas operating expenses are on the increase.

The condition of the company's property, particularly the track, is very unsatisfactory and a large sum would be required not only to place the track in safe and proper operating condition but also to meet the recommendations and requirements of the state, county and municipal authorities. Mr. Tingley stated that, having tried every known means to keep the property in operation, and the parties who had advanced the money to make up the deficits which had been incurred during the past few years having refused to advance any further funds, it was deemed advisable and even necessary that the company should cease operations. In reply to questions he stated that the company did not propose to substitute any other form of transportation in place of the trolley system, but planned to tear up the tracks and sell the rails and equipment for their scrap value. He said, however, that the company would be glad to turn over for its scrap value the whole property or any portion thereof which interested parties might desire to take over for the purpose of operating it as a trolley line.

It was demonstrated that for the years 1918 and 1919 there had been a gross income of $38,497 and $42,086, respectively, for the years 1920 to 1922, inclusive, and for the first four months of 1923 there had been a marked deficit, ranging from $7,781 in 1920 to $27,991 in 1922 and $29,728 for the first four months of 1923. This statement also showed that there had been a continued deficit in the net income of from $6,538 in 1918 to $93,575 in 1922 and $51 637 for the first four months of 1923. This, with the preferred stock dividend of $36,000 per annum, caused a total deficit ranging from $42,538 in 1918 to $129,575 in 1922 and $63,637 for the first four months of 1923.

Marked Decrease in Traffic Recently

The statement of revenue passengers carried indicated an increase from 1916 to 1918, a gradual decrease to 1920, a slight increase in 1921, followed by a marked decrease in 1922, and a slight proportionate increase for the first four months of 1923. The maximum number of revenue passengers carried was in 1918, which was 5,134,630. This was explained to have been due largely to unusually heavy traffic incident to the activity of local industries engaged in the manufacture of war munitions and other war material. The population statistics indicated a generally slight increase in the communities served, the total population for 1920 being 37,324, as against 22,350 for 1910.

The statement in regard to the repairs necessary to place the track in proper operating condition indicated that it would require an expenditure of $266,474, in order to meet the demands of the various regulatory bodies. The analysis of operating expenses and deductions for gross income indicated a steadily increasing expenditure, ranging from $245,116 in 1918 to $321,531, in 1922 and $103,114 for the first four months of 1923. The deductions from gross income indicated a practically continual increase, ranging in totals from $45,035 for 1918 to $65,583 for 1922 and $21,909 for the first four months of 1923.

It was suggested that various ways and means might be adopted for reducing costs, such as the operation of one-man cars, discontinuation of non-paying trips, the elimination of extra, or "tripper," service during rush hours, the cutting in half of the existing fare zones and charging a flat 5-cent fare in each new zone thus created, and various other methods. The company replied that in some cases the suggestions had been tried, in others the suggestion was evidently impracticable and in still others the plan or one similar to it had been seriously considered but had not been thought advisable. It strongly emphasized that the falling off in traffic of the line was due to a very great extent to the competition of the privately owned automobile. Mr. Hitchcock, local manager, did not regard the population of the territory served to be large enough to permit operation on a successful basis.

Conditions Improved in Indianapolis

A general betterment in the financial condition, both of the Indianapolis Street Railway and the Terre Haute, Indianapolis & Eastern Traction Company in 1922, is shown in the annual reports of the two companies for 1922, made public on June 13 at the annual meeting of the stockholders.

The street railway's net earnings increased 17.07 per cent, or $216,918, over 1921, and the traction company's net earnings increased $114,967.

The street railway, after paying all fixed charges, including interest on bonds and deducting the amount required for sinking funds and for dividends, had a deficit at the end of the year of $26,909. The traction company, after paying all fixed charges and adding $214,046 to its sinking fund, had a balance of $226,336. It paid no dividends. Gross earnings thus far in 1923 are 8 per cent higher than in the same period of 1922.

The street railway on Sept. 1 resumed the payment of dividends, and has paid the quarterly dividends since, although it now is six quarterly dividends in arrears. The dividend payments thus far have been at the rate of $1.50 a share of preferred stock.

The report of the city railway mentions need for fifty new cars, for rebuilding carhouses and storerooms, erecting a new shop, and the construction of substations in the city. The statement is made that "all this requires money, which can not be obtained until the company's earnings are sufficient to place it on a safe and sound financial basis."

The reports of both companies mention the plan of the traction companies entering Indianapolis to erect freight terminals in Kentucky Avenue, which they say will establish Indianapolis as one of the most extensive electric railway freight terminals in the country, and also "entirely relieve the Indianapolis Street Railway from furnishing freight facilities, which in the past have been maintained at a loss."

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Mayor Offers Plan for Financing Detroit Street Railways

A new plan for paying off the Detroit United Railway and financing the Municipal Department of Street Railways has been suggested by Mayor Frank E. Doremus of the city of Detroit. The plan includes the possible submission of a bond issue of $15,000,000 to put the now remaining debt on the same basis as that represented by the $15,000,000 of construction bonds authorized when the Detroit United Railway was taken over by the city.

In a statement by the Mayor it was pointed out that the contract for the purchase of the Detroit United Railway property required the city to pay in full in ten years the sum of $19,850,000. Because of this contract, the Department of Street Railways is required to set aside from earnings about $1,900,000 a year. This annual contribution to the sinking fund takes care of the payments of $1,000,000 annually to the Detroit United Railway, as well as the final payment of $7,580,000 due at the expiration of the contract in 1932.

If the Detroit United Railway debt was represented by long term bonds instead of the ten-year contract the Department of Street Railways would be required to set aside from earnings approximately $400,000 annually instead of $1,900,000. In other words, if long term bonds were issued and the Detroit United Railway debt settled there would be available from earnings about $1,500,000 in additional revenue with which to rehabilitate the tracks, purchase new cars and extend and improve the system generally.

A report on the finances of the Department of Street Railways by the Detroit Bureau of Governmental Research holds that the contract between the city and the Detroit United Railway now constitutes an unduly heavy financial burden, although held to be advantageous when the agreement was entered into. It is also the belief of the city controller that bonds could be issued at 4½ per cent or 4¾ per cent interest, whereas the city is now paying the Detroit United Railway 6 per cent under the terms of the contract.

According to the bureau's report, to finance from earnings the extensive program of rehabilitation necessary to needed service will require several years, if uninterrupted by business depression. A depreciation reserve, as such, has not been established, it is cited, but it is understood that the board of street railway commissioners agrees such a reserve is highly desirable as a means of determining actual property values, operating costs and proper rate of fare and contemplates the establishment of a depreciation account in the near future.

Among the conclusions drawn from the report is the statement that under the circumstances, creditable progress has been made toward solving the financial problems of the Department of Street Railways. The revenues of the department during the last eleven and one-half months are in excess of all charges made for operation and maintenance, except depreciation, and interest and sinking fund requirements. Reserves are being set aside in the sinking fund to provide for the payments of interest and to retire all outstanding bonds issued in behalf of the department.

Sufficient reserves are being set aside to meet the nineteen semi-annual payments of $500,000 each on the purchase contract with the Detroit United Railway and to make the final payment of $7,580,000 due in 1931.

Partial rehabilitation of the property acquired from the Detroit United Railway, some of which, according to the report, might fairly be chargeable to capital, has been effected and paid for out of earnings.

To complete the full program of rehabilitation promptly will necessitate either an issue of bonds or an increase in the rate of fare.

It is further pointed out that if earnings under existing conditions are applied toward rehabilitation, extensions to furnish satisfactory service must be provided by the issue of bonds or an increase in rate of fare.

Texas Railway Sells Notes Locally

The Northern Texas Traction Company at Fort Worth, Texas, has been successful in its campaign to sell $500,000 of 7 per cent notes to its patrons. The proceeds will be used to provide funds to pay for improvements and betterments. The campaign to sell notes was launched in March. It has been conducted by employees of the company.

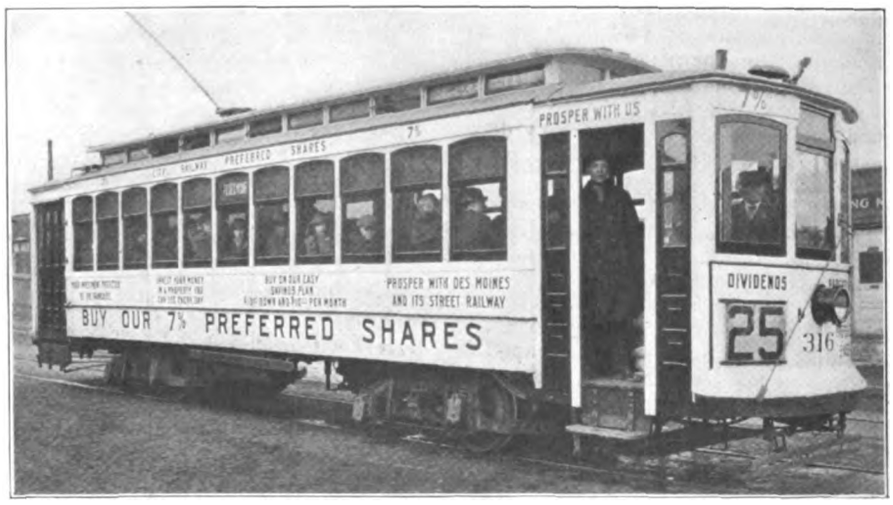
The extensions demanded by the city and agreed to as necessary by the company include lines to South Fort Worth, Sycamore Heights and Riverside. Surveys have been made for these extensions, and materials have been ordered with which to begin the work. The lines will be completed and service started early in the fall.

Favorable Results Announced on Des Moines Stock Sale

Officials of the Des Moines City Railway are well satisfied with the reception on the part of the employees and public of the 7 per cent preferred stock issue.

It is the first time that the Des Moines company has ever made an offer of stock to its employees or the local public and it feels that the attitude of both parties is entirely favorable. Among the employees the shop force is already 100 per cent sold and a number of the other departments have set a high mark. The trainmen are, of course, slower to get into the game, but officials of the company feel that progress is being made with them.

While the issue authorized was $750,000, no attempts will be made this year to put the entire amount on the market. No figures as to the amount sold to date have been announced, but officials say they will have no trouble in selling during the year an amount sufficient to finance the year's extensions.



Car Used in Des Moines to Advertise Stock Issue

The campaign for the sale has been a quiet, consistent program, with grandstand methods entirely lacking. An advertising medium which caused considerable interest in the sale throughout the city was the use of one street car, painted white and with signs to tell the story of the sale, which was put into regular service on all lines in the city.

As a concrete result of the use of this means of advertisement E. L. Marriage, assistant to General Manager Chambers, cites the sale of a block of $2,000 worth of stock which went to an Italian miner. The miner saw the white car and became interested to the extent that he asked his boss about the stock. The mine owner being acquainted with officials of the street railway, called it to their attention and, after a few conferences, the Italian hauled $2,000 in currency out of a home-made bank. The currency was in small amounts and the bundles were tied with thread which was darkened with age and showed that the miner distrusted banks and had cached the money somewhere in his home.

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Files Interest Default on Tidewater Railway Bonds

Order for a default on interest on the Birmingham-Tidewater Railway's first mortgage bonds was filed in the Federal court on July 2. The bond interest due July 1 amounts to $37,500 and Judge Grubb in his order instructs Lee C. Bradley and J. S. Pevear, co-receivers for the Birmingham Railway, Light & Power Company, not to advance funds for the payment of interest to the Tidewater from the proceeds of operations of the properties of their company.

It is pointed out in Judge Grubb's order that the operation of the Tidewater property, which has been under the Birmingham Railway, Light & Power Company receivers, has shown a constantly increasing deficit. It is also shown that the receivers have advanced a sum of $433,051 from proceeds of the operation of Birmingham Railway properties to the Tidewater up to May 31, 1923. Judge Grubb holds that in view of this heavy deficit, advance for interest should not be made.

Foreclosure proceedings against the Tidewater property it is stated cannot be started under ninety days. The bond interest, authority for payment of which was denied is due on an issue of $1,500,000 of first mortgage gold bonds of the Birmingham-Tidewater Railway dated Jan. 1, 1916, and payable at the Empire Trust Company in New York.

Sale of the Tidewater property or the junking of a part of the line and operation of the remainder by the Birmingham Railway Light & Power Company are considered the only alternatives.

Cheerful News for Traction Holders

B. C. Forbes, writing in the New York *American*, says that twenty railroad and traction companies have announced very cheerful dividend news for their stockholders within the last six weeks. As Mr. Forbes sees it the prospect is that the next six months will bring many other increased dividend checks for transportation company stockholders. He includes in his list of traction payments the following:

Fort Dodge, Des Moines & Southern Railroad resumed dividends at the rate of $1.75 quarterly on preferred stock—the first since May, 1921.

Charlottesville & Albemarle Railway declared quarterly dividend of 2½ per cent on common.

Philadelphia Company increased dividend from $3 to $4 basis on common.

Eastern Texas Electric Company increased quarterly dividend to $2.25 per share on common, compared with $2 previously.

Twin-City Rapid Transit Company increased semi-annual dividend on common from 2 per cent to 3 per cent.

Federal Light & Traction Company declared stock dividend of 75 cents a share in addition to regular dividend. Initial dividend paid on common.

United Light & Railways Company declared extra dividend of three-quarter of 1 per cent on common.

Columbus Railway Power & Light Company declared dividends of 6 per cent on common and 6 per cent on preferred "B" stock for the year.

United Railways Investment Company redeemed dividend certificates issued in 1906 and 1907, at par and interest to and including May 15, 1923.

Washington Railway & Electric Company resumed dividends at the rate of 1½ per cent on common, first payment since May 1, 1919.

The news of the declaration of these payments is not new, but the method of presenting them adopted by Mr. Forbes is somewhat unusual.

Auction Sales in New York.—At the public auction rooms in New York there were no sales of electric railway securities this week.

Abandonment Sought in Illinois.—Permission to cease operation and to dismantle its line between Yorkville and Morris has been asked of the State Commerce Commission by the Fox & Illinois Union Railway, Aurora, Ill. The line, 20 miles long, according to the petition, is losing money.

Preferred Stock Being Offered—The Southern Securities Company of Madison, Wis., is offering for sale at par, preferred stock of the Madison Street Railway, yielding 7 per cent. Already about $55,000 of this stock has been sold to patrons of the company. The proceeds of the issue will be used for betterment and extensions to take care of the steadily increasing demands for the company's services.

Arrears in Dividends Being Paid.—The Fairmount Park Transit Company, Philadelphia, Pa., has declared a dividend of 3½ per cent on preferred stock for the six months ended June 30, 1923, and a dividend of 14 per cent against accumulation at the rate of 7 per cent for the years 1917 and 1918. The dividends are payable on July 10 to stock of record of June 30. There are still unpaid accumulated dividends for the four years from 1919 to 1922 inclusive.

Merger of El Paso Companies Proposed.—Merger of the three Stone & Webster traction companies in El Paso is proposed in application made by Alba Warren, vice-president and general manager of the El Paso (Texas) Electric Railway Company, for permission to combine his company and the El Paso & Juarez Traction Company and the Rio Grande Valley Traction Company. The merger is sought, Mr. Warren told the El Paso City Commission, to enable the company to obtain funds for needed improvements.

Offer Bonds.—Bodell & Company and P. W. Chapman & Company are offering at 99½ and interest to yield more than 7 per cent $500,000 of Fort Dodge, Des Moines & Southern Railroad ten-year debenture gold bonds known as series "A" 7 per cent. The bonds, callable on any interest date upon thirty days' notice, at 105 and interest, are dated June 1, 1923, and are due June 1, 1933. The proceeds of this issue will be used in part for the installation of the new 12,500-hp. turbine and the greater part of the balance for the 1923 capital requirements. The company owns electric lighting properties in six Iowa cities and towns operating under favorable franchises running to 1934-1939. The company owns 2,355 freight cars, eleven electric locomotives, eleven miscellaneous cars and thirty-two passenger cars.

Michigan United Sold Under Foreclosure.—Properties of the Michigan United Railways were purchased at Jackson on June 30 by the Irving Bank-Columbia Trust Company of New York City for $5,000,000 at a mortgage sale. The bank and trust company is trustee for the bondholders. The sale was made by William S. Sayres, Jr., Special Master of the United States District Court. The property includes a total of 258 miles of trackage and complete equipment for operating the interurban and street railway lines. The reorganization terms have been reviewed previously in the ELECTRIC RAILWAY JOURNAL.

Seeks to Abandon Part of Line.—The Southern New York Power & Railway Corporation, operating the Mohawk-Oneonta trolley line, applied to the Public Service Commission on June 29 for approval of a declaration of abandonment of that part of its line in Oneonta starting at Main and Broad Streets and running along Main Street to the east end of the line. The company claims that public convenience and necessity do not require further operation of that part of its line. Public hearing will be given on the petition.

Another Payment on account of Lorimer Failure.—Ten years of litigation resulting from the failure of the Southern Traction Company, one of the projects of former United States Senator William Lormier, was brought to a close by Federal Judge G. W. English in East St. Louis a few days ago when he entered an order authorizing Judge C. B. Thomas, referee in bankruptcy, to pay out all but $34,000 of the $400,000 realized by the sale of the road several months ago to the Alton & Southern Railway, an Aluminum Ore Company line. Under the court order the creditors of the defunct road will have received about 35 per cent when final settlement is made.

Change in Capital Structure Proposed.—The West Penn Company, a subsidiary of the American Water Works & Electric Company, has called a special meeting of its stockholders July 9, to take action on a proposal to increase the capital stock from 310,000 shares, $100 par, to 1,000,000 shares divided into 500,000 shares no par common and 500,000 shares preferred, $100 par. The latter it proposes to reclassify into 80,547 shares of 6 per cent cumulative and 419,453 shares of 7 per cent cumulative. Present 6 per cent cumulative preferred may be exchanged share for share for the new 7 per cent preferred, while any of the 6 per cent preferred acquired by the company will also be converted into 7 per cent, and as such may be held, sold, or reissued by the company. The 7 per cent preferred will be redeemable at 115 and accrued dividends but will have no voting power unless there occurs a default in four quarterly dividend payments.

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Traffic and Transportation

Forms Club

W. H. Sawyer Furthers Idea of Loyalty in East St. Louis by Grouping Old Employees Into Club

Ten employees who have served the East St. Louis & Suburban Railway for twenty-five years didn't give much thought to this distinction, so busy have they been in the performance of their duties during those years, but something happened a short time ago in East St. Louis and the men now feel that they are part and parcel of the progress and development of their city.

This is how it came about. W. H. Sawyer, president of the company, always interested in instilling loyalty and friendship into the men organized a group of his employees into what he terms the East St. Louis & Suburban Company Twenty-five-Year Club. The ten men who had served for that length of time were brought before Mr. Sawyer, made active members, dined as his guests and received checks from the company for $25 each. Before the big day celebration was over their chief had told the faithful ones that they were really selling a service; that they were indispensable to him and that next year at the annual dinner of the newly formed club he would expect them all to be present. When it was announced that honorary members could be elected, at the will of the active members, but that not more than one honorary member could be elected in one year, the men chose Mr. Sawyer. He at first objected on the ground that he had spent only four years at East St. Louis, but it was explained to him that the twenty-five-year clause was not binding on honorary members.

According to the rules and by-laws of the club active membership is to be limited to employees of the operating companies controlled by the East St. Louis & Suburban Company who have been in the employ continuously for twenty-five years or more. The membership is to be voluntary and there are to be no regular dues. It was agreed that members shall from time to time make such rules, elect such officers and hold such meetings as the majority desires with the exception that an annual meeting and dinner shall be held each year as close to May 18 as is practicable.

The object of the club is only another expression of Mr. Sawyer's idea of what an organization should be to its members. This club is to promote friendship, contentment and "firmly to unite those who, through many years of close personal and business relationship, have many mutual desires and interests."

After the dinner on May 18 each man was asked to tell what he was doing twenty-five years ago. One man told about his horse car experiences and another related how when operating one of the first electric cars he had had to hire a team of mules to have his car pulled back on the track. At length it was put up to Mr. Sawyer himself as to his doings a quarter of a century ago. He didn't stress difficulties with mules or horse cars, but merely said that he had got married. The men weren't satisfied with that as an answer (to the holders of twenty-five-year service records marriage is not a problem) and he had to tell some of his experiences as an electrical engineer for the General Electric Company.

Railway in Camden to Operate Buses

The Public Service Transportation Company, a subsidiary of the Public Service Corporation of New Jersey, will operate a fleet of modern buses on Kaighn Avenue and in the parkside district of Camden. At the same time, electric railway service on the present Kaighn Avenue line will be discontinued. The part of the route east of Kaighn Avenue is new and provides service to a district not before served. For a part of the distance, it runs along Forest Hill Park and in addition gives easy access to the Camden High and Junior High Schools.

The rate of fare will be 8 cents cash, with four tokens for 30 cents. Tokens sold by the Public Service Railway will be honored. Upon payment of 1 cent additional a transfer will be issued from the buses to cars of the intersecting lines of the Public Service Railway. Transfers will be issued by the railway to the buses at the same charge. Eight Model 50 White chassis, with Hoover bodies, will be operated.

Authorizes Bus Permits for Los Angeles Suburbs

After conducting various public hearings during the past thirty days based on applications of several bus line operators, the California State Railroad Commission has taken into consideration that there is a necessity of providing the fast-growing outlying district of Los Angeles with motor bus transportation service either by the auxiliaries of the street car lines or by privately operated bus systems; therefore, the commission on June 23 granted several motor bus certificates to furnish the desired service.

The permits authorize bus service to a portion of the San Fernando Valley; between Alhambra and South Pasadena and between Santa Monica and Venice.

At the same time the commission dismissed the application for bus line permits between Glendale, Hollywood and other points to Los Angeles.

Confidence Restored in San Diego

People of California City Know that Local Railway Always Had Best Interest of City in Mind

What caused the voters of San Diego, Calif., who last October refused by about 1,400 majority to relieve the railway of paving obligations, to reverse their position in five months' time and in March, this year, vote the asked relief by about the same majority? While many side lanes of local politics, ancient rancors and prejudices enter into the question, in the main the answer may be said to lie in two words—"fair play." And fair play is not a one-sided proposition; it applies both to the company and the public.

At the close of the war, the San Diego Electric Railway, like other railways, found its plant pretty much run down. Owing to lack of upkeep and peculiar local soil conditions, most of the roadbed was in a deplorable state. Rolling stock was in fair shape, but with such roadbeds, good service was impossible. This condition continued for some time after the war, and the people grumbled, and from a service standpoint, with justice. But what to do?

The company went before the State Railroad Commission, proposed and obtained a zone fare system which materially increased the average fare. And then, when public patience had almost reached a breaking point, came announcement from the company of an extensive rehabilitation program. This made the people feel better.

Meanwhile the company prepared a charter amendment empowering the Council to relieve it of paving obligations, and another to remove its affairs from the jurisdiction of the city and place it with the State Railroad Commission. It secured enough signers to compel the City Council to call a special election.

Old sores were ripped wide open again, however, in August, when the company, early one Sunday, tore out about a mile of the Adams Avenue line before the work was stopped by order of the Mayor. Anti-corporationists took advantage of the situation and blamed the company for all ills. Company officials asserted their action was necessary to protect themselves against an impending paving program of the City Council, charging bad faith on the part of the officials in not waiting until the paving amendment had been voted on by the people. The matter was taken to the courts, but agreement was finally reached, through mediation of the State Railroad Commission, and the company agreed to rebuild its tracks. In the meantime, however, patrons of the Adams Avenue route had to ride in buses, which didn't improve their state of mind any and probably lost many votes for the company's paving proposition.

In the October election the factors mitigating against the company's paving proposal were principally these:

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Many people believed that the proposal was a loophole through which the company was seeking to escape its reconstruction program. Others mistrusted the proposed amendment because it was drawn by the company's attorneys. Others confused it with the proposal to remove the company from local jurisdiction to that of the State Railroad Commission, a proposal which was on the same ballot. Still others desired to punish the company for its stand in the Adams Avenue matter. And then there's always a percentage "agin' the corporations."

The result was that the paving amendment proposed by the company lost by a vote of 6,489 for and 8,952 against.

The company officials took the defeat philosophically and the reconstruction work went right ahead. Good service was installed on several of the more important lines in the city, car service was resumed on Adams Avenue, and all could see that the new type of track was substantial and enduring. Service was speeded up and there was shorter spacing between cars. Evidence that the company intended to keep its promises on the rebuilding program and the improved service put the car riding public into a more cheerful state of mind. The starting of the weekly pass system on Jan. 1 enhanced this feeling. All this was accompanied by judicious newspaper and folder publicity on the part of the company. All of the publicity emphasized the company's desire to serve and to make San Diego's "the best street car system in the United States."

The result was that in five months' time the people reversed their former verdict and freed the company of future paving obligations by a vote of 7,757 for and 6,374 against. The fact that the city attorney drew the amendment submitted at the spring election and that it was more detailed and therefore clearer to the average voter also probably operated to favor the company at the spring election. The voters were impressed with the company's "fair play" and also aimed to play fair.

Since that election the company has gained further good will by its announcement of the building of the Mission Beach line and the La Mesa line, and also just recently a line to La Jolla, so the relations between the company and the people at this time are very cordial. "Co-operation" is the watchword in San Diego just now, and it was emphasized recently by a speech by John D. Spreckels to more than 150 San Diego business men, when he, as head of the Spreckels interests, which include the San Diego Street Railway, pleaded for support for his plans to make San Diego a great city. Co-operation, he said, was all that was needed to put through a large development program, although most of the active work for the Spreckels companies would now devolve on his son Claus Spreckels. The senior Spreckels has been active head of the companies for thirty-six years, but he intimated he might soon retire.

Operation of One-Man Cars Still an Issue in Wisconsin

The litigation instituted by the city of Milwaukee to abolish one-man cars on the railway lines in Milwaukee will be advanced another step. It is now announced that the city will appeal to the Wisconsin Supreme Court from the recent decision of Judge E. Ray Stevens of the Dane County Circuit Court at Madison, who upheld the verdict of the Railroad Commission in its decision allowing the Milwaukee Northern Railway to continue the operation of one-man street cars in Milwaukee.

The city attorney says the commission has exceeded its powers granted by statute and that the decision as to the complement of a car crew in the city should be vested in its Common Council.

This new appeal will be in the form of a test case.

On May 22 the committee on recommendations of the Wisconsin Legislature recommended that the bill be killed which had been introduced by Senator J. J. Hirsch, Milwaukee, calling for the abolition of one-man cars from the streets of Milwaukee. After this action he offered an amendment providing that the authority for the operation of these cars should be vested with the Common Council. On May 24 the Hirsch bill was definitely killed by the Legislature.

Making Effective Jim Crow Provisions

Jim Crow provisions of the ordinance recently adopted by the City Commission of Birmingham effecting a settlement of all issues between the city and the Birmingham Railway, Light & Power Company, were put into effect on eighty-three cars of the company on July 1 and will be made effective on all cars within ten days. All provisions of the general settlement including regulations, which practically banned all jitneys from the streets, were to have become effective July 1, when a reduction in cash car fares from 8 to 7 cents and a reduction on tickets fares from 6¾ to 6 cents was to be granted by the company. However, the enforcement of the jitney regulations has been held up by a temporary injunction granted by Judge William M. Walker in the Chancery division of the Circuit Court. Hearing on the injunction proceedings is set for July 11.

Under the terms of the agreement between the city and the Birmingham Railway, Light & Power Company and the receivers, the provisions of the settlement were not to take effect until the jitneys regulations were put into effect. However, the company is making the Jim Crow provisions of the ordinance effective at once. Boards separating the sections of the cars set apart for white and colored passengers, extending from the back of the seats to the top of the windows are being installed on all cars.

Jitney men have prepared and obtained signatures to a petition for an initiative election to submit a substitute ordinance prepared by the Jitney Owners and Operators' Association to the voters of the city. This petition it is stated probably will be filed with the secretary of the City Commission in a few days.

Ticket-Selling Plan Changed. — The Georgia Railway & Power Company, Atlanta, will start this month issuing tickets at three for 20 cents, it was announced by the company. Heretofore, tickets have been sold for the lines only in quantities of fifteen for $1. The fare in Atlanta is 7 cents.

One-Man Cars in Operation. — Five new one-man cars have been started on the Jule Street line of the St. Joseph Railway, Light, Heat & Power Company, and similar cars are to be put on the Frederick Avenue and Twenty-second Street lines. Twelve cars of this type have been completed by the American Car Company, St. Louis.

Obliges Patrons.—In response to public demand the Tri-City Railway, Davenport, Iowa, has issued a timetable of car schedules. It is in the form of a four-page booklet, which shows the time of departure of cars from the end of the lines, also the first car in the morning, the last regular car at night and the schedule of owl cars.

Fares Reduced.—A change in tariff has been filed with the Public Service Commission, effective July 22, 1923, by the International Railway whereby sixteen tickets good for transportation in either direction between Buffalo and Elwood will be sold for $2. Tickets will be good only on Buffalo-Lockport cars and not good as part payment of any through fare to a point beyond destination named in the ticket.

Arrangement Made for Letter Carriers.—A contract has been entered into between the Milwaukee post office and the Milwaukee Electric Railway & Light Company whereby all letter carriers of Milwaukee in the performance of duty only will be carried on the company's cars for $10,000 a year. Previous to this carriers have been allowed street car tickets for this purpose.

Heavy Bonds for Jitney Operators.—Jitney competition for the Georgia Railway & Power Company in Atlanta was eliminated when the City Council passed an ordinance requiring bus operators to post $5,000 indemnity bonds for the privilege of operating in Atlanta. President Preston S. Arkwright of the railway company states that with jitney competition now virtually eliminated by this new law the company will go ahead at once with an extensive construction and improvement program. Several hundred thousand dollars have already been invested this year in laying new tracks throughout the city, and the work is to be carried out through the rest of the year, Mr. Arkwright states. Operation of bus lines is one of the plans of the company.

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Personal Items

New York Body Elects Mr. Duffey

President of Cortland County Traction Company Honored by New York Association at Bluff Point Meeting

Edwin Duffey, president of the Cortland County Traction Company, Cortland, N. Y., was elected president of the New York Electric Railway Association at the meeting at Bluff Point on June 23. In addition to being president of the railway, which post Mr. Duffey has held for about five years, he is a director of the National Bank of Cortland and a trustee of the Cortland Savings Bank. He was born at Buffalo, N. Y., March 14, 1868. When Mr. Duffey was an infant his parents removed to Middletown, N. Y., where they remained seven years. They then moved to Cortland, where Mr. Duffey has lived ever since. He was educated in the Cortland Normal School and was graduated from Amherst in 1890 with the degree of A. B. In 1893 he was graduated from Columbia Law School. He has since practiced law in Cortland. In 1897 he was elected district attorney and in 1915 was appointed Highway Commissioner of the State of New York, in which office he continued a little more than four years. Since retiring from that office he has been head of the traction company.

Edwin Duffey

William B. Mayo Heads Detroit Street Railways

William B. Mayo has accepted the appointment offered by Mayor Doremus of general manager of the Department of Street Railways, Detroit. Ross Schram will continue as assistant general manager. Mr. Mayo is the chief engineer of the Ford Motor Company and has been a member of the Street Railway Commission since his appointment by former Mayor Couzens when the commission was formed.

His connection with the Ford company will not be severed, but the major part of his time will be given to the railway problem. He is a "free lance" in the Ford organization and is free to devote as much time as necessary to the Detroit Railways.

Engineer and Securities Expert Joins Guaranty Company

Clarence E. Morrow, author of the article "Prospects for Electric Railway Financing in 1923," which appeared in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 6, 1923, page 24, has joined the Guaranty Company, New York, N. Y., in charge of the public utility bond division. He will be associated in negotiations for the purchase of public utility bonds which are underwritten by that company. Since 1921 Mr. Morrow has been connected with the corporation department of Merrill, Oldham & Company, investment bankers of Boston, examining and reporting on properties whose securities were handled by that organization. He was graduated from Whitman College in 1910 and from the Massachusetts Institute of Technology in 1912. Following his graduation at the institute he was an instructor there. For several years Mr. Morrow was chief draftsman with Stone & Webster, Boston, and later was engaged on appraisal and report work in connection with electric railway and electric light and power properties. The Guaranty Company, with which Mr. Morrow has now become connected, is affiliated with the Guaranty Trust Company, of which it is in fact the bond distributing department.

R. E. Skow is now chief engineer of the Lincoln (Neb.) Traction Company. In this position he succeeds J. M. Pawling.

R. M. Hanneford, assistant chief engineer of the Montreal Tramways, has been appointed acting chief engineer to succeed W. F. Graves, resigned.

C. J. Driscoll has replaced H. W. Reade as auditor of the Escanaba Power & Traction Company, Escanaba, Mich. Mr. Driscoll is also general freight and passenger agent.

C. W. Gifford, formerly general manager and purchasing agent of the Brockton & Plymouth Street Railway, Plymouth, Mass., has also been made vice-president.

William Rogers has succeeded Ralph Statler as chief engineer of the Mount Beacon (N. Y.) Association. This property operates 2,000 ft. of cable incline railway to the summit of Mount Beacon.

Mr. Cameron, Business Manager of the "Journal"

David Cameron has been appointed business manager of ELECTRIC RAILWAY JOURNAL and *Bus Transportation* effective July 1. He succeeds L. W. Seeligsberg, who has resigned to engage in advertising work for himself.

Having served in the field as a salesman on both papers for a number of years Mr. Cameron comes to the main office to take charge with a background of selling experience and a knowledge of conditions confronting the manufacturers serving both the railway and bus fields, which are believed to fit him eminently for his new position.

Mr. Cameron has been continuously with the McGraw-Hill Company and its predecessor the McGraw Publishing Company since his graduation from college in 1914. He started in as make-up man on ELECTRIC RAILWAY JOURNAL. After about a year he was transferred to the subscription department, where he served as assistant manager, working on all the McGraw publications. Then for about six months he did some special work for Mr. McGraw, which was terminated when he entered the army air service as a second lieutenant and pilot, serving in France for eight months.

David Cameron

When he received his discharge he came back with the company and was the Chicago district advertising manager of ELECTRIC RAILWAY JOURNAL. Later, with the establishment of *Bus Transportation*, he became the Cleveland district advertising manager for both ELECTRIC RAILWAY JOURNAL and *Bus Transportation*.

Mr. Cameron was born at Houtzdale, Pa., on Feb. 26, 1893. His early education was in the Wellsboro, Pa., High School, and he received his college training in Cornell University, University of Michigan and Dickinson College, Carlisle, Pa. He received his A. B. degree from Dickinson, where he was also elected to the honorary society Phi Beta Kappa.

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Celebration for Mr. Hill's Ten Years Service in Elmira

Employees of a railway know that it isn't all sunshine for their general manager. This was evidenced in Elmira recently, when the forces of the Elmira Water, Light & Railroad Company expressed their appreciation of Frederick H. Hill's cordial relations with them in the ten years service he has given the company. Attorney Halsey Sayles, legal representative of the company for approximately twenty-five years, in behalf of the 300 employees presented a solid silver service to Mr. Hill. The celebration took place at Rorick's Glen dancing pavilion, where a dinner was served, followed by dancing.

It was on May 12, 1913, that Mr. Hill became identified with the Elmira property as chief engineer. A short time later he was promoted to the position of general manager to succeed H. M. Beardsley, resigned. Later Mr. Hill was elected vice-president and today he is serving in that capacity as well as general manager. The Elmira newspapers, too, commented favorably on Mr. Hill's accomplishments, declaring that the unexcelled car service, the modern artificial gas plant and a satisfactory electric light and power service were all achievements of the corporation under Mr. Hill's supervision.

J. C. Bennett Elected Director of Westinghouse Electric

James C. Bennett, comptroller of the Westinghouse Electric & Manufacturing Company, has been elected a director of the company to succeed John R. McCune, who died on May 14.

Mr. Bennett entered the employ of the company almost immediately after graduation from high school in 1886 as assistant to the auditor. Inasmuch as the company had been founded only five months prior to this time, he is one of its oldest employees. Mr. Bennett is also an officer and director of a number of the Westinghouse subsidiary companies.

Mr. Dickson in Providence

E. J. Dickson, formerly vice-president in charge of operation of the International Railway, Buffalo, N. Y., has been elected vice-president of the United Electric Railways, Providence, R. I. He entered upon his new duties on July 1.

A. W. Loasby Made President of Equitable Trust

Arthur W. Loasby, senior vice-president of the Equitable Trust Company, New York, was elected president of that institution on June 26. He entered upon his new duties on July 1, when Alvin W. Krech, president of the Equitable for practically twenty years, retired to become chairman of the board.

Mr. Loasby is well known to electric railway executives throughout New York State, particularly those in Central New York. He played a large part in the reorganization of some of the interurban railways operating out of Syracuse, and previous to accepting appointment to the Equitable Trust Company he was president of the Auburn & Syracuse Electric Railroad and the Rochester & Syracuse Railroad.

Mr. Loasby entered the banking businedd in Syracuse at the age of twenty years when he became identified with the First National Bank of that city. It was not long before his aggressiveness and ability carried him into a vice-presidency of that institution. Subsequently he became president of the Trust & Deposit Company of Syracuse. Later he accomplished a consolidation of those two companies and became the head of the merged institution. He joined the Equitable Trust Company about two years ago.

C. E. Warwick on Leave of Absence

C. E. Warwick, superintendent of the railway lines of the Wisconsin Public Service Corporation, has been granted a leave of absence in the hope of improving his health.

C. H. Allen has been appointed acting superintendent of railways of the company and will be in complete charge of that department pending the return of Mr. Warwick.

E. M. Lunda has been appointed master mechanic in charge of the repair shops and railway equipment of the company.

Allan Cunningham has succeeded L. E. Flint as assistant treasurer of the Manchester Traction, Light & Power Company, Manchester, N. H.

C. D. Vail, railroad and hydraulic expert for the Colorado Public Utilities Commission, has been appointed a member of the commission to fill temporarily the place of Judge Tully Scott, who is ill and unable to perform the duties of his office.

J. T. Hambleton of Pen Argyl, Pa., has been appointed general manager of the Hartford & Springfield Street Railway Company, beginning July 5. Mr. Hambleton succeeds William W. Walker, who resigned to become manager of the Shore Line Electric Company.

George E. Cockings, manager of the Bristol & Plainville Electric Company, Bristol, Conn., formerly the Bristol & Plainville Tramway, has been elected president of the Tenney Service Association, an organization of leading men in the utilities managed by Charles H. Tenney & Company, Boston. For the past twenty-seven years Mr. Cockings has been manager of the electric railway, gas and electric properties at Bristol. The company at Bristol does a combined railway and lighting business. The railway line is about 14 miles long. The general managers are Charles H. Tenney & Company.

Levick P. Miles of Memphis, prominent in electric railway legal circles, was honored by an election as vice-president of the Tennessee Bar Association for West Tennessee at its recent annual meeting held in Nashville.

Major William H. Holcombe, Corps of Engineers, has been detailed as assistant engineer commissioner of the District of Columbia. Major Frank S. Besson will continue to serve as acting engineer commissioner until a successor to Col. Charles Keller is named.

M. Bernard, at one time assistant engineer in the way and structures department of the Brooklyn Rapid Transit Company and more recently office engineer in connection with the construction of tracks for the city of Detroit, is now associated with the Engineering Service Bureau, Tribune Building, New York City.

Frank B. Faris, former attorney-examiner for the Public Service Commission of Indiana and recently associated with the law firm of Haynes & Mote, has entered the general practice of law at Indianapolis under his own name, devoting himself particularly to rate, securities, valuation, tax and other matters affecting public utilities before regulatory boards, commissions and the courts.

H. S. Cooper, well known utility official of Texas, has been chosen city manager of the municipality of Highland Park, a suburb of Dallas, Tex., which maintains a separate government. Mr. Cooper has been in Dallas for a number of years. He was formerly secretary of the Southwest Gas & Electric Association. Prior to coming to Dallas he was general manager of the Galveston Electric Company, a Stone & Webster property that operates the railway lines in Galveston.

Charles G. Blakeslee of Binghamton has been appointed by the Public Service Commission of New York State as counsel to the commission, succeeding Ledyard P. Hale, whose resignation takes effect on June 30 after a continuous service as counsel since the establishment of the Public Service Commission in 1907. Mr. Blakeslee was appointed a member of the Public Service Commission on April 25, 1921, by Governor Miller, his term expiring early this year, when he was succeeded by James A. Parsons of Hornell.

Philip O. Geier, treasurer of the Cincinnati Milling Machine Company, has been appointed to fill the vacancy caused by the death of Judge W. A. Geoghegan on the Cincinnati Rapid Transit Commission. The appointment was made by Mayor George P. Carrol. Mr. Geier was strongly indorsed by the business men of the city. He will serve the balance of the term of Judge Geoghegan, which runs until Nov. 15, 1928. Mr. Geier is prominent in local business and civic circles. He is a director of the Business Men's Club and the Cincinnati Fall Festival Association.

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Obituary

P. N. Jones

P. N. Jones, general manager of the Pittsburgh Railways, died suddenly on July 1 in a Lancaster, Pa., hotel in which he had stopped while en route through the East on an automobile trip with Mrs. Jones and his daughter. The party left the Jones residence the previous Friday evening. Mr. Jones was then apparently in good health. Acute dilation of the heart was given as the cause of death.

Mr. Jones always approached the problems of management from their engineering side. This was quite logical, because first of all he was an engineer. Thus there grew out of the studies of railway operating problems which Mr. Jones made in Pittsburgh and other cities a series of developments embodying many patentable ideas suitable for general application. The creative work of the man really was prolific, so that it is impossible here to do more than merely mention some of the outstanding developments of the railway art for which he was responsible.

Perhaps his most important contribution to the science was the so-called baby motor. The tendency toward lighter weight in car construction set in about 1912. Mr. Jones was one of the first to discern this need under the changing economic status of the industry. Already an advocate of the low-floor car, which had its real inception in 1910 in center-entrance trail cars in Pittsburgh with 22-in. wheels, he found the low-floor car advantageous for all-around application, but impossible of adoption in hilly Pittsburgh with the usual motor equipment. The heavy grades and the severe schedules necessitated the application of a considerable amount of power, notwithstanding the light weight of the proposed car, and even with four motors the minimum motor size that was considered feasible was 30-35 hp.

Unfortunately no existing motors in this capacity could be mounted on axles with 22-in. wheels and give sufficient clearance. Although there was some skepticism as to the possibilities, both commercial and operative, about the prospects of a motor of the required dimensions, the development of a new design was undertaken for the Pittsburgh Railways and carried to perfection under the direction of Mr. Jones. A new method of remote control adapted to these cars also stands to his credit. He was also responsible for the design of a new type of sliding and rolling car door. Quick to discern the advantages of the application of new methods to old problems, Mr. Jones was one of the first to introduce parallel operation first of d.c. railway generating stations and then of a.c. stations.

Mr. Jones was able to apply to the problems that confronted him experience dating back to the early days of the electric railway when he became a shop apprentice in the construction department of the Short Electric Railway Company, Cleveland, manufacturers of the Short electric railway motors. He remained with that company until it was absorbed by the General Electric Company, when he became identified with the Lincoln Electric Company in experimental work. In May, 1894, he entered the testing department of the Westinghouse Electric & Manufacturing Company at Pittsburgh and was made superintendent of city construction in Pittsburgh.

On Jan. 1, 1903, Mr. Jones became manager of the Cleveland sales office and April 1, 1903, he became sales manager at Pittsburgh. Oct. 1, 1905, he resigned to become electrical and mechanical engineer of the Pittsburgh Railways. He was advanced to general superintendent in 1909 and to general manager in 1912, the additional duties of second vice-president being assumed later.

P. N. Jones

Mr. Jones was born near Springfield, Ohio, in 1865. He was educated in the public schools and was graduated from Ohio State University in 1892 as a mechanical and electrical engineer.

He was a member of the American Electric Railway Association, Engineers' Society of Western Pennsylvania, the American Institute of Electrical Engineers and the Pennsylvania Street Railway Association.

F. W. Brooks

Frank W. Brooks, former president of the Detroit United Railway, died in Detroit on June 28 following an extended illness. Mr. Brooks retired from the company at Detroit in 1921. He had not been well for a long time then, but continued in his post at the head of the company because of the need that was felt by his associates of his help and advice at that critical time in the affairs of the company just prior to the city taking over the local lines. The disposition has been quite general since the advent of municipal ownership in Detroit to criticise the former management of the D. U. R., and to charge that the attitude of the officials toward the problem there only served to intensify the feeling against the company. That is something of which it is not easy to judge. It is quite certain, however, that few men can be found anywhere who carried out the trust placed in them more faithfully than did Frank Brooks or at greater personal sacrifice than he. In the last analysis that is the real measure of any man.

The career of Mr. Brooks is virtually the history of interurban railway development, especially in the vicinity of Detroit. Mr. Brooks was born in Waco, Texas, March 4, 1865. He was educated in private schools in Waco and was graduated from the Texas State College, where he specialized in engineering. In 1882 he became identified with the construction of the New Orleans & Texas Pacific Railway. In succession he followed his chosen engineering work with the Queen & Crescent Railway and the Illinois Central system.

From steam roads Mr. Brooks turned to the field of electric railway construction and operation in 1895, when he became general manager of the Rapid Railway at Detroit, then under construction and one of the first lines in the country to develop the use of the trolley for the delivery of freight and mail as well as to carry passengers between the adjoining communities.

When the Rapid Railway, through financial negotiations, passed into the control of the Detroit United Railway in 1903 Mr. Brooks was made assistant general manager. Within a short time he relieved Jere C. Hutchins, at that time president, of the detail work of general manager. In February, 1916, Mr. Brooks was elected one of the vice-presidents of the company. In June, 1916, he was made president following the retirement of Mr. Hutchins to become chairman of the board of directors.

F. M. Weld

F. M. Weld, master mechanic of the department of street railways, city of Detroit, died on June 22. Mr. Weld was fifty-four years of age.

Mr. Weld was well known to electric railway mechanical men throughout the entire country, but particularly to electric railway operators in Massachusetts, where he began his railway career in 1901 with the Wakefield & Stoneham Street Railway. By far the largest part of his career was in New England, but he served on several Indiana properties and at Birmingham, Ala., as master mechanic.

John A. Britton

John Alexander Britton, nationally prominent in the electric light and power field and vice-president and general manager of the Pacific Gas & Electric Company, died in San Francisco on June 29, after a short illness, at the age of sixty-eight. At the recent convention of the National Electric Light Association Mr. Britton had been elected first vice-president. As an executive engineer Mr. Britton did some notable work. He was a member of the American Society of Mechanical Engineers, American Society of Civil Engineers as well as of the American Institute of Electrical Engineers.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Four-Motor Equipment Favored

Development of Low-Floor Car and Need for Rapid Acceleration Increase Popularity of Quadruple Equipment

A study of recent purchases of cars shows that a number of railways which formerly operated two-motor cars are now buying four-motor cars. Increasing traffic congestion and the necessity for rapid acceleration, coupled with the development of the low-floor car, have been important factors in creating this changed sentiment, manufacturers say.

Among the companies which have previously used two-motor equipment and are now buying four-motor equipment is the United Railways of St. Louis. This company's most recent cars are equipped with four motors of 25 hp. to 35 hp. each. The Los Angeles Railway, which in the past has used two-motor equipment, is now buying quadruple equipment. The reasons there are, primarily, the necessity of making more stops and at the same time increasing the scheduled speed. Another factor which no doubt has influenced the Los Angeles Railway is the narrow gage of its track, which is only 3 ft. 6 in. The Chicago Surface Lines recently purchased a large number of quadruple equipments for heavy cars, and at the same time a number of double equipments with the same type motor for use on light-weight cars. Had it not been for the desire to use the same type motor on both lots of cars, the light-weight cars would probably have been equipped with four motors.

Other railways which have in the past operated many two-motor cars and which now appear to favor the four-motor type include the Boston Elevated Railway, where all recent purchases for surface cars have been quadruple equipment of 25 hp. and 40 hp. capacity; the Capital Traction Company, Washington, D. C.; the Houston Electric Company, which has recently purchased quadruple equipment of 35-hp. motors; the Louisville Railway; the Milwaukee Electric Railway & Light Company, and the Cincinnati Traction Company.

In the South, where climatic conditions are particularly favorable to the use of two-motor cars, there appears to be nevertheless some tendency toward the use of quadruple equipment. Besides the Houston Electric Company, already mentioned, several other companies have recently bought quadruple equipment of 35-hp. motors. Among these are the Georgia Railway & Power Company, Atlanta, Ga.; the Birmingham Railway, Light & Power Company, and the Memphis Street Railway.

Aside from the question of traffic and the need for rapid acceleration there is room for argument concerning the relative economy of two-motor and four-motor equipment. Theoretically the energy consumption of two large motors is less than that of four small motors, because in the former case larger and more efficient machines are involved. The maintenance of the two-motor equipment should cost less than that of the four-motor equipment, because only one-half of the number of motors are in service, and part of the maintenance expense is nearly independent of the size of the motor. However, some railway operators seem to feel that these theoretical advantages are outweighed by the waste of energy caused by the greater slipping of wheels.

Copper Unlikely to Go Lower

The price of copper in the open market today is little higher than it was before the war. While the price of most articles has increased tremendously, copper has made no permanent advance. This is fundamentally an unsound condition, manufacturers say, because the cost of mining and refining has increased in conformity with the increased cost of manufacture in other lines. The present market price, therefore, means that copper is being sold at less than true cost. The reason for this is easy to understand, when it is remembered that it costs hundreds of thousands of dollars per month to keep the plants in condition, even though they are not working. Manufacturers, therefore, prefer to sell their product at a slight loss than to have their plants idle. Obviously, however, this situation cannot be maintained indefinitely. The price of copper therefore seems destined to go higher rather than drop lower.

The improved financial condition of Europe is beginning to result in the purchase of more copper from the United States. This process will probably be gradual and a long time may elapse before our copper export amounts to as much as it used to before the war. At the same time, the use of copper for domestic purposes is also increasing. It is being used in many places where other metals previously were in use. Ultimately, therefore, the combined domestic and export market may be greater than it was in 1914. This will not necessarily boost the price of copper, manufacturers say, because the production capacity in the United States is considerably greater than the present demand. During the war we were able to increase our production approximately 40 per cent. This increase is not now being used, and there is, therefore, a leeway between present demand and ultimate production capacity that will prevent any real shortage. However, a period of approximately three months is required between the mining of the copper and its appearance on the market, so if there should be any sudden wave of buying the price might be temporarily driven upward.

ELECTRIC RAILWAY MATERIAL PRICES—JULY 3, 1923

Metals—New York

Copper, electrolytic, cents per lb.	14.50
Lead, cents per lb.	6.50
Nickel, cents per lb.	29.50
Zinc, cents per lb.	6.10
Tin Straits, cents per lb.	37.75
Aluminum, 98 to 99 per cent, cents per lb.	25.50
Babbitt metal, warehouse, cents per lb.:	
Fair grade	56.00
Commercial	30.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$5.625
Somerset mine run, Boston	2.625
Pittsburgh mine run, Pittsburgh	2.05
Franklin, Ill., screenings, Chicago	1.675
Central, Ill., screenings, Chicago	1.375
Kansas screenings, Kansas City	2.625

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	3.15
Tie plates (flat type), cents per lb.	2.575
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.125
Steel bars, cents per lb.	2.40
Ties, white oak, Chicago, 6 in.x8 in.x8½ ft.	$1.50

Hardware—Pittsburgh

Wire nails, base per keg	3.00
Sheet iron (28 gage), cents per lb.	3.85
Sheet iron, galvanized (28 gage), cents per lb.	5.00
Galvanized barbed wire, cents per lb.	3.80
Galvanized wire, ordinary, cents per lb.	3.35

Waste—New York

Waste, wool, cents per lb.	12–16
Waste, cotton (100 lb. bale), cents per lb.:	
White	11–13.50
Colored	8–13

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal.	$1.11
White lead (100 lb. keg), cents per lb.	12.625
Turpentine (bbl. lots), per gal.	$0.93
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4.75

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	18.00
Rubber-covered wire, No. 14, per 1,000 ft.	$7.45
Weatherproof wire base, cents per lb.	18.50

Paving Materials

Paving stone, granite, 4x8x4, f.o.b. Chicago, dressed, per sq.yd.	$3.50
Common, per sq.yd.	3.10
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.75
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	54.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.75
Cement, Chicago consumers net prices, without bags	2.20
Gravel, ¾-in., cu.yd., N. Y.	2.25
Sand, cu.yd., N. Y.	1.25

Old Metals—New York

Heavy copper, cents per lb.	11.50
Light copper, cents per lb.	9.50
Heavy brass, cents per lb.	5.00
Zinc, old scrap, cents per lb.	4.00
Yellow brass, cents per lb. (heavy)	6.00
Lead, heavy, cents per lb.	5.25
Steel car axles, Chicago, net ton	$20.25
Old car wheels, Chicago, gross ton	21.25
Rails (short), Chicago, gross ton	22.25
Rails, (relaying), Chicago, gross ton	33.50
Machine turnings, Chicago, net ton	10.25

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Rolling Stock

Twin State Gas & Electric Company, Brattleboro, Vt., has ordered three buses costing about $6,500, with a view to putting these into operation on Aug. 1 in place of the railway system.

Southwestern Traction Company, Temple, Tex., suffered the loss of two cars by fire when lightning struck the power house and carhouse located between Belton and Temple. Besides the two cars the fire consumed the repair shops, carhouse and welding plant.

Brooklyn City Railroad, New York, N. Y., has ordered 200 four-motor passenger cars. They will be of the one-man, two-man type, arranged for double-end operation, with front entrance and center exit, the conductor to be located in the center well. They will be 44 ft. long, will seat fifty-three passengers and have an approximate weight of 38,000 lb. They will be fully equipped with Safety Car Devices Company devices and will also be provided with Westinghouse Traction Company variable load brakes. Of these cars 100 will be built by the St. Louis Car Company and 100 by the J. G. Brill Company in Philadelphia. All of the trucks will be furnished by Brill. The Westinghouse and General Electric will each supply 400 motors of 35 hp. capacity. The gears furnished are to be such that they will be completely interchangeable between the two types of motors. All the exterior sheeting is to be .025 copper bearing steel as a rust-resisting material. Delivery is expected in the early autumn. The detailed specifications of the equipment are as follows:

Bolster centers, length	21 ft. 6 in.
Length over all	44 ft.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 3 in.
Height, rail to trolley base	10 ft. 9⅛ in.
Body	Steel
Interior trim	Mahogany
Headlining	Agasote and Nevasplit
Roof	Arch
Armature bearings	Plain
Axles	Heat treated
Bumpers	7-in. Hedley
Signals	Consolidated Car Heating Company
Car trimmings	Statuary bronze
Center and side bearings	Brill oil retaining
Conduits and junction boxes	Crouse-Hinds
Control	K-72-A
Couplers	Emergency only
Curtain fixtures	Crown
Curtain material	Pantasote
Designation signs	Hunter Illuminated
Door operating mechanism	Consolidated Car Heating Company
Fare boxes	Brooklyn Elec. Registering Coin Box
Fenders	Root Spring Scraper Company
Gears and pinions	G.E. Grade M, West. Grade BP
Hand brakes	Peacock Staffless
Heater equipment	Gold Electric
Headlights	Crouse-Hinds Type ZP
Journal bearings	A. E. R. A.
Journal boxes	Brill
Lightning arresters	West. MP and G.E.
Motors	West.-510, G.E.-265
Motors	Inside hung
Registers	International solenoid operated
Sanders	Ohio Brass
Sash fixtures	O. M. Edwards
Seats	Reversible
Seating material	Cherry slat
Slack adjuster	American Brake Company Type J
Springs	Brill
Step treads	Feralun
Trolley catchers or retrievers	Ohio Brass Form M-1
Trolley base	Ohio Brass Form M-1
Trolley wheels or shoes	5-in. wheel
Trucks	Brill 77-E-1
Ventilators	Utility Honeycomb
Wheels	26-in. rolled steel
Lighting fixtures	Dayton Manufacturing Company

In addition to the above motor cars the Brooklyn City Railroad some time ago placed an order with the Westinghouse Company for motors to equip fifty-four existing center entrance trailers built in 1919 and seating sixty-two passengers. The details as to the equipment for converting these cars into double-end motor cars are:

Motors	Two Westinghouse 535-A per car
Trucks	Brill 62-E-1
Control	Westinghouse K-68-A
Air brakes	G.E. Comp. CP-27-B
Fenders	Root Spring Scraper Company
Hank brakes	Peacock Staffless
Trolley bases	U. S.-11
Trolley catchers	Ohio Brass
Lightning arresters	West. Type MP
Registers	International solenoid operated

Track and Line

Madison Street Railway has begun the work of doubling its track on East Johnson Street. New ties, ballast and rail will be installed.

Fort William Electric Street Railway, Fort William, Ont., expects to electrify 5 miles of steam railway. The company announces that it will be in the market for bonding material, trolley and feed wire, crossarms and brackets, etc.

Kentucky Traction & Terminal Company, Lexington, Ky., is installing for the new light-weight one-man city cars ordered in January new passing sidings, two new turning point wyes. The material was contracted for and received.

Southern Public Utilities Company, Charlotte, N. C., will spend $18,000 for track work. The program in accordance with the city paving plan will mean the rebuilding and paving of nine blocks of track. The first three blocks of this paving have been completed.

Abilene Street Railway is building a line to McMurray College, a new educational institution established by the Methodist Church on the outskirts of the city of Abilene. The new line will be about 1 mile long and will be ready for operation by next September.

Power Houses, Shops and Buildings

Milwaukee Northern Railway, Cedarburg, Wis., expects to erect in the near future an adequate passenger station in Sheboygan.

Milwaukee Electric Railway & Light Company suffered the loss of electrical equipment and other supplies valued at not more than $40,000 when the public service building caught fire on June 27. Damage to the building amounted to about $75,000, covered by insurance.

New Jersey & Pennsylvania Traction Company, Trenton, N. J., has abandoned its power station at Yardley, Pa., and is now purchasing current from the Phoenixville, Pa., Electric Company. The current is being sent more than 40 miles to the New Jersey territory. The company will continue to maintain its substations and will keep the plant at Yardley for emergency purposes.

Trenton & Mercer County Traction Corporation, Trenton, N. J., has purchased a large plot of ground on Perry Street, near the center of the city, and will erect a terminal on the site. It is the plan of the company to build a modern terminal, one which will be used not only for the housing of suburban cars, but for transfer points and as a central office for the company. If the company is granted a franchise by the city to operate buses the site will also be used as a terminal for bus routes and as a storage yard for cars for emergency service. The proposed bus service is to be established by the Central Transportation Company.

Trade Notes

George H. Hawley has been appointed manager of the metal departments of the Standard Underground Cable Company's Perth Amboy, N. J., works, to fill the vacany caused by the death of C. C. Baldwin. Mr. Hawley has been production manager for the past three years of the departments in question, which include the melting furnaces, rod, wire brass and tube mills, and those for the manufacture of weatherproof and magnet wire. He has had an unusually wide experience in such work and before going with the Standard company was connected with the National Conduit & Cable Company at Hastings-on-the-Hudson, and for many years prior with the American Brass Company at Ansonia.

Mamolith Carbon Paint Company, Cincinnati, Ohio, has been sold to J. H. Kresge, president of the Kresge Coal & Mining Company, Pittston, Pa. The sale, which involves approximately $300,000, includes the plant, equipment, paint formulas and carbon mines of the company in Arkansas. At present the company is incorporated under the laws of Missouri with a capital of $200,000. The Missouri charter will be surrendered by the new owners and the company incorporated under the laws of Ohio with a capitalization of $500,000. Mr. Kresge will be president, Mr. Dresbach treasurer and Mr. Clements vice-president and general manager.

New Advertising Literature

Combustion Engineering Company has published a folder describing the type K stokers for operating boilers ranging up to 200 hp.

A. Gilbert & Sons Brass Foundry Company, St. Louis, Mo., has just issued a new catalog descriptive of Gilbert's electric railway specialties for motors, overhead line material, steam locomotives and cars. This includes such parts as trolley wheels, armatures and axle bearings and brasses, babbitt and anti-friction bearing metals, trolley frogs, ears and splicers.

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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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HENRY W. BLAKE and HARRY L. BROWN, *Editors*

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Government Regulation for the Coal Industry

THE first report of the United States Coal Commission, covering the anthracite field, is important to electric railways more for what the report indicates will later be said about the bituminous field than for what the report now made public contains. It is of interest particularly for the definite conclusion reached that this industry should be placed under public regulation, though any recommendation as to the form this should take is deferred. Another important recommendation is that there shall be open publicity for all the coal operators' accounts.

The commission speaks of the anthracite monopoly plainly and to the point when it states that the guiding principle must no longer be maximum profit to owners but maximum service to public; and again, when it calls attention to the fact that some of the material supplied to the commission by both operators and the miners' union was intended to inflame the public mind for or against one of the parties. This latter bespeaks the attitude of mind with which the coal men submitted to the investigation, though this attitude has improved as the work went along.

If one admits that the railroads should be regulated, it is difficult to find reasons why the coal industry should not be, for it touches the interest and welfare of everyone the country over with almost the same degree of importance. But regulation is not desired by any industry. It always is a hampering incumbency, as it is so often administered in an ill-advised way. Coal men have had every opportunity, however, to avoid this, had they taken a lesson from the public utilities and the carriers. The men in these industries have learned that the best way to keep government out of business is to sense public demand in advance of governmental requirement. In other words, having regulation, they are now making the most of it by increasingly sincere endeavor to make service the paramount duty in running their businesses.

The report is significant in another respect. Having investigated all the facts, the commission comes out firmly against government ownership and operation. The coal industry is one that many have thought was particularly suited to socialization. But the commission concludes that the public interest will be best served by private operation if supervised, not managed, by governmental agency. This makes the third time in the last four years that a similar investigation by a government body, with only public interest in view, has brought the conclusion that private operation under proper control is the best way of conducting these businesses on which the public is closely dependent. The Esch-Cummins act relating to the railroads and the Federal Electric Railways Commission report were the two previous instances.

The Coal Commission report seems to give a perfectly sound finding. It is fair, though it speaks plainly as to the faults of the industry. Its two principal recommendations—regulation and open publicity of accounts—will go a long way toward improving conditions. In general, it can already be seen that the fact-finding commission is doing a very constructive piece of work.

N. & W. Men Enthusiastic Over Electrification Performance

THERE is no uncertainty in the remarks of N. D. Maher, president of the Norfolk & Western Railway, regarding his experience with electric motive power, as chronicled elsewhere in this issue. President Maher is an enthusiast for electrification in general and for the single-phase-three-phase system in particular because the transportation requirements on his road are being met admirably by this means of operation. That is all he is interested in. Eight years or more ago a dozen electric locomotives replaced more than three times as many Mallets, did work that the Mallets could not do, and were rebuilt to eliminate weaknesses while they were doing it.

These engines played an important part in winning the war. They transported millions of tons of the famous Pocahontas coal on its way to the seaboard, where it was transferred to naval vessels and merchant ships. Their reliability, thus convincingly demonstrated, appealed increasingly to the N. & W. operators until today confidence in the adequate ability of the electric zone to deliver coal without delay to the classification yard at Bluefield is evident among the men throughout the zone itself and in the executive offices at Roanoke. The war was a real test for the N. & W. electrification, but it had another during the shopmen's strike. So reliable was the service, however, even under these conditions, that not a train was refused in the electric zone.

The confidence in the reliability of electric operation is showing itself in a practical way by substantial extensions, and more are being planned. The work just completed and that to be completed in 1923 practically doubles the electrified mileage. The new work is being carried out substantially along the lines laid down ten years ago. There are differences in detail, to be sure, but there is no thought of abandoning the constant-speed motor, which seems well adapted to the local conditions. The overhead contact system, with steel cross-members supported on steel columns, has also been found satisfactory and will be continued on the new construction.

It was rather natural, of course, that the Virginian Railway should adopt the same system as used on the N. & W. since the two roads are such near neighbors over a large part of their routes. Having the same system gives the great advantage of interchangeability of motive power and enables either road to utilize the track of the other in emergencies. But these advan-

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tages doubtless would have been nullified for the Virginian management had there been any fear of unreliability in operation.

Rail Wear Is the Result of Several Causes

THE subject of rail wear is one that is of increasing importance on many street railway systems. So much attention has been paid, in recent years, to the problem of obtaining permanent track structure that this has been attained to a considerable degree. Thus, it now develops that the wear on the head of the rail may determine the life of the track in some cases. This is the conclusion that has been reached by Charles H. Clark, as given in his article in this week's issue, on measurements taken on tracks in Cleveland.

While this may be true with the type of construction and traffic conditions that prevail in Cleveland, there are other factors that enter into the determination of the effective life of steel rails as a general proposition. The relationship of these factors, however, is not very generally known. In many cases, joints are at the point where the wear is greatest and which limits the life of the remainder of the track. A loose joint quickly allows the rail to bend out of shape, which, in turn, results in a hammering on the rail end, soon getting the track out of alignment.

Even when the track is well constructed, there is another factor entering into rail wear, which was not considered in this series of tests. The measurements made would indicate, roughly, that the wear on the rail was proportional to the number of car wheels passing over it. However, observations made in Chicago several years ago showed that on certain busy streets, where car service was light but vehicular traffic heavy, the rail wear was as great as on lines with a considerable amount of street car traffic.

A comparison of the actual amount of the wear caused by vehicles with the wear caused by the passage of car wheels will depend on the relative movement of the two classes of vehicles, so that it cannot be determined unless all the characteristics are known. A study of some of these other elements under the conditions existing in Cleveland, or similar cities, would do a great deal to clear up the question of rail wear and its effect on the life of tracks.

The Opportunity for the Traffic Engineer

THE work of the traffic engineer on the larger railways has become more and more important during the past few years. This position is called by various names on various railways, but it should not be confused with the position of traffic agent or passenger agent. The work of the traffic engineer is to study the problem of operation from the point of view of the engineer. The description in last week's issue, page 13, of the way in which one company reconstructed the system for making delay reports illustrates an important service that this branch of the railway organization can perform. An article which was published recently telling of schedule revision at Toronto is another illustration.

An old proverb tells of the man who could not see the forest because of the trees. A railway transportation department is often in just such a position. The operation of the cars presents a never-ending problem, but because they are so close to it the transportation men are sometimes unable to see its larger aspects. The traffic engineer, on the other hand, free from the duties of keeping the cars moving, can view this problem from a distance and achieve a perspective often quite impossible to a man in the transportation department. Moreover, when a particular phase of the problem becomes specially troublesome, the traffic engineer is able to study it without interruption until some solution of the difficulty is arrived at. This could not be done in the transportation department because the vicissitudes of operation are such that a new problem often becomes distressingly acute before the ultimate solution of the first problem is reached.

Unfortunately, the fact that the electric railways maintained a successful existence for many years before the traffic engineer came into being leads some of the older men in the industry to view with distrust this recently established department. Then, too, the occasional use of a department of traffic engineering as a sort of secret service to investigate the methods of other departments and report on them may tend to embitter the rest of the organization. The true function of a traffic engineer, however, is different from that. His job is not to "show up" a department, but to help it. His job is to investigate every phase of the operation, analyze the results of these investigations and recommend such changes as may tend to improve conditions.

Every sizable company ought to have a traffic engineer, for the savings possible in the average transportation department are greater than can be derived in almost any other phase of railway work.

Exhibits for the Accountants

AT PAST conventions of the American Electric Railway Association there have been practically no exhibits of equipment of interest to the accountants who attend. There was a time, of course, when there was practically nothing of a manufactured nature to show these men. But in recent years labor-saving devices of numerous designs and remarkable performance have invaded the accounts' province and have introduced economies in labor and time that ought to be fully known to every electric railway accountant. These machines are being used at present by electric railways only to a very limited extent, part of the reason probably being the absence of these devices at the one big showplace where railway men foregather to learn of such things.

Investigation discloses the information that there are more than fifty manufacturers of machines and some twenty manufacturers of loose-leaf forms, accounting books and supplies, who produce something of interest to electric railway accountants. These comprise such devices as bookkeeping and billing machines, tabulating machines, adding machines, coin counting and coin sorting and wrapping machines, various calculating machines, and so on.

To these manufacturers, the convention exhibit at Atlantic City, Oct. 8 to 13, offers the best opportunity of the year, in fact the only opportunity, to demonstrate and explain the functions of their machines and the savings possible to a large number of men from all over the country in the space of a few days. The accountants are eager for new ideas in the conduct of their departments, and it is believed they would show a keen interest in exhibits at Atlantic City pertinent to their own work.

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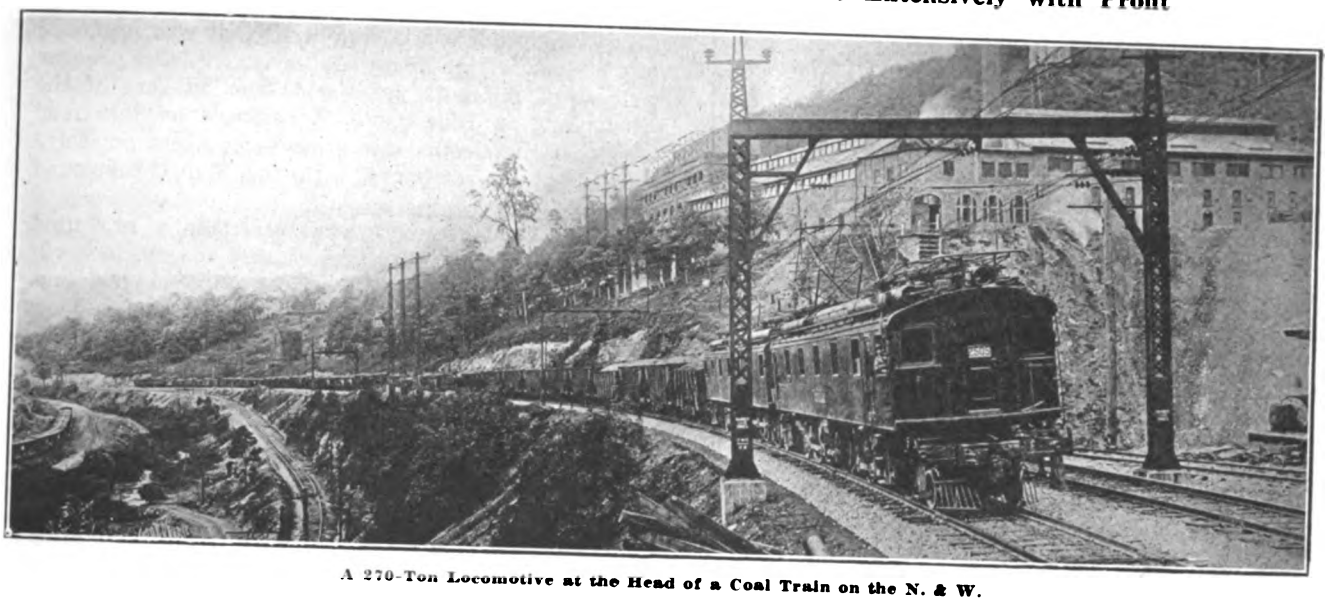
N. & W. Electrification a Good Investment

In an Interview with a Representative of This Paper, N. D. Maher, President Norfolk & Western Railway, Tells Why He Is Enthusiastic for Electric Operation and Believes that It Can Be Used Still More Extensively with Profit



A 270-Ton Locomotive at the Head of a Coal Train on the N. & W.

N. D. MAHER, president of the Norfolk & Western Railway, is one of those progressive railroad men who has sensed the possibilities of railroad electrification in general and on his own property in particular. He has been able to demonstrate the soundness of his convictions, for eight years of electric operation on the N. & W. has postponed enormously the necessity for track and tunnel additions and in addition has proved economical as to running costs.

A representative of the ELECTRIC RAILWAY JOURNAL called on Mr. Maher with a view to asking him a few questions on the subject of heavy electric traction. The answers to these questions showed conviction that there is an assured place for the electric locomotive in the movement of heavy trains under conditions such as obtain on the N. & W.

Asked as to the reasons for electrifying originally, Mr. Maher explained that the railroad was confronted by the necessity for increasing track capacity in the mountain section where the coal fields are located. The "neck of the bottle" was the tunnel through which the track, elsewhere double, is single. The double-tracking of this tunnel was a formidable undertaking. Electrification was the logical solution of the problem and the expenditure of $3,000,000 for electrification was justified by the expected increase in capacity, not only in the tunnel but over the system as a whole. Results have been as expected, the ability of the road to move tonnage having been increased 60 per cent in the mountain section and at least 20 per cent over the system as a whole.

RELIABILITY AN OUTSTANDING FACTOR OF ELECTRIC OPERATION

In reply to a question as to the characteristics of the N. & W. electric locomotive which impressed him as most useful, Mr. Maher enthused over its reliability in getting over the line. Not only is the regular speed which it makes a desirable feature, but its ability to hold to this constant speed under all variations in load and grade is admirable.

Maintenance costs on the N. & W. locomotives, generally known to have been high, were discussed. They were very high at first, Mr. Maher said, but this was not unexpected. The railroad and the manufacturer made mistakes in the designs, but this was to be expected in view of the pioneer nature of the installation; it was part of the game. Correcting the defects was expensive for both, Mr. Maher pointed out, but the mistakes were corrected and maintenance costs are now as low as any other under conditions which are comparable.

Breakdowns were at first troublesome. The weak parts have been made stronger and the new machines now under construction embody the results of the experience with the earlier ones. But in the meantime Mr. Maher feels that the traffic has been handled in a wonderful manner and the development work, carried out under severe operating conditions, was merely an incident.

Mr. Maher pointed out that he is not interested in the technical details of the electrification. He and the transportation department formulated the requirements as to the movements of trains and put it up to the engineers to meet these requirements. Every opportunity was afforded, but the requirements had to be met, and they were met. The faith of the railroad in electric operation is shown by extensions now under way. What is known as the Wilcoe-Farm extension, begun just prior to the war and now practically complete, adds 16 route miles, or 51 single-track miles, to the electrification, and this year a further extension from Farm to Iaeger, including the Auville yard on the Dry Fork branch, has been authorized. This will add 22 route miles, or more than 50 single-track miles.

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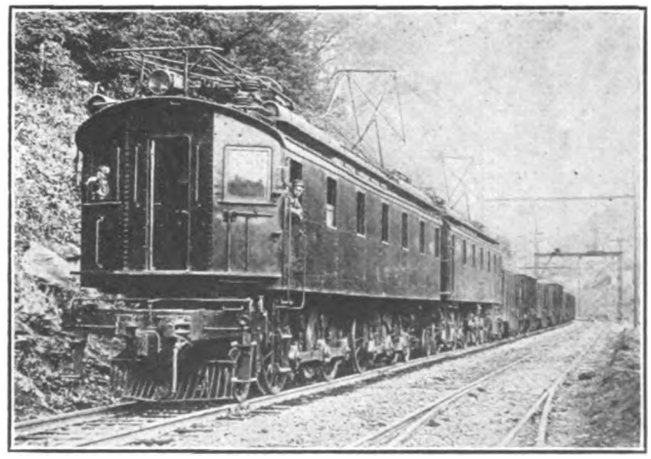


One Leading Locomotive and a Pusher Can Take 3,250 Tons Up a 2 per Cent Grade at 14 M.P.H.

In Mr. Maher's opinion the application of electricity on the line all the way to Norfolk would be a paying proposition.

Selection of Single-Phase by Virginian Railway a Wise One

Owing to the interest in the decision of the Virginian Railway, which closely parallels the N. & W., to electrify a long section at 11,000 volts single-phase, Mr. Maher was asked as to his opinion of the wisdom of this. He replied that it is a wise move in several ways. It will be a paying proposition, as conditions are even more favorable for electrification than on the N. & W., the Virginian being largely a single-track road. Then the possibility of interchanging equipment in emergency makes it desirable for the two roads to use the same system. The Virginian will benefit more from this assurance due to its having but one track. As regional director of railroads during the war Mr. Maher had jurisdiction over both roads and stated that he thus realized clearly how both will benefit by co-operation. In regard to the length of the projected Virginian electrification, which is more than 200 single-track miles, he said, this is logical and the N. & W. might also well electrify as far as Roanoke with good assurance of an excellent return on the investment.

As to the relation of the power plant to the electrification problem on the N. & W., Mr. Maher said that the logical thing is to add to the present electrification to a point which will load the power plant at Bluestone to an economical limit. Work now under way will do this. Projected extension to the west, if carried out, would involve another power plant properly located and loaded to an economical extent.

Coal Saving Is Secondary But Considerable

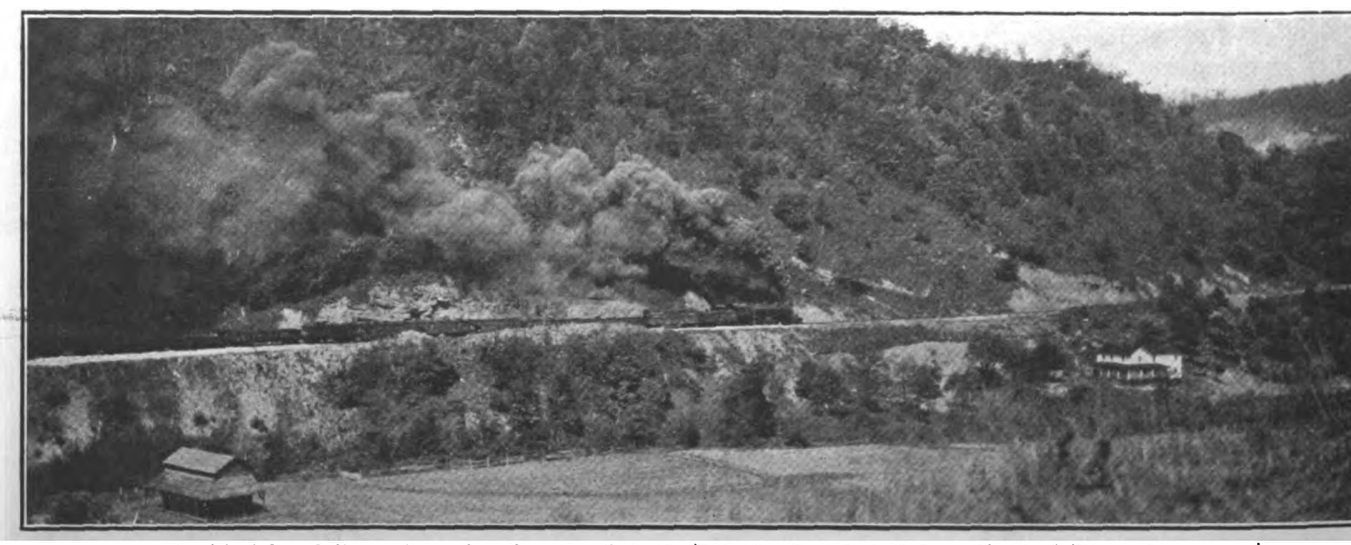
Mr. Maher also spoke of the effect of coal cost on the proposition. While the electrification was undertaken entirely independently of fuel saving, it was profitable from the power standpoint also, even with the pre-war coal cost of 85 cents per ton in the bunkers of the power plant at Bluestone. Experience on this road shows that the electric operation saves about one-third in fuel cost as compared with the Mallet compound engines.

About 12,000 tons of coal per month are used at Bluestone Junction at present and the amount will probably be increased to from 14,000 to 15,000 tons when the extension to Iaeger is complete. Coal now costs about $2.50 per ton, a monthly coal bill of, say, something over $30,000. There is thus a saving of $15,000 or more per month as compared with the steam engines, which will be increased to, say, $18,000 when the extension to Iaeger is completed. In addition to this there will be power plant economies due to the greater output of the station.

Steam Railroad Accident Statistics

STATISTICS on accidents on steam roads during 1922 have just been published by the Interstate Commerce Commission, Bureau of Statistics. The total number of persons killed during the year in all steam railroad casualties was 6,326, of which 1,657 were employees, 203 were passengers, 2,499 were trespassers, and 1,967 were not included in any of these three classifications. The total number of persons injured was 134,872, divided among the four groups mentioned in the following order: 117,197 in the first, 6,712 in the second, 3,129 in the third, and 7,834 in the fourth. The figures given include non-train accidents. Among the details shown are a total of thirty-seven collisions with trolley cars, in which two persons were killed and 169 injured.

The Interstate Commerce Commission calls attention to the fact that highway grade crossing casualties continue to increase.



The Virginian Railway, Operating Near the N. & W., Will Also Be Electrified on the Single-Phase System

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Wear on Rail Head May Determine Life of Track

Measurements of Many Rails in Cleveland Track Show Relative Wear at Stops Is Much Greater than the Average—Relation Shown Between Numbers of Wheels Passing and Rail Wear

By Charles H. Clark
Engineer Maintenance of Way, Cleveland Railway

AN OLD adage among electric railway men is "The life of the track is the life of the joints." Let us see if it is. One company that installs joints says: "The first cost is the last cost," and that the joints are the same as the rail. Several modern types of joints are considered capable of equally good service. We are down to the proposition, therefore, that the life of the track is practically the life of the head of the rail and the structure combined.

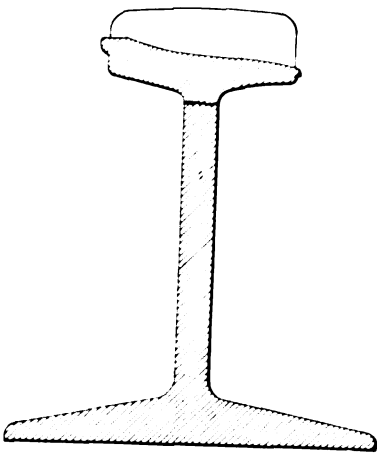
Wear on the rail head is caused by the number of cars that pass over the rail, together with their speed and weight. Wear may come from the rolling of the wheel on the rail, from the grip of the contact between wheel and rail in acceleration and retardation, or from actual slipping of the wheel over the rail. When moving, a car possesses kinetic energy equal to one-half its mass times the square of the speed. To stop the car this kinetic energy must be absorbed. This is accomplished by setting the brakes, causing an impeding friction that is transferred through the wheels to the track. These various actions cause wear on the car wheels, the brakeshoes, and the track. Other things being equal, it may be considered that the wear on the track is proportional to the kinetic energy dissipated in stopping the car.

The average schedule speed of a city car in service such as that in Cleveland is perhaps 11½ m.p.h., but to make such a schedule, including stops, maximum speeds in the neighborhood of 25 m.p.h. must be attained. A 40-ton interurban car, hauling freight or passengers over the same tracks, does not make all the stops that a city car does, but since it cannot pass the city car it cannot attain an average speed to exceed, say, 15 m.p.h. It may be calculated that the 25-ton car going 25 m.p.h. has a kinetic energy of 1,044,200 ft.-lb. as against 601,100 ft.-lb. for the 40-ton car at 15 m.p.h. This indicates that the rail wear from the city car may be the greater, despite the extra weight of the interurban cars.

Measurements Made on Rails in Place to Determine Amount of Rail Wear

In order to determine the effect of these factors on the wear of the rail, careful measurements were made of certain rails in service. The results are shown in the accompanying table. An examination of the figures show that on Jan. 1, 1922, track that had been in service for nine years, with a total passage of more than 20,000,000 wheels, showed a wear of 7/16 in. at car stops and ¼ in. between stops. On another piece of track in another section of the city, which had been in service twenty-one years with a total passage of 19,000,000 wheels, there was found to be the same wear—7/16 in. —on the rail at car stops and ¼ in. wear between stops. The life in these two cases agrees closely, although in the first instance interurban cars used the tracks, while in the other there were none but city cars.

From this investigation the inference may be drawn that the life of the track is determined, to some considerable extent, from the service on it. Since 1903 this company has been relaying its tracks with the best modern construction known at the time, and the last twenty years have shown that this position has been well taken. With increasing car mileage we should expect the life of the track to decrease, all other things being equal. The accompanying chart shows the increase in the average number of cars operated per mile of track for the years 1911 to 1922, inclusive, and also gives the average life in years of the track removed. Cumulative averages for the number of cars per mile and the average age of the track are also given for each year, beginning with 1909. These cumulative averages show the relative wear, although of course a considerable amount of the track removed in the past fifteen years had been built a considerable time prior to the earlier date. An inspection shows that the track laid previous to 1902, and which was removed from ten to twenty years thereafter, showed a decreasing length of life, while the track which was laid after 1902, and removed during the same period of from ten to twenty years, showed an increasing length of life, although the service over it was materially greater than for the older design of track. While the speed of the cars has gone up somewhat, general street traffic has increased materially, causing a great deal more congestion and necessitating more stops. For this reason the maximum speeds also may be higher than they were formerly.



Wear Resulting from 21,000,000 Car-Wheel Passes at a Car Stop with Lorain Rail Section 95-400 in Eight and One-Half Years

The table shows that more than 30,000,000 car wheels have passed over certain track in the downtown district in nine years, and this is still in use. This is the solid concrete steel tie construction. In another part of the

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Service Records of Various Track Constructions in Cleveland

Between	And	Ft. Single Track	Rail Section No.*	Kind of Ties	Foundation	Year Laid	Years in Service	No. of Cars Passed Over	Rail Wear: At Car Stops	Rail Wear: Between Car Stops
BROADWAY LINE										
On Broadway										
Ontario St.	Orange Ave.	1,944	141-395	Oak	Crushed Stone	1904	18	†3,853,723	½ in.	½ in.
On Pittsburgh Ave.										
E. 27th St.	E. 32nd St.	2,025	95-400	Carnegie	Concrete	1916	6	2,105,476	1/16 in.	½ in.
On E. 34th Street										
Trumbull Ave.	Broadway	2,148	103-426	Carnegie	Concrete	1909	13	†3,853,476	1/16 in.	½ in.
On Broadway										
E. 34th St.	E. 55th St.	10,875	100 lb. ARA	International	Concrete	1916	6	2,105,476	½ in.	1/16 in.
E. 55th St.	Union Ave.	3,141	95-400	Carnegie	Concrete	1917	5	1,758,181	1/16 in.	½ in.
Union Ave.	N. & S. S. R. R.	11,171	95-400	Carnegie	Concrete	1917	5	1,342,934	½ in.	½ in.
N. & S. S. R. R.	Harvard Ave.	1,359	95-400	Alternate‡	Concrete	1917	5	1,342,934	½ in.	½ in.
N. Bd. Harvard	C. & P. R. R.	365	95-400	Oak	Crushed Stone	1917	5	2,319,188	1/16 in.	½ in.
S. Bd. Harvard	C. & P. R. R.	365	95-400	Oak	Crushed Stone	1917	5	1,370,188	1/16 in.	½ in.
N. Bd. C. & P. R. R.	Miles Ave.	975	95-400	Alternate‡	Concrete	1917	5	2,319,188	1/16 in.	½ in.
S. Bd. C. & P. R. R.	Miles Ave.	975	95-400	Alternate‡	Concrete	1917	5	1,370,188	1/16 in.	½ in.
On Miles Ave.										
W. Bd. Broadway	E. 93rd St.	539	95-400	Oak	Crushed Stone	1915	7	2,827,648	1/16 in.	1/16 in.
E. Bd. Broadway	E. 93rd St.	539	95-400	Oak	Crushed Stone	1915	7	1,533,177	1/16 in.	1/16 in.
E. 93rd St.	Car House	3,588	95-400	Carnegie	Concrete	1915	7	1,629,666	1/16 in.	½ in.
Car House	Corlett	11,515	95-400	Carnegie	Concrete	1915	7	1,594,698	1/16 in.	½ in.
CEDAR AVENUE LINE										
E. 22nd St.	E. 36th St.	6,313	95-297	Oak	Earth	1901	21	†2,233,214	1/16 in.	½ in.
E. 36th St.	E. 39th St.	2,032	95-319	Oak	Crushed Stone	1906	16	†2,233,214	½ in.	½ in.
E. 39th St.	E. 55th St.	3,294	103-426	Carnegie	Concrete	1909	13	†2,233,214	½ in.	1/16 in.
E. 55th St.	Ashland Rd.	1,346	95-400	Alternate‡	Concrete	1919	3	594,296	½ in.	1/16 in.
Ashland Rd.	E. 65th St.	1,026	95-400	Oak	Crushed Stone	1913	9	1,864,329	½ in.	½ in.
E. 65th St.	E. 70th St.	2,926	95-400	1469 ft. Int'l Ties	Concrete	1919	3	594,296	½ in.	1/16 in.
E. Bd. E. 70th St.	E. 105th St.	6,841	95-400	Carnegie	Concrete	1916	6	1,230,206	½ in.	1/16 in.
E. Bd. E. 105th St.	Fairmount Blvd.	1,278	95-400	Carnegie	Concrete	1916	6	1,230,206	½ in.	1/16 in.
W. Bd. E. 70th St.	E. 84th St.	3,291	95-400	Carnegie	Concrete	1919	3	594,296	1/16 in.	1/16 in.
W. Bd. E. 84th St.	E. 105th St.	3,274	95-400	International	Concrete	1917	5	1,015,371	½ in.	1/16 in.
W. Bd. E. 105th St.	Fairmount Blvd.	984	95-400	International	Concrete	1917	5	1,015,371	½ in.	1/16 in.
Fairmount Blvd.	Priv. R. of Way	855	95-400	Carnegie	Concrete	1913	9	1,864,329	1/16 in.	½ in.
EAST 55TH STREET (CROSS TOWN LINE)										
St. Clair St.	Payne Ave.	5,938	95-400	Carnegie	Concrete	1912	10	2,954,022	N. Bd. ½ in.	½ in.
Payne Ave	Lexington Ave.	695	95-400	Oak	Crushed Stone	1914	8	4,236,930	S. Bd. 1/16 in.	1/16 in.
Lexington Ave.	Hough Ave.	919	95-400	Carnegie	Concrete	1912	10	3,183,618	½ in.	1/16 in.
Hough Ave.	Perkins Ave.	495	95-400	Carnegie	Concrete	1912	10	4,527,488	½ in.	1/16 in.
Perkins Ave.	C. & P. R. R.	1,395	95-400	Carnegie	Concrete	1912	10	2,961,931	½ in.	1/16 in.
C. & P. R. R.	Euclid Ave.	624	95-400	Oak	Crushed Stone	1913	9	2,683,071	½ in.	1/16 in.
Euclid Ave.	Central Ave.	4,406	95-400	Carnegie	Concrete	1913	9	2,683,071	N. Bd. 1/16 in. & ½ in. / S. Bd. ½ in. & 1/16 in.	½ in.
Central Ave.	Scovill Ave.	2,649	95-319	Oak	Crushed Stone	1909	13	†2,961,931	½ in.	½ in.
Scovill Ave.	Woodland Ave.	2,601	95-400	Carnegie	Concrete	1914	8	2,368,443	½ in.	½ in.
Woodland Ave.	Diamond Ave.	2,817	95-400	Carnegie	Concrete	1913	9	2,638,071	½ in.	1/16 in.
Diamond Ave.	Julia Ave.	288	95-400	Oak	Crushed Stone	1917	5	1,464,704	1/16 in.	½ in.
Julia Ave.	Viaduct	715	95-400	Oak	Crushed Stone	1913	9	2,707,224	½ in.	1/16 in.
On Viaduct		1,150	100 lb. ARA	Bridge		1921	2	255,576	0	0
Viaduct	Erie R. R.	4,153	95-400	Carnegie	Concrete	1913	9	2,707,224	½ in.	1/16 in.
Erie R. R.	McBride Ave.	2,410	95-400	Oak	Crushed Stone	1920	2	568,654	½ in.	1/16 in.
McBride Ave.	Broadway	2,536	95-400	Carnegie	Concrete	1914	8	2,391,304	½ in.	½ in.
EUCLID AVENUE LINE										
Ontario St.	E. Roadway	304	95-319	Oak	Crushed Stone	1908	14	†8,958,981	....	1/16 in.
E. Roadway	E. 9th St.	2,639	95-400	Carnegie	Concrete	1913	9	9,354,816	½ in.	½ in.
E. 9th St.	E. 14th St.	2,352	95-400	Carnegie	Concrete	1914	8	6,862,348	1/16 in.	1/16 in.
E. 14th St.	E. 21st St.	3,435	95-400	Alternate‡	Concrete	1920	2	1,275,604	1/16 in.	½ in.
E. 21st St.	E. 40th St.	9,488	95-400	Carnegie	Concrete	1915	7	3,456,607	½ in.	1/16 in.
E. 40th St.	E. 55th St.	2,768	95-400	Oak	Crushed Stone	1912	10	5,299,015	½ in.	1/16 in.
E. 55th St.	E. 57th St.	697	95-400	Oak	Crushed Stone	1913	9	5,053,706	1/16 in.	½ in.
E. 57th St.	E. 105th St.	18,750	95-400	Carnegie	Concrete	1914	8	4,581,042	1/16 in.	1/16 in.
E. 105th St.	Univ. Circle	1,316	95-400	Carnegie	Concrete	1913	9	5,053,706	½ in.	1/16 in.
Univ. Circle	W. Pk. Entrance	539	95-400	Oak	Crushed Slag	1920	2	877,043	½ in.	½ in.
Univ. Circle	W. Pk. Entrance	1,102	100 lb. ARA	Oak	Crushed Slag	1920	2	877,043	½ in.	½ in.
W. Pk. Entrance	E. 118th St.	5,835	95-400	Alternate‡	Concrete	1919	3	1,259,243	1/16 in.	1/16 in.
E. 118th St.	E. 123rd St.	1,370	95-400	Oak	Crushed Slag	1919	3	1,259,801	E. B. ½ in. / W. B. 1/16 in.	E. B. ½ in. / W. B. 1/16 in.
E. 123rd St.	City Line	1,908	95-400	Carnegie	Concrete	1913	9	3,282,010	½ in.	1/16 in.
E. Bd. City Line	Superior Ave.	3,325	95-400	Carnegie	Concrete	1917	5	2,003,191	½ in.	1/16 in.
E. Bd. Superior	Windermere	2,520	95-400	Alternate‡	Concrete	1917	5	2,003,191	½ in.	1/16 in.
W. Bd. City Line	Eddy Rd.	4,512	95-400	Alternate‡	Concrete	1917	5	2,003,191	½ in.	1/16 in.
W. Bd. Eddy Rd.	Windermere	1,335	95-400	Alternate‡	Concrete	1918	4	1,618,182	1/16 in.	1/16 in.
Windermere	Hastings Rd.	9,586	95-400	Alternate‡	Concrete	1918	4	846,354	1/16 in.	½ in.
Hastings Rd.	Ivanhoe Rd.	4,670	95-400	Alternate‡	Concrete	1919	3	651,429	½ in.	1/16 in.
LORAIN AVENUE LINE										
W. 25th St.	Fulton Rd.	4,312	95-400	Carnegie	Concrete	1914	8	1,856,983	E. Bd. ½ in. / W. Bd. 1/16 in.	E. Bd. ½ in. / W. Bd. 1/16 in.
Fulton Rd.	N. Y. C. & St. L. R. R.	8,218	95-400	Carnegie	Concrete	1914	8	2,190,529	½ in.	½ in.
N. Y. C. & St. L. R. R.	W. 73rd St.	4,084	95-400	Carnegie	Concrete	1915	7	1,890,933	½ in.	½ in.
N. Y. C. & St. L. R. R.	W. 73rd St.	820	95-400	Oak	Crushed Stone	1915	7	1,890,933	½ in.	½ in.
W. 73rd St.	Car House	9,394	95-400	Carnegie	Concrete	1913	9	2,485,588	1/16 in.	½ in.
Car House	Old City Line	1,262	95-400	Oak	Crushed Stone	1920	2	405,862	1/16 in.	1/16 in.
W. Bd. O. City Line	W. 117th St.	4,406	95-400	Carnegie	Concrete	1916	6	815,338	1/16 in.	½ in.
E. Bd. O. City Line	W. 117th St.	3,868	95-400	International	Concrete	1917	5	705,034	1/16 in.	1/16 in.
SUPERIOR AVENUE LINE										
E. Roadway	E. 3rd St.	657	95-400	Carnegie	Concrete	1913	9	4,672,862	½ in.	1/16 in.
E. 3rd St.	E. 9th St.	1,813	95-400	Carnegie	Concrete	1913	9	4,672,862	½ in.	1/16 in.
E. 9th St.	Payne Ave.	569	103-426	Oak	Crushed Stone	1911	11	5,568,666	1/16 in.	1/16 in.
Payne Ave.	E. 12th St.	636	103-426	Carnegie	Concrete	1910	12	†3,941,063	½ in.	½ in.
E. Bd. E. 12th St.	E. 22nd St.	2,308	103-426	Oak	Crushed Stone	1910	12	†3,941,063	½ in.	½ in.
W. Bd. E. 12th St.	E. 22nd St.	2,308	103-426	Carnegie	Concrete	1910	12	†3,941,063	½ in.	½ in.
E. 22nd St.	E. 36th St.	7,249	103-426	Carnegie	Concrete	1910	12	†3,941,063	½ in.	½ in.
E. 36th St.	E. 55th St.	8,296	103-426	Carnegie	Concrete	1910	12	†3,959,559	½ in.	½ in.
E. 55th St.	E. 65th St.	3,100	103-426	Carnegie	Concrete	1910	12	†3,954,751	½ in.	½ in.
E. 65th St.	E. 66th St.	656	103-426	Carnegie	Concrete	1910	12	†3,954,751	½ in.	½ in.
E. 66th St.	Ansel Rd.	13,256	103-426	Carnegie	Concrete	1910	12	†3,954,751	½ in.	½ in.
Ansel Rd.	E. 105th St.	3,625	95-400	Carnegie	Concrete	1914	8	3,005,518	1/16 in.	½ in.
E. 105th St.	Car Yard	6,180	95-400	Alternate‡	Concrete	1918	4	1,464,070	½ in.	1/16 in.
WADE PARK AVENUE LINE										
W. Bd. E. 66th St.	E. 79th St.	2,922	95-400	Alternate‡	Concrete	1918	4	692,969	½ in.	1/16 in.
W. Bd. E. 80th St.	E. 86th St.	1,116	95-400	Alternate‡	Concrete	1918	4	692,969	½ in.	1/16 in.
E. Bd. E. 66th St.	E. 71st St.	1,352	95-400	Alternate‡	Concrete	1918	4	692,969	½ in.	1/16 in.
E. Bd. E. 80th St.	E. 86th St.	1,114	95-400	Alternate‡	Concrete	1918	4	692,969	1/16 in.	½ in.
E. Bd. E. 71st St.	E. 80th St.	2,065	95-400	International	Concrete	1919	3	411,238	1/16 in.	1/16 in.
W. Bd. E. 79th St.	E. 80th St.	631	95-400	International	Concrete	1919	3	411,238	1/16 in.	1/16 in.
E. 86th St.	E. 105th St.	3,339	95-400	Alternate‡	Concrete	1919	3	411,238	½ in.	1/16 in.
E. 86th St.	E. 105th St.	2,787	95-400	International	Concrete	1919	3	411,238	½ in.	1/16 in.
E. 105th St.	E. 118th St.	6,071	95-400	Oak	Crushed Slag	1921	1	179,286	½ in.	1/16 in.

* Lorain Steel Company's section unless otherwise specified.
† Record covers years 1911-1921 inclusive.
‡ Alternate Carnegie and International steel ties.
The above record is as of Jan. 1, 1922.

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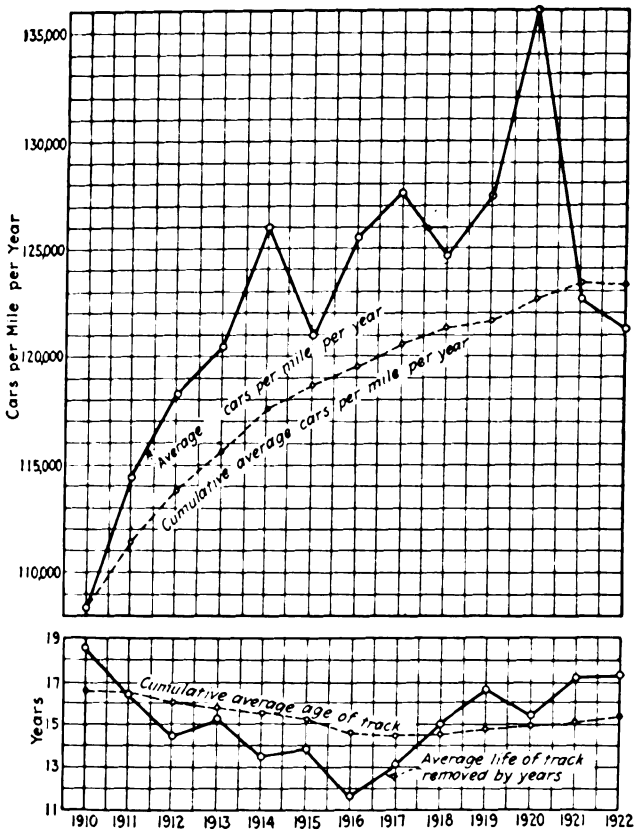
city, tracks which were constructed with a 9-in. tram rail and wooden ties, with dirt foundation, and have had only 16,000,000 car wheels over them, have had to be relaid with modern construction.

It may be questioned whether with the light-weight cars now being used the tracks may be constructed lighter than in previous years. One of the greatest sources of expense in maintaining car tracks, however, is the paving. If the track structure is rigid, the pavement will stay in position. Today the pavement must be constructed to stand the shocks caused by the enormous weights carried on motor trucks and other vehicles. This means that the track structure must be designed to accommodate the improved type of pavement. We also are confronted with the weight of work



Above—Extra Duty of Present-Day Track Is Shown by Increasing Number of Cars per Mile. Below—Average Life of Track Removed Has Been Maintained Despite Added Service

trains and other special rolling stock that necessarily pass over our tracks. It is, therefore, economy to build a type of construction suitable for any traffic that may be placed upon this track providing a large margin of safety.

An accompanying illustration shows the end of a Lorain Steel Company section 95-400 rail which was in service eight and one-half years, and which was taken from a portion of the track at a car stop. About 21,000,000 wheels passed over this rail. It finally failed below the head.

It will be noticed that the wear on the rail is not evenly distributed over the head, due to the coning of the car wheels. Tilting of the rail to an angle of 1 in 25 will allow ⅛ in. more wear on the head of the rail, which means at least 15 per cent more life. For this reason, the Cleveland Railway has redesigned this rail section and is now using a new section, known as section 102-516, instead.

Carrying Safety to the Public—X*

Accidents Now Cost Electric Railways a Large Sum—Greatest Reduction Can Come Only by Enlisting the Public—A Continuous Campaign Is Necessary

By C. W. Price
Vice-President in Charge of Public Safety, Elliott Service Company, New York City.

In this, the last of the series of ten articles, I wish to submit twelve statements, which I believe to be statements of fact which can easily be verified by any railway executive. A careful consideration of these should convince any executive that in his own city or town he should not only give his whole-hearted support to any intelligent effort to organize community safety, but more than this, he should take the initiative in launching such a movement. Judging by the experience thus far the development of public safety in the future, whether it will be slow or rapid, will depend on the initiative and support of the electric railway interests of this country more than on any other one factor.

The whole public safety movement at this particular time is in exactly the same condition as the industrial safety movement was in 1906, and awaits just such an aggressive and constructive leadership on the part of some powerful interest, such as the electric railways, as was given by the United States Steel Corporation to industrial safety in 1907.

Here are the twelve statements:

1. The total cost of accidents to the electric railway systems of the United States each year is approximately $40,000,000. This amount represents some 4.7 per cent of the gross yearly income of the electric railways. Perhaps we can better appreciate the significance of these figures if we will consider that this annual loss to the industry, could it all be prevented, would give a return equivalent to an annual payment of 6 per cent on an investment of $666,000,000.

2. The best figures available reveal the fact that from 50 per cent to 65 per cent of the electric railway accidents are accidents in which automobiles and trucks are involved, and the number of such accidents is growing with the increase of motor vehicles. In 1906 there were 106,928 automobiles in the United States, and there were 374 deaths caused by automobiles. In 1922 there were 12,239,114 automobiles and trucks in the United States, or one motor vehicle to every 8.6 persons. We killed during that year 14,000 men, women and children. Between 1919 and 1922 the number of motor vehicles increased on the average 20 per cent each year and the deaths increased on the average 14 per cent each year.

3. A recent report of the Interstate Commerce Commission points out that steam railroad crossing accidents involving motor vehicles have increased 50 per cent since 1917. An investigation of the accidents at crossings of interurban electric railway lines would doubtless reveal a similar increase of their crossing accidents.

4. A recent analysis of the accident experience of one representative electric railway revealed that from

*Tenth and last of a series of articles.

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65 per cent to 75 per cent of the accidents could not be prevented by any effort on the part of the employees, no matter how loyal they were to the safety idea; if prevented at all they must be prevented by reaching the drivers and pedestrians on the street. It is reasonable to suppose that this finding would apply, with some modifications, to all electric railways.

5. The widespread awakening of interest in the whole problem of traffic safety as reflected by the continuous publicity given in the newspapers to the subject of accidents is most significant, amounting as it does almost to a condition of alarm in many cities. This aroused public interest need only be effectively organized and properly led in order to launch a community-wide campaign for safety which will meet with an immediate response from the public.

6. The present conditions call for immediate action before the accident problem gets beyond control and before aroused public sentiment results in drastic and unreasonable legislation.

7. An investigation on the part of any intelligent railway executive of the experience in the cities mentioned in the previous articles, and others, will convince him beyond a doubt that traffic accidents can be prevented; that the public can be reached with the safety idea. He will be convinced that the methods adopted in these cities have developed beyond the experimental stage and have become clearly defined and established as have methods used in promoting industrial safety.

8. A study of the experience of the cities in which substantial reductions have been made in public accidents reveals the fact that there were five distinct features which were the determining factors in reaching and influencing every man, woman and child in the community. These five factors are:

Safety Week.
Safety instruction in the public and parochial schools.
Continuous poster campaign.
Continuous publicity campaign.
Drivers' school.

All of these features have been fully outlined in the previous articles of this series.

9. It is entirely possible and practicable in a community of any size to conduct at a reasonable expense a safety campaign which includes these five features. Specific instructions in regard to methods for conducting such a campaign, and complete material with which to carry out the program, are now available.

10. Because of their financial interest in community safety it will be found in practically any city or town that the railroads, the trucking companies, the taxicab companies and the larger industries will gladly join hands with the electric railway executives in launching a public safety campaign.

11. An investigation of the experience of electric railways in cities where public safety campaigns have been efficiently conducted will convince any railway executive that any reasonable financial support which he may give to a community effort will yield not only ordinary dividends, but extraordinary dividends on the investment.

12. Railway executives are becoming keenly alive to the fact that accidents in which street cars are involved help to break down public confidence and good will. On the other hand the active participation of railway executives in a great community-wide effort to save human life will just as certainly directly contribute to the building up of an attitude of confidence and good will on the part of the people. This is an asset which progressive railway executives are more and more coming to value.

Summarizing what these ten articles all come to and putting in a nutshell what is the secret of success in reaching the public with the safety idea, these three fundamental principles stand out as of paramount importance in a successful campaign:

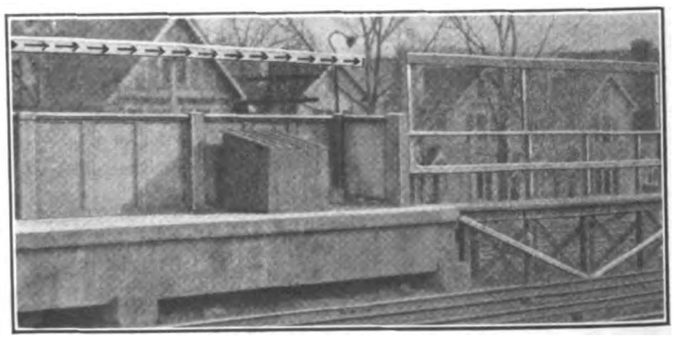
1. An intensive drive at the start off to wake up the community and to demonstrate that accidents can be prevented.

2. Utilization of the already existing agencies in a community, such as the schools, the newspapers, the industries, the police and the clubs, and to have each one function in its own sphere of activity as a big piece of machinery, which when set in motion is capable of reaching continuously day by day and year in and year out thousands of people with the safety message.

3. The visualization of safety through posters and other means so that it is kept continuously and impressively before the people.

Tell-Tale Shows Inaccurate Stops

THE New York Municipal railway operates cars 67 ft. long with three pairs of doors on each side. Many of the trains now being operated are made up in what are termed "three-car units"—that is, the doors for three cars are controlled by a single guard stationed



Tell-Tale Boards Give Warning to Guards When Car Doors Should Not Be Opened

in the center of the middle car. Where these cars run over the elevated structure there are some station platforms which are but little longer than the length of the train. If the motorman stops his train a little too soon or too late, there is danger that one or more of the doors of the end car may project beyond the end of the platform. It is difficult for the guard to know this.

In order to provide a warning signal for the guard under the circumstances, the company has installed tell-tale boards at some of the elevated stations. These boards are approximately 91 ft. long and are installed at each end of the platform at a height of about 7½ ft. above the platform level. The end of the board nearest the end of the platform is painted red for the first 23 or 24 ft., and the remainder has red arrows on a white background. If the center door of a single car unit stops in front of the red portion of the tell-tale board, the trainman knows that the end door of that car nearest the end of the platform should not be opened. If a three-car unit is being operated and the center door of the middle car in the unit is opposite any portion of the board marked with red arrows, the operator knows that all of the doors of the first or last car should not be opened.

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Chicago's Unified Transit Plan Revived

In a Comprehensive Report to the City Council R. F. Kelker, Jr., Outlines a Plan for a Unification of Surface, Elevated, Subway and Bus Lines—Will Give the City Much Faster Service and Allow It to Develop More Uniformly—Previous Plans Amplified to Meet Present-Day Conditions

THE committee on local transportation of the City Council of the city of Chicago some time ago appointed R. F. Kelker, Jr., its consulting engineer, and directed him to prepare a report on a physical plan for a unified transportation system for the city. The report, which has just been made public, consists of 175 pages of reading matter and numerous charts. The present article covers the general recommendations and a discussion of present conditions. The specific references to new construction will be treated in a subsequent article.

In his report Mr. Kelker states that the plan presented shows a marked similarity to the physical plan recommended in the Parsons-Arnold-Ridgway report of 1916, the general features of which had previously been accepted by the committee as a satisfactory basis for local transportation development. The history of Chicago's transportation development is so well known that it should suffice to call attention to the major improvements only, those of greatest benefit to the public being as follows:

1. Construction of elevated railroad.
2. Rehabilitation of street railways.
3. Unification and through-routing of elevated lines.
4. Unification of street railway lines.

The need for rapid transportation facilities was apparent long before the advent of automobiles and motor trucks, and with the streets practically saturated with vehicular traffic as they are today, this need is now more imperative. Unfortunately for Chicago, rapid transit development has not kept pace with the city's growth in population, and during the last decade, while the population has increased nearly 25 per cent, there has been no increase in rapid transit facilities.

General Premises

The fundamental elements of a plan for an adequate transportation system in a metropolitan city may be stated as follows:

1. Long-haul traffic should be carried on rapid transit lines.
2. Short-haul traffic should be carried on surface lines, serving as feeders to the rapid transit lines.
3. Transfers should be permitted and encouraged between surface and rapid transit lines in order to make rapid transit service accessible to all.
4. Independent transportation systems should be unified and operated as a single system, thereby eliminating competition.
5. The transportation system of the city should be planned for the metropolitan area in advance of traffic demands.
6. Existing structures, as far as possible, should be used to form a part of a complete rapid transit system.
7. The transportation system should connect the various outlying commercial centers of the city in such a manner as to provide rapid transit without passing through the congested central business district.

The engineer points out that the growth and development of our large American cities has been dependent in a great measure upon the facilities afforded by local transport. In fact, it is inconceivable that any modern city, small or large, could have been developed without a system of transportation. Through the development of mechanical traction we now have three distinct types of conveyance for metropolitan city service: Rapid transit trains, street cars and motor buses.

Urban traffic may be classified in two general groups: (a) Short-haul traffic that is largely confined to feeder lines on which single cars are operated, and (b) long-haul traffic that is carried on rapid transit lines on which trains are operated.

The service afforded by these two classes of transit is vastly different. One cannot be effectively substituted for the other, and competition should not exist between them. However, when unusual local conditions interfere with or obstruct the normal function of either system, duplication of service with its consequent waste results.

Rapid Transit Lines

The average ride of the long-haul rider on surface cars in Chicago is now about forty-five minutes. High-speed rapid transit service would reduce this time in many instances to twenty-five minutes or less, a saving of not less than twenty minutes. High speed is conditioned on the frequency of stops and length of standing time at stations, all other matters being equal. The prerequisite conditions for rapid transit development are, first, a traffic of sufficient volume to support the heavy fixed charges; second, a minimum number of stations in order to permit the extended use of crest speed; and third, a minimum length of time for station stops, thus reducing the amount of standing time.

The principal factors other than traffic demands essential to the proper location of rapid transit lines are a right-of-way free from interruption of operation by street traffic, and an alignment suitable for high-speed operation of trains. While it is necessary that only subways be built in congested areas, states the engineer, it is his opinion that a rapid transit system for Chicago should consist largely of elevated railroads supplemented by subways. Nearly 4 miles of the usual type of elevated lines can be constructed for the same cost as 1 mile of subway line; consequently for the same investment an elevated railroad will serve four times the area that a subway will serve. It is desirable to travel above ground, enjoying light and air. With the same equipment and adequate signaling devices equivalent speed may be attained in either case. The casual observer forms an idea of speed of subway trains by the apparent rapidity with which the closely set columns flash by the car windows, which is further accentuated by the roar of the trains.

If a rapid transit system were constructed, exclusively of subways, of the same scope and affording the

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same facilities as the plan proposed in this report, states the engineer, then the cost of such a transportation improvement would be greater than the cost of the system proposed by $550,000,000. While not affording any better facilities or service nor yielding any increase in gross revenue, this would increase the annual fixed charges of the unified system by more than $27,000,000. This sum is approximately one-third of the present annual gross receipts of the elevated and surface lines combined. To pay the interest and amortize such an investment would, therefore, add nearly 4 cents to the present fare paid by all car riders.

Street Car Lines

The elevated and surface lines in Chicago have been operated in competition with each other ever since their construction, which has resulted in duplication of service with its consequent waste and unnecessary expense. By co-ordinating these systems and providing for an interchange of passengers between them, this waste can be eliminated.

Several plans for transit improvement have been suggested in which large expenditures for street car subways have been recommended. These have been largely based upon the improvement of street car service itself and the improvement of street traffic conditions by the removal of street cars from the surface in congested areas. The great cost of subways when used solely by street cars limits their location to the congested areas of metropolitan cities. The cars are subject to all the delays and interruptions incident to operation on the streets for the major portion of their routes. It is impracticable to construct subway stations at each street corner. Therefore, the convenience afforded by the usual car operation would be wholly lacking in subway operation. Moreover, in order to utilize a street car subway up to its capacity, a large number of individual street railway lines must be routed so that they will converge at or near the subway portal and operate through the subway on one or more tracks, which tends to retard rather than to facilitate car movement, as car loading is made difficult.

Subways may be used either for single-car operation or for train operation. If street cars are operated on a single track in single units and on twenty-second intervals, a capacity of 180 cars per hour passing a given point can be obtained. However, if a subway is used for the operation of rapid transit trains, then fifty ten-car trains per hour per track can be operated, or 500 cars per hour.

The engineer holds that street car subways are justified when the primary purpose is to relieve street congestion, regardless of the cost involved. In short, these subways form a street expansion in a vertical direction instead of by the usual lateral method. When street widening is impossible, or impracticable because of the expense, the construction of street car subways may be warranted, although the cost is a burden that should only be carried in a small part by the car riders as such. Removing all street cars from streets in the central district and operating them in subways would entail the use of a large amount of capital, which would require higher fares entirely disproportionate to the slight benefit the car riders would receive in return.

The engineer states that he fully recognizes the necessity of relieving the downtown streets from the obstruction caused by street car operation on the surface. As the recommended plan is developed a material improvement in traffic conditions can be economically secured. This will be accomplished by the extension of the elevated system into all parts of the city, with transfers at the intersecting surface lines. This will place the rapid transit system within easy access of a large proportion of the population, greatly increasing the use of the elevated system by diverting the long-haul riders from the street cars to the elevated lines.

The construction of subways in the territory adjacent to the present Loop district will break down the barriers of that district, thereby expanding it into an area four times its present size. The construction of rapid transit subways for through north and south travel will attract a large number of the car riders who now use the street cars. This and other improvements will cause a shifting of the load which will correspondingly reduce the number of street cars operating through to the Loop, as well as throughout the central business district. The demand for street car service then will be of a local character tending to remain constant. It is estimated that at the end of the first period of construction a satisfactory service could be rendered by 70 per cent or less of the number of street cars now operated in the central business district.

Motor Bus Lines

In comparing motor bus lines with street railway lines, the most striking difference is the relatively low initial capital investment for motor bus plant and equipment. The investment for cars and equipment is approximately the same for buses as for street railways, but the latter must have tracks in addition. As the traffic demand increases and additional units are placed in service, the ratio of the track investment to the total investment for street cars is appreciably diminished.

Obsolescence is an important factor in the cost of motor bus operation, and is unfavorable to such service. Buses built only two years ago have been made obsolete by later ones; consequently the cost of displaced equipment is a heavy burden. The power plant and transmission system of a motor bus represents more than 50 per cent of its total value, while the electrical equipment of a street car is about 30 per cent of its total value. The costs of maintenance and depreciation are largely dependent upon these parts of the unit. The gas engine and transmission systems with their many parts are much more costly to renew and maintain than the more simple and rugged street railway electrical equipment and gears. A comparison of the maintenance cost of rubber and steel tires is also unfavorable to the motor bus. Consequently, a point is reached in the density of traffic on a line where the smaller maintenance and renewal cost of the street railway car offsets the advantage of the lower initial investment of the motor bus.

Annual reports for 1922 of the Fifth Avenue Coach Company in New York, and of the Chicago Motor Bus Company in Chicago, show that the cost of operation (maintenance, conducting transportation, etc., including depreciation and taxes) were 8.2 cents and 8.5 cents respectively per passenger carried. On the other hand, according to the annual report of the Chicago Surface Lines for the same year, the above cost of operation was 5.8 cents for each revenue passenger carried. In addition to the items of cost mentioned for motor bus lines the latter figure includes all expenses for the main-

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tenance of paving, cleaning of streets, etc. A comparison of these figures indicates that, at present, motor buses cannot compete economically with street cars on close headway lines where like fares are charged and the length of the average ride remains the same.

RECOMMENDATIONS

After a thorough survey of Chicago's local transportation needs, a careful consideration of the above-discussed principles and a study of the various reports, maps, plans and data, which have been presented to the City Council from time to time, the following recommendations were made by the engineer:

1. Consolidation and co-ordination of all local transportation lines, so as to permit unified operation throughout the city of Chicago.
2. Establishment of a single fare on the unified system within the limits of the city, with transfers between rapid transit and surface lines.
3. Construction of subways and the expansion of existing elevated and surface railways to form a comprehensive and unified system of transportation.

The construction program has been divided into two periods, the first one including such parts of the plan as are urgently required and can be definitely located at this time, while the second includes parts in anticipation of service requirements, changes in the general trend of population and traffic which are likely to occur in the future.

DISCUSSION OF PRESENT CONDITIONS—SURFACE LINES

A description of the present system of transportation in the city of Chicago is next given. The Chicago Surface Lines comprise 1,060 miles of single track and 3,100 cars. This system, which is the combination of a number of subsidiary companies in accordance with the "unification ordinances" of the city of Chicago, is in excellent physical condition, chiefly because of the large expenditures for rehabilitation and extensions made between 1907 and 1911, in which five years about $59,000,000 was expended.

The universal transfer for a single fare on the surface lines and the limited rapid transit development in Chicago have resulted in an average length of ride on the surface lines of 4.2 miles, which is probably longer than that in any other city. The average operating speed of the surface cars between terminals is more than 11 m.p.h., varying from a speed of 5 m.p.h. in the congested areas to a speed of 15 miles in the outlying districts.

Of the total passenger traffic carried by the elevated and surface lines in 1922, the surface lines carried about 80 per cent, or 763,000,000 revenue passengers per annum. In addition to this volume of revenue business there were about 557,000,000 transfer passengers carried.

Under the settlement ordinances of 1907 the city shares in the net receipts of the Chicago Surface Lines to the extent of 55 per cent, as a result of which the city's "traction fund" now amounts to about $27,000,000, in addition to which the companies have offered the city further payments amounting to about $8,000,000. By a further provision of these ordinances 8 per cent of the gross receipts is set aside monthly in a "renewal fund." These accumulations now amount to $14,000,000 according to the reports of the Board of Supervising Engineers, while the combined "capital account" as of Jan. 31, 1923, is $160,975,108.

ELEVATED LINES

The Chicago Elevated Railways operates the rapid transit system of Chicago, which radiates from the central business district. The system comprises 162 miles of track with 1,650 cars and is operated independently of and in competition with the Chicago Surface Lines. The number of revenue passengers carried per annum (1922) is about 181,000,000 or about 20 per cent of the revenue traffic of the two systems.

A free transfer is permitted between the various elevated lines, which is taken advantage of by nearly 50,000 people daily. The average length of ride on the elevated system is about 6.7 miles. The average speed of express trains between terminals is about 20 m.p.h., on portions of the system reaching 25 m.p.h.

The growth of traffic on the elevated system has not kept pace with the increase in population of the city, the principal difficulty in obtaining the maximum capacity being because thirteen tracks converge into the two tracks of the Union Loop. The majority of the people employed in the central business district arrive at their places of employment between 8 and 9 a.m. and leave between 5 and 6 p.m. During intervening hours traffic to and from this district is confined largely to shoppers and visitors, and the total number of people carried in the non-rush hours does not greatly exceed the total volume of the Loop workers who use the elevated in the rush hours.

The value of the physical property and real estate of the Chicago Elevated Railways, according to the Illinois Public Utilities Commission, is $86,250,000 as of June 30, 1919.

BUS LINES

The Chicago Motor Bus Company operates lines on certain boulevards through Lincoln Park and through the northern section of the city, which have been in operation for several years. In April of this year service was extended on the south side, and service on the west side will be initiated in July, according to information furnished by the company. At present ninety-five buses are in operation.

The Depot Motor Bus Company, operating in the central business district, serves several steam railroad stations and carries about 650,000 passengers annually.

The Chicago Elevated Railways has made application to the Illinois Commerce Commission for permission to operate several bus lines as feeders to its system.

PASSENGER STATISTICS

Recent statistics show that the annual revenue passengers carried during the year 1921 by the transportation systems of Chicago were as shown below:

ANNUAL REVENUE PASSENGERS IN THE METROPOLITAN DISTRICT OF CHICAGO

	Revenue Passengers	Per Cent of Total
City Lines		
Surface	750,515,622	71 2
Elevated	180,629,282	17 1
Motor bus	8,428,359	0 8
	939,573,263	89 1
Suburban Lines		
Surface	30,167,803	2 9
High-speed electric	19,575,654	1 8
Steam railroads	65,817,953	6 2
	115,561,410	10 9
Total	1,055,134,673	100 0

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The preceding table shows that of all the traffic in the metropolitan area of Chicago more than 88 per cent is dependent upon the surface and elevated lines.

Street Congestion

Conditions in Chicago's congested traffic areas have reached a point where they are deplorable, according to the engineer. The city's streets were not designed for the great volume of traffic of today. Added to this their usable width has been reduced materially since the advent of the automobile, with the resulting parking nuisance. The space available for street cars, which provide a means of transportation for the general public, is becoming more and more limited.

Recent counts of street traffic outbound from the central business district for a period of twelve hours on a normal week day follow:

SUMMARY OF VEHICLE COUNT
OUTBOUND FROM LOOP DISTRICT OF CHICAGO
(6:30 a.m. to 6:30 p.m., normal week day)

Commercial vehicles	Number	Per Cent	Passengers	Per Cent
Horse-drawn	14,500	17.6	14,500	3.3
Motor trucks	17,180	20.9	17,200	3.8
Total	31,680	38.5	31,700	7.1
Passenger automobiles	42,130	51.3	84,300	18.9
	73,810	89.8	116,000	26.0
Surface cars	8,360	10.2	330,000	74.0
Total	82,170	100.0	446,000	100.0

Nearly 75 per cent of the passenger traffic is carried by surface cars, which are only 10 per cent of the total number of vehicles using the streets.

Pedestrian traffic also is assuming such large proportions that it is now becoming a serious factor in its effect on local transportation. A recent traffic count at State and Madison Streets shows that in one hour there were 46,600 pedestrians entering this intersection and at the same time 1,800 vehicles passed through it.

Counts were made during February and March of this year of the number of people leaving prominent buildings between the hours of 12:30 and 6:30 p.m. It was found that there were forty-one buildings from each of which more than four thousand people passed out in these six hours, the total being 532,300 persons. Of that total 291,000 (55 per cent) left eight of these buildings. The following table shows the concentration of pedestrian traffic created by large buildings in three fifteen-minute periods of the evening rush:

PEDESTRIAN COUNT—EVENING RUSH

Type	5:00-5:15 p.m. Number	Per Cent	5:15-5:30 p.m. Number	Per Cent	5:30-5:45 p.m. Number	Per Cent
Office buildings	21,860	57	11,940	43	11,080	39
Department stores	10,560	28	13,090	48	14,810	52
Public buildings	5,080	13	2,040	7	1,760	7
Hotels	640	2	560	2	590	2
	38,140	100	27,630	100	28,260	100

The movement in the six-hour count was at the average rate of 22,100 for each fifteen-minute period, while the maximum fifteen-minute period shown above is 38,140. The rush-hour congestion is therefore nearly 75 per cent greater than the average.

Population

The population of Chicago has increased from 500 in 1830 to 2,701,000 in 1920. Various forecasts made during the past twenty years estimated a population in 1950 varying all the way from 4,000,000 to 10,000,000 people.

The Chicago Traction and Subway Commission in 1916 estimated that the population of Chicago would be 5,000,000 in the year 1950. This has been adopted by the engineer as a basis for various estimates in this report.

Although the most densely populated districts in Chicago are not as dense as those in other large cities, it is apparent that Chicago has overcrowded housing conditions, caused to a considerable extent by inadequate rapid transit facilities. The following table shows the population area and density of population of various cities:

POPULATION DENSITY IN LARGE CITIES—1920

City	Population	Area of City, Square Miles	Population per Acre
New York City (Borough of Manhattan only)	2,284,103	22	162
Paris	2,906,000	30	151
Berlin	2,200,000	29	118
London	4,483,000	115	60
Paris (Metropolitan District)	4,500,000	185	38
New York City	5,621,151	315	28
Boston	748,060	47	25
Cleveland	796,836	57	22
Philadelphia	1,823,158	130	22
Boston (Metropolitan District)	1,772,254	57	21
Chicago	2,701,705	200	21
St. Louis	772,897	62	19
Detroit	993,739	83	19
Berlin (Metropolitan District)	3,804,000	339	18
Chicago (Metropolitan District)	3,000,000	275	17
London (Metropolitan District)	7,476,000	693	17
Baltimore	733,826	92	13
New York (Port Authority)	8,000,000	1,463	9

In the above table the Metropolitan District of Chicago was determined by adding to the municipality all of the principal suburban communities adjacent, within Cook County, and in addition Hammond, Indiana. Only those communities which can be considered a part of the metropolitan district were included.

A study of the figures above discloses that the population density of Chicago strikes a fair average of the density of other large American cities; the extension of the boundaries of Chicago has about kept pace with the growth of the city, and the population density of the Borough of Manhattan, New York, of London and of Paris, in which cities subway development has been extensive, is greater than that of Chicago.

With the growth of the city there has been a distinct change in location of residential districts, the tendency being for these districts to shift outward and away from the central business district. In the past twenty years there has been a great increase in population in the zones lying between 3 and 9 miles from State and Madison Streets, with a corresponding decrease in the zones within the 3-mile radius. The city has grown physically to the north and south, and to a limited extent to the west. The imposition of an additional street car fare at the western city limits doubtless has been a material factor in the limitation of growth in that direction. The natural physical growth eventually should be such as to include all of the territory lying within a 12-mile radius measured from State and Madison Streets.

In order to encourage the future growth of the city provision should be made for its expansion and uniform development by the construction of transportation facilities somewhat in advance of the immediate need therefor. If the construction of these facilities is long delayed the growth of the city will be throttled. The additional facilities recommended in this report will tend to distribute the population more evenly throughout the area of the city.

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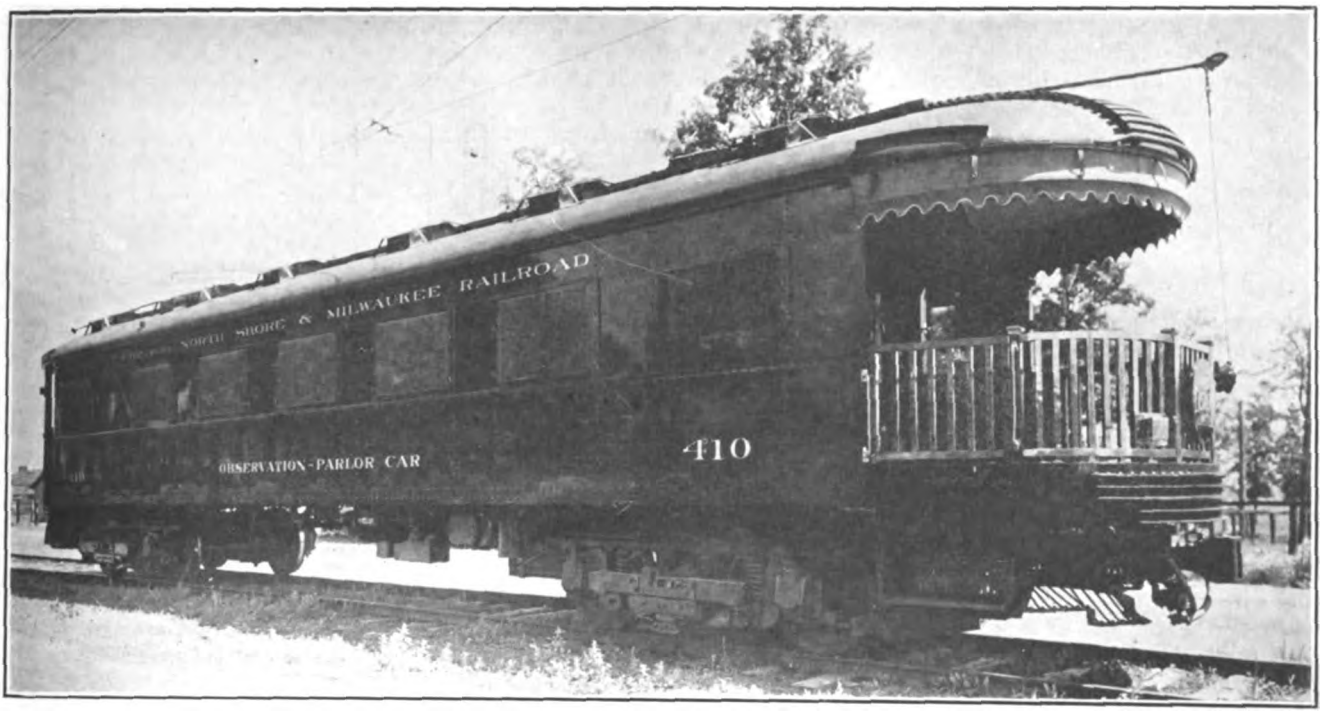


New Observation Car Which Inaugurates Parlor Car Service Between Chicago and Milwaukee

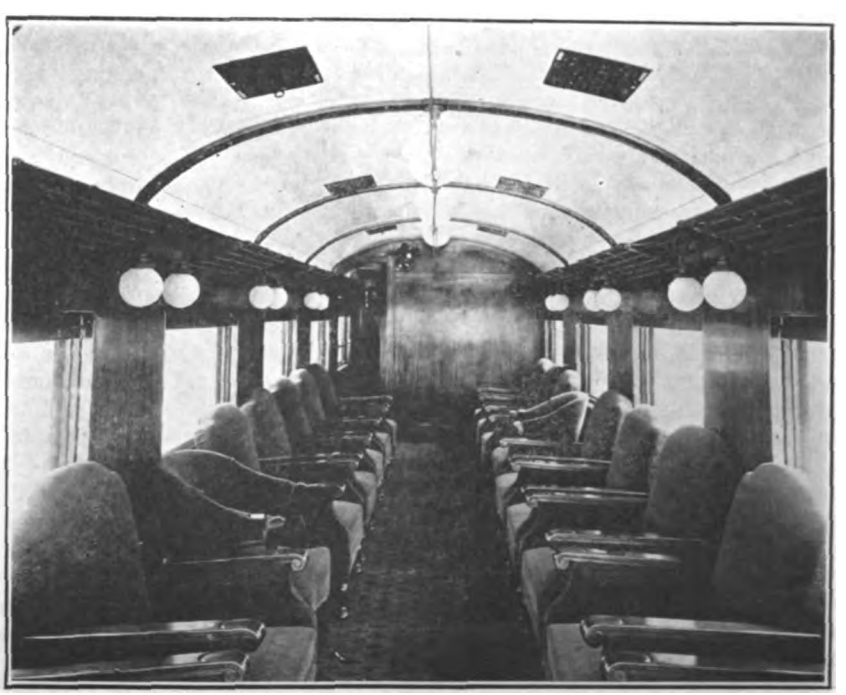
A Car that Makes You Want to Ride

North Shore Line Installs New Design of Parlor Car for Crack Train Connecting with Twentieth Century Limited—Attractiveness and Comfort Are Main Features

THE inauguration of a new observation parlor car service between Milwaukee and Chicago, on the Chicago, North Shore & Milwaukee Railroad, was made with a trial run of a magnificent new car on Wednesday, July 11. A two-car train, made up of a new diner-motor car and the new trail parlor car, carried officials of the company and guests on a run to Milwaukee. Luncheon was served in the dining car, and a fast return trip to Chicago was followed by several trips around the Loop during the evening rush hour—some very effective advertising, incidentally.

This diner and observation car are the first of several new North Shore cars to be delivered by the Cincinnati Car Company. The new diner will be described in a later article. The observation car is of the characteristic North Shore heavy traction design, and is without motors, though equipped with trolley poles. It embodies in the body structure and arrangements much the same design as is used in steam railway observation cars, and as related in detail in ELECTRIC RAILWAY JOURNAL for Sept. 23, 1922, page 470.

The outstanding feature of the car is its inviting



The Observation Platform from Without and the Comfort and Attractiveness of the Interior Should Certainly Attract Passengers

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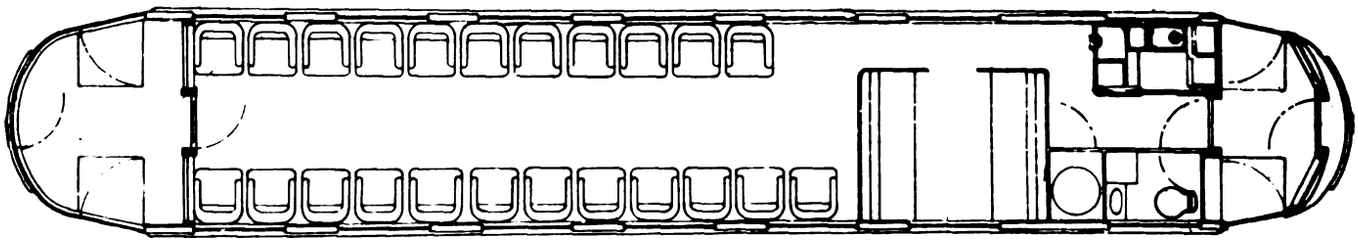

Seating Arrangement North Shore Line Parlor Car

appearance, both inside and out. The main compartment is provided with olive-green plush over-stuffed lounging chairs and green carpet. The interior finish is of mahogany, and the arched roof ceiling is paneled in an artistic manner. Wall fixtures have been provided in addition to the ceiling lights, giving generous illumination. There is a smoking compartment seating six, and a kitchenette from which beverages and sandwiches may be served.

A new plan of heating has been worked out in connection with these cars. They are equipped with the usual hot-water heater, but of small capacity, and in addition, with thermostatically controlled electric heaters. With this combination it is thought that it will be possible to provide just the right amount of heat under any weather conditions, there having been some difficulty previously in keeping the cars from getting uncomfortably warm on mild days, where a hot-water heater of sufficient capacity for the coldest days was the only heating plant. The plan of operation now will be to use the electric heat alone in mild weather, the hot-water heater alone in normal cold weather, with the electric heat coming in automatically to reinforce the hot-water heater in extremely cold weather.

DETAILS OF NEW NORTH SHORE OBSERVATION CAR

Length over all	55 ft. 3¼ in.	Weight	84,000 lb.
Length over body	44 ft. 2⅜ in.	Seating capacity	31
Length of platform	5 ft. 6⅝ in.	Truck centers	32 ft. 8 in.
Length of observation platform	7 ft.	Wheel base	7 ft.
Extreme width	9 ft.	Wheel diameters	36 in.
Rail to top of trolley boards	12 ft. 7⅞ in.	Post centers	35 in.
Rail to bottom of side sills	3 ft. 4 3/16 in.	Type of roof	Arched
Rail to first step	16 1/16 in.	Interior finish	Mahogany
Width over side sheathing	8 ft. 8 in.	Type of heater	Hot water
Vestibule door opening	29 in.	Type of ventilators	Garland-C-1
Train door opening	26 in.	Type of operation	Train
Bulkhead door opening	26 in.	Sash	Brass

A new system of ventilation has also been worked out. The fresh air, coming into the car through a forward intake, passes over the hot-water heater pipes and is then distributed into the car body. It is exhausted through eight ventilators spaced along the roof.

In exterior appearance the car is also decidedly attractive. The observation platform is provided with an awning and the usual folding chairs. All windows are copper screened, and these screens will be replaced in winter with storm sash having individual ventilators.

The accompanying photographs give an idea of the construction and appointments of the observation car, for which the general dimensions and equipment are given in the table above. The new cars of this type will be used in the de luxe train service between Milwaukee and Chicago, forming a part of the regular equipment of the Eastern Limited, which makes connection with the Twentieth Century Limited of the New York Central Lines. A small additional charge will be made for seats in the parlor car.

Regulation of Anthracite Industry Is Recommended

Report of the United States Coal Commission Considers Punitive Legislation Undesirable, but Says that the Time Has Come to Establish Public Control

THE outstanding conclusion in the recent report of the United States Coal Commission on the anthracite situation is that the coal industry should come under public regulation. It is pointed out that coal is quite as much a public necessity as gas, street railway service, or any other service or commodity that has been brought under public regulation. The commission believes that there should be no secrets from the public in regard to mining costs, profits, salaries, wages or corporate relations. Banks and insurance companies are privately managed because it has been found by experience that they can be managed more efficiently and economically on the principle of individual responsibility. But, like railroads, they are required to report to a public authority, and they are subject to such regulation in the public interest as experience may show to be necessary and public opinion may from time to time approve. The guiding principle in such enterprises is no longer maximum profit to the owners but maximum service to the public.

The commission does not recommend the abolition of existing property rights, however much may be said for the view that mineral deposits should have been held from the beginning as national rather than individual property. Government ownership, either by purchase at present value or by expropriation is not recommended. It is thought, however, that a limited natural monopoly like anthracite, held by a relatively small number of individuals, estates and companies, and supplying a necessity of life for millions of people, cannot continue to be treated as if it did not affect the public interest. The time has come, the report says, to establish government regulation, but the commission is not yet prepared to recommend the way in which this can best be accomplished.

An analysis is made to show where the anthracite consumer's dollar goes. In this connection it is interesting to note the distribution of a dollar paid in New York for hard coal. According to the commission 56 cents goes to the mine, 18 cents to the railroad, and 26 cents to local dealers. The commission does not undertake to criticise these amounts, but does say that the subject of freight rates for anthracite is worthy of careful study, and in regard to the local dealer, it mentions the undesirable condition that the source of the coal has more to do with the success of the dealer than the efficiency with which he conducts his business.

The report urges Congress to fix a unified standard of weight for anthracite and bituminous coal throughout the country. At present anthracite is mined, sold

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at the mine, and transported by the gross ton of 2,240 lb., but is retailed in some places by that unit and in some places by the short ton. A reduction in the number of commercial sizes of anthracite is also recommended. Attention is called to the fact that in one instance only, during the war years 1916-1918, has a shortage of anthracite resulted from any other cause than a strike or suspensions at the mines.

Careful sociological studies have been made of the composition of the mining population, living costs and wage rates. In these respects, however, the report is more a presentation of definite facts than a recommendation of policies to be followed. Mention is made, however, of the comparatively large proportion of miners of foreign birth who have made no efforts to become American citizens. It is felt that the companies have been remiss in Americanization work.

Concerning excessive hours of labor, the commission says that in the face of the principle of the eight-hour day, properly accepted in successive agreements since 1916, there can be no justification for the employment of a considerable number of men on shifts of twelve hours or more. Speaking of living conditions, the report says that the impression which a fairminded and sympathetic observer in the anthracite region will gain is of drab and bleak exterior conditions, imposed not by lack of earnings or income but by the very character of the industry. The earnings of full time workers certainly permit the essentials of a reasonable standard of living. Those who take advantage of their opportunity to earn in the various occupations connected with the industry and are not handicapped by serious misfortune need not suffer for shelter, food, clothing or other decencies and comforts of life, even without supplementary earnings of wife or children. On the other hand, many of the families of the miners' helpers or laborers have a very uncertain and inadequate income. Some adjustment of wages and of the terms of employment which will bring larger and more assured income to these laborers is desirable.

Until the total earnings can be compared with the total investment, the public should withhold judgment as to the profits received by the anthracite industry. Judged by this standard the commission says it may be that the margin obtained before the war was too small. If, on the other hand, the pre-war margin was adequate, the present margin may be unduly large, unless in the meantime there has been a marked increase in the investment. The task has proved so involved and far-reaching that the findings of the commission on the subject of the profits of anthracite companies are reserved for a later report. Praise is given to the companies, however, for the way they held down the price during the coal shortage of last winter.

At the end of its report the commission makes this important recommendation:

"The expiration of the contract in the anthracite region should not coincide with the expiration of that in the bituminous region. The contract should run for a definite period of time with the proviso that it shall be deemed to be renewed for a like period of time except as to such provisions thereof in which notice of a desired change shall have been given by either party to the other at least ninety days before the renewal date. Upon these proposed changes the parties shall immediately confer and if, sixty days before the date fixed for the renewal of the contract, they have been unable to agree, they shall report such fact to the President of the United States, specifying clearly the controverted point. The President shall thereupon appoint a person or persons to inquire into and make public the report upon all the relevant facts in the controversy before the date of such renewal shall have arrived."

The commission calls attention to the fact that some of the material presented to it by the operators and by the United Mine Workers is likely, if not actually intended, to inflame the public mind for or against one of the parties. This is the case to an even greater extent in the bituminous controversy. The charges and countercharges are most unfortunate at this period of negotiations. Instead of preparing the public mind as to what will be real justice to the operator and to the miner and what will stabilize the industry, there has been too much of epithet and too little of argument. The commission recommends that each side forget past differences and grievances and attack the problem in a spirit of justice and fair dealing, not only between themselves but with due regard for the rights and sensibilities of the American people.

Selling Transportation in 1890

Some Modern Ideas, Such as the Monthly Ticket, Advocated—Other Methods Used for Building Business—Retrospection Over Thirty Years Reveals Interesting Experience

SO MANY methods of merchandising transportation have been proposed in the last few years that it would seem this is an entirely new idea. It may be interesting to recall a few thoughts presented some thirty-three years ago by Benjamin F. Owen, one-time president of the Reading City Passenger Railway Company, in a paper read before the American Street Railway Association at the 1890 convention and published in the STREET RAILWAY JOURNAL, Vol. 6, page 526. Mr. Owen stated that in 1877 he was made an officer in a street railway about 2 miles long in a city of 40,000 population. The fare was 7 cents. The road had the usual flattering beginning, but latterly had met its deficit by a sale of horses—the trips were reduced until there were only three cars on the road. Since no more horses could be sold, some other means to increase the revenue must be found, or the road would go under.

He soon found that the theory of railroading, so far as the general public is concerned, is, very simply, this:

Adopt a time table with cars as frequent as possible —slightly more than the travel warrants—announce the time of running and run then—a single failure to do so will be quoted against the company for weeks. The next thing was consideration of the fare. The odd amount was not pleasing to the public—it broke a 10-cent piece. The remainder might as well go with it. Five cents, with 3 cents for children, was adopted and tickets sold at six for 25 cents. The writer said that although this change had an immediate effect, the cars still ran empty, passengers looked lonely, felt lonely, and seemed almost guilty when stared at by their neighbors on the sidewalk.

A canvass of the patrons of the road showed but two persons spending as much as $15 a year in carfare. A ticket, giving the one person named thereon the unlimited right to ride for one year, was offered at $12. A few were sold. The price was reduced to $10, with a greater sale. Holders were urged to use the cars frequently to give an appearance of business. The number increased and the price was raised to $15, then to

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$25, and finally abolished to make a market for a life ticket.

The annual tickets met the wants of one class. The workingmen required something with less investment, and there was issued about the same time a monthly ticket, giving the one person named thereon unlimited rides for a month at $1. Within a year the sale reached an inconvenient number, and the price was raised to $1.25—then to $1.50. Their sale was still too great, but, as the ticket was useful to workingmen, it was limited to certain hours and on working days only, and finally the rides were limited, the ticket standing at the time of writing the paper (October, 1890) four rides for each working day in the month—good until 8 a.m., 11 to 12 and 4 to 7 p.m.—not good on Sundays or holidays. It made a ride cost 1½ cents. Passengers could not be carried at that price, according to the writer, but it taught people to ride, it made it possible for workingmen and others to live at long distances from the center, it encouraged building on the outskirts and it made outlying property more valuable. The workingman, taught to ride to his work, used the cars freely on Sundays and holidays, taking wife and children with him. His companions without monthly tickets followed his example and paid 5 cents. The wives soon used the cars to markets and stores, with occasional trips to the cemetery or park.

The article states that 5 cents is an ideal fare, but that in the compact city, short distance travel was very limited. To increase it, reduced rate coupon tickets with thirty rides were offered for $1 each. These tickets steadily gained favor until fully 30 per cent of the gross proceeds of the company came from their sale. The tickets were purchased because they were cheap and used by the riders because they held them.

The Sale of Securities Was Made Easier with a Life Ticket as Bonus

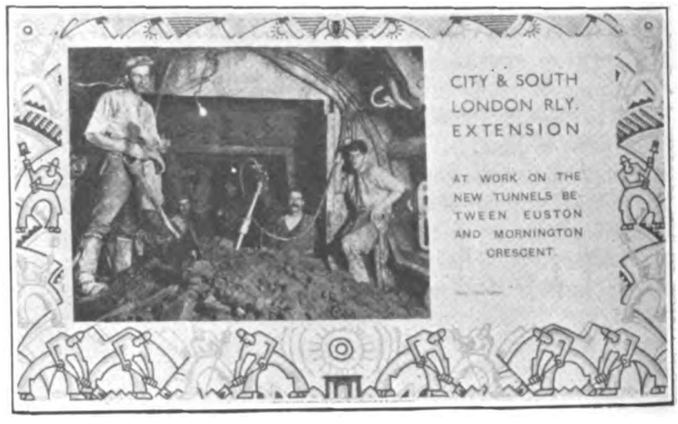
Certain changes in the city made it necessary to abandon a portion of the track, and it was found desirable to build another section to replace it. At the same time the steam railroad built a new station in the heart of the city. The company found it practically impossible, with stock below par and the road mortgaged to build a stable, to sell more stock. It was decided that, as property on the new line would be enhanced in value by the change, property owners should bear the expense of it. A life ticket was offered to each who contributed $300 toward the purpose, the company agreeing to build if the amount were raised. The receipt for the money made the ticket transferable but not redeemable for the first five years and redeemable but not transferable after that date—the ticket to carry one person named on its face. The money was raised and the extension made. The new branch added to the receipts more than was lost from the depot travel, and the holders of the tickets were more than pleased with their bargain. Their property at once found ready sale at lot prices and the tickets afterward changed hands at $400.

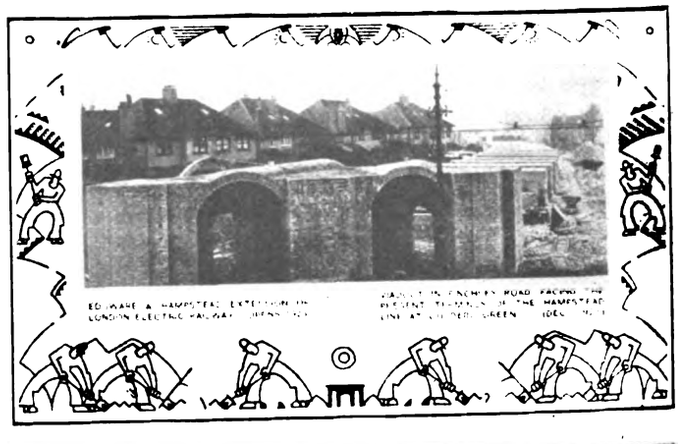
The writer states that the success in this venture proved two things—that if fairly approached property holders would pay for extensions, and that extensions were necessary to make the older portions of the road profitable. After all of these various experiments, the writer states further:

"Expedients to build up travel are sometimes necessary, but the prudent manager will so guard matters as to be able in the end to reach that ideal. Life and annual tickets, coupon tickets and monthly tickets may be good, but regard them only as temporary expedients, to be abandoned when travel is established. Keep the cars clean—have the drivers and conductors attentive and polite, allow no disputes with unreasonable passengers.

All others on the car take sides against the railway company. Keep the public with you by keeping them interested. Have every new move given to the papers. People are curious in small places, and will go out of their way even to see the digging of a cellar. If a plot of ground be open for sale at the end of your line, have your stockholders talk it up, remembering that a new house is worth to you from $25 to $50 per year in carfare."

Making Progress Reports to the Public





THE London Electric Railway is building an important extension of a rapid transit line and is publishing a series of posters, like the three reproduced herewith, to keep the public informed of the progress of this extensive construction work.

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Present Conditions in Norfolk, Richmond and Petersburg

Jitneys Are Troublesome in the First Two Cities—Railless Car Gaining in Popularity, Though Its Use Is Still Limited—Observations of "Journal" Editor on Three Divisions of the Virginia Railway & Power Company

By "Spectator"

WHEN I visited Norfolk early last month I found the jitney problem a serious one for the Virginia Railway & Power Company. The jitneys were probably taking in $2,000 per day. They were thick on the main car-line streets. Many buses were operated, and the larger part of the jitneys were regular buses. The jitneys were being given permits by the city to operate continuously over fixed routes, but obviously it was difficult to supervise operation of these vehicles. The fare charged by the jitneys was 7 cents, the railway fare being 7 cents, or four tickets for a quarter. The car fare was raised from 6 cents, with tickets at the same rate, on June 10, 1923. The hope of the railway management is that the jitneys will be classed as common carriers and brought within the jurisdiction of the state commission. This commission has jurisdiction now over them outside the cities. The principle is, therefore, established that these vehicles are common carriers outside the cities and it is difficult to see how the present system of control can be permanently continued, the railways in the cities having within recent years been taken by act of legislature into the jurisdiction of the state. The public service law of Virginia, it will be remembered, originally comprehended only the steam roads, but provided for extension of jurisdiction to public utilities by legislative action. Such action was taken in 1920, the law having been enacted in 1914.

The recent increase in fare was allowed as necessary with the lowest valuation which had been suggested for the property. The city has recently been making a valuation, and while the result is a value much below that considered equitable by the company, the latter believes that the city appraisal was made in a spirit of entire fairness. Differences lie largely in items on which it is generally difficult for owners and municipalities to agree. The company had a complete appraisal made some years ago by Stone & Webster, which covered the property in great detail. The city considers the value set thus to be much too high. There is this to be said regarding the local situation: Norfolk is governed by a commission of five members elected at large, with details administered by a city manager. There is, therefore, a better opportunity than in many places for an understanding to be reached between the public and the company regarding principles to be followed. The jitney competition is the stumbling block now. The city government goes on the principle that the jitneys furnish necessary transportation and allows practically unlimited competition. With this handicap the company not only loses business directly, but the beneficial effects of increases in fare allowed by the state commission are neutralized by the deflection of patrons to the city-allowed competitors.

A. Merritt Taylor, two years ago, presented a report for the city commission on transportation conditions in Norfolk. His recommendations, if followed, would have improved matters considerably. They have not been followed, at least to any great extent, and the city is therefore losing the benefit of the advice of its own expert. It is possible that the city lacks machinery to put the Taylor recommendations into operation, as it is a large city for the city manager plan, under which it is operated. In the meantime it is fortunate for the railway company that it is also in the light and power business. Enough said.

It was interesting to ride on the free trolley bus, or railless car, as it is called locally, which is, or was, being operated on a loop in the center of town to demonstrate the practicability of this form of vehicle. The bus was furnished by the Brill company and operated by the railway company at the request of the City Council. The Virginia Railway & Power Company is an advocate of the use of this vehicle and would use it for certain services if permission to do so could be obtained. It is doing so in a preliminary way in Petersburg, near Richmond, the only city which has placed no restrictions in its way. In Norfolk the public authorities look favorably on it, and one official went so far as to say to me that it will prove the salvation of the electric railway.

The safety cars are operating in large numbers in Norfolk and nearby Portsmouth, with eminent satisfaction to the public. At one time they were barred from the city due to illy judged agitation. These, like the larger cars, are gradually blossoming out in bright orange enamel in place of the dull green formerly in vogue. While they may thus be more difficult to keep clean they will be better salesmen of the service.

In Norfolk I looked in on the Norfolk Southern, a steam railroad which has a two-route, or rather loop, electric line to Virginia Beach and Cape Henry. This railroad is a joint owner in the fine union station, which while primarily a steam terminal also serves the electrified line.

The Virginia Beach-Cape Henry line formerly carried mainly summer traffic, but the quality of the service furnished is building up all-year business as permanent residents are settling along the line. While the Norfolk Southern track, steam and electric, is practically unballasted, it is substantially constructed and Norfolk & Western excursion trains are handled to Virginia Beach by means of Norfolk Southern electric locomotives.

An interesting feature of the Norfolk Southern shops, which are not extensive as the number of cars to be maintained is small, is that they are housed in ready-made (Truscon) steel buildings. At a cost of

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about $450 per car, sixteen sixteen-bench open cars have recently been converted in these shops into closed cars of very creditable construction and appearance.

Going from Norfolk to Richmond, where the railway also is part of the Virginia Railway & Power Company property, I found the property there, as at Norfolk, Portsmouth and Petersburg, pervaded by the personality of the president, T. S. Wheelwright. Mr. Wheelwright is not a railroad man by training, but from boyhood has shown remarkable executive talent. He is proud of the fact that when a young court stenographer he took dictation (stenographically speaking) from Frank J. Sprague, who was doing pioneer work in replacing the horse (or mule) with electric motive power on the railway in Richmond.

MR. WHEELWRIGHT BELIEVES IN PUBLICITY

Mr. Wheelwright had numerous difficult but ultimately successful business experiences away from Richmond, including the development of the telautograph, but threw up an excellent job to go back to "Old Virginny," without any idea what he was going to do there. It was not long before he had a proposition from Frank J. Gould to manage the Old Dominion Iron & Steel Company in Richmond. Mr. Gould had just acquired this property and wanted a president for it. Through a mutual friend he heard of Mr. Wheelwright and thrust the job on the latter, who knew steel only from the chemical side. Then when Mr. Gould took over the Virginia Railway & Power Company he insisted that its presidency be added to that of the steel company. Mr. Wheelwright, in taking on this latest job in a new field, made a specification that not a cent of expenditure should be made by the company that the public could not be told about. This suited the new owner "to a t." The rule has been followed and the public is coming gradually to respect the policy and bit by bit the situation is improving.

In Richmond I found a peculiar jitney situation, which bids fair, however, to work itself out shortly on economic grounds. In seriousness it does not compare with that in Norfolk. On Franklin and Grand Streets, good residence and business streets where there are no car tracks, a merry warfare is going on between a flock of Fords and other jitneys of the original type, charging mostly a 5-cent fare, and an independent line of excellent buses with good financial backing. The bus promoters expected to kill off the jitneys, even at the fare of 8 cents which they charge, but so far they have been disappointed. It is difficult to figure out how either can succeed in direct competition with nearby parallel rail lines giving excellent service. Except for the effect on the railway revenues, the situation is amusing and the appearance of the ubiquitous little jitneys is especially so. The enactment of the state law mentioned in connection with my visit to Norfolk would clarify the situation.

Richmond is struggling along under a 6-cent fare. It needs more, but is expecting that good service rather than agitation will bring relief. John A. Beeler's organization recently reported on the local situation for the City Council. Mr. Beeler made a number of detailed recommendations, but the city has apparently done nothing with the report as yet, and has given no indication of what it plans to do. In the meanwhile the president insists that the company demonstrate the fact that there are two essentials of utility success—character and credit, especially the former, which applied to electric railway service means quality. This explains his interest in the railless car, which his associates share. If the use of this vehicle were permitted in Richmond it would undoubtedly be applied in certain sections there.

Meanwhile in Portsmouth, where Mr. Wheelwright's company operates the railway, an extension of a line leading to an important city park has been equipped for railless operation. I found two handsome cars in the carhouse awaiting completion of the roadway upon which they are to run. They will serve a newly developed residence section. If the service proves satisfactory, it will be extended, some track in paved streets being removed in connection with the extension.

An unusual incident which occurred recently in Portsmouth was the petitioning of the management by the employees to permit the naming of a new power plant and substation in honor of J. E. Harvell, general manager of the Richmond and Petersburg divisions. The desired permission was granted and a bronze tablet has been placed on the wall of the "Harvell Power Station" commemorating the fact that Mr. Harvell, who still lives in Petersburg, was employed on its site thirty-two years ago. The station has been his special pride and, while not a large plant as modern stations go, it is a jewel in design and construction.

The Readers' Forum

Further Information on the Timber Situation

PUBLIC SERVICE RAILWAY

NEWARK, N. J., July 6, 1923.

To the Editors:

In the issue of the ELECTRIC RAILWAY JOURNAL for May 12 you published a letter from me dealing with the importance and economic necessity for wood preservation and conservation of our national forest resources. You followed this with an editorial along the same lines in the issue of June 2.

Since these latest two comments on this extremely important subject appeared, the United States Department of Agriculture has issued Bulletin No. 1119, dated April 25, 1923, on "Lumber Cut of the United States from 1870-1920." It was prepared by R. V. Reynolds, forest examiner, and Albert H. Pierson, statistician in forest products, United States Forest Service. This bulletin contains sixty-two pages of data and statistics compiled from reports and records of the Forest Service and the Bureau of the Census. It should be read and studied carefully by every consumer of timber in this country, for the facts are so clearly stated as to make their interpretation easy to the non-technical man as well as the engineer.

It is, of course, not possible to make a general review of its contents in a communication of this kind, but there are a few outstanding features which substantiate the statements made in my previous communication to such a degree as to justify my calling specific attention to them. The American Electric Railway Engineering Association committee on wood preservation is attempting to make the electric railway industry realize the seriousness of the situation and do its part. The investigations we have made to date show that the industry does not realize this. We want to make railway

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men understand the condition the industry is approaching. If we succeed in this, half the battle has been won. Through the association we have placed in their hands specifications for wood preservative treatments, and wood preservative oils, the instruments for prolonging the life of their timber, but unless we can impress them sufficiently with the economic necessity for making use of these processes and materials, we have accomplished nothing and our efforts have been largely wasted.

Referring to the bulletin in question, the data show that there has been an average annual decline of 2 per cent in the production of all classes of lumber in the thirteen years since the peak, which occurred in 1907. While the decline has not been continuous, its trend is unmistakable and its magnitude notable. This decline has a more serious meaning when it is compared with an increase of 15 per cent in the population of the United States during the last decade. For such an increase in population, an increase in lumber production would normally have been expected. While part of the decrease in lumber production may be due to an increasing use of brick, concrete and other fireproof materials in building construction, the steadily increasing cost of lumber has certainly been largely responsible.

As the authors have stated: "As the supply decreases, rising prices tend to restrict this use. . . . The average American is using about the same amount of lumber as he did in 1866, fully one-sixth less than in 1890, and 40 per cent less than in 1896. In 1920 for his reduced yearly quota he paid in dollars three times as much as he did in 1890. . . . Even measuring the cost in terms of other commodities, he paid the manufacturer in 1920 more than he did thirty years before for a supply which was nearly one-sixth larger."

The records show that four-fifths of the original Southern pine is gone, and there is in progress a marked drift of lumbermen from the Southern states to the Pacific Coast and to the northern part of the Rocky Mountains. A table in the bulletin shows that lumber production has passed its maximum in all regions except on the Pacific Coast and in the Rocky Mountains. The production curves for these regions are ascending, while those for the Southern states are falling rapidly, and for the first time the production of the Pacific and Rocky Mountain groups exceeds that of the Southern pine group, and the indications are that we must look more and more to the West as the main center of supply. Douglas fir has invaded the Central and Eastern lumber markets to a rapidly increasing degree, until now it is appearing as a prominent factor on the Atlantic Coast, this market being made more accessible by reason of the operation of the Panama Canal.

According to the authors' data, "Not quite 50 per cent of the lumber produced in the United States is consumed north of Tennessee and east of Iowa. Heretofore the average haul of timber to this region has been between 500 and 1,000 miles. Hereafter, a large amount of the supply will have to be hauled between 2,000 and 3,000 miles, although a considerable amount may find its way through the Panama Canal. In the years when much more timber was accessible to waterborne traffic, transportation cost from $1 to $3 per thousand feet. In the year of this report it cost about $9 per thousand from the South and about $20 from the Pacific Coast to New York, the steamer rate from the West Coast to New York in March, 1922, being approximately $18.25 per thousand feet."

There seems to be an opinion among many that our lumber resources are inexhaustible, hence as long as there is plenty for the immediate future why worry about the more or less distant future. But it is a fact that we are cutting in earnest our last reserve of virgin timber and no suitable cycles of new forest have been provided. The result will be that, while we will always have lumber in our markets, the price is going to soar to the point where the average user cannot afford to pay it, and the resulting increased cost will be reflected back, either directly or indirectly, into shelter, food, clothing, fuel, transportation, etc.

The whole problem resolves itself into two considerations. The first, how to postpone the evil day as long as possible, is answered in one way, namely, the use of the most efficient preservative treatment of all timber that can be afforded. The second, that of providing against the day when the present virgin forests have been stripped, is answered by forest culture on an extensive scale.

The absolute necessity for both steps must be recognized. Timber will have to be considered as a national crop the same as our corn and wheat, and, while it will probably never be as plentiful in the future as it has been in the past, there should eventually be sufficient to meet all our annual requirements if such a program is carried out.

HOWARD H. GEORGE,
Engineer Maintenance of Way.

Local Railway Boosts Harrisburg

Mr. Stranger:—

Harrisburg has more public improvements and recreation centers than any other city of its size in Pennsylvania.

Why not become a permanent resident of this city?

Harrisburg Railways Company

Are You a Stranger?

Harrisburg offers you every facility and inducement for getting better acquainted and finally becoming a resident.

Call on the Chamber of Commerce.

Harrisburg Railways Company

Car Cards Used to Stimulate Interest in Locality as Permanent Residence

THE Harrisburg Railways has recently used car cards to direct attention to the advantages of permanent residence in the city. The local Chamber of Commerce reports that they have been successful in stimulating inquiries, which have come to the office by mail, telephone and personal calls.

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Association News & Discussions

Selecting a Railway Motor for a Given Cycle of Duty*

By W. G. Gordon

Traction Engineer, Canadian General Electric Company, Toronto

IN DECIDING on the proper railway motor to adopt for definite street railway service, consideration has to be given to certain variable characteristics which are not met with in any other class of commercially adopted electric drive. The American Institute of Electrical Engineers in its standardization rules defines the nominal rating as the output of the motor on a stand test for one hour under specified conditions.

In the test run for determining the nominal rating only a small proportion of the heat escapes, most of it being used in heating the mass of the motor, so a mere increase in the mass, although without mechanical or electrical value, and without any effect on the service capacity, will increase the nominal rating. The service capacity, as limited by the heating, depends principally on the motor losses and on the capacity of the motor for dissipating heat, both under service conditions. The service capacity is largely increased by a free circulation of air through the motor. There is no relation, therefore, between the nominal rating and the service capacity, as the two are functions of different factors.

The introduction of the interpole has given a wide extension of commutating limits, and with full ventilation the modern motor has a greatly increased capacity for dissipating heat. Modern motors show greatly increased service capacity as compared with nominal rating and the accelerating currents can be much in excess of the rated current. The maximum load permissible for short periods is now determined by the area of brush contact.

In view of the above, the comparison of railway motors on the basis of their nominal rating is misleading, and the only significance that should be attached to this rating is that contained in the A. I. E. E. definition.

Continuous Capacity

The A. I. E. E. standards state: "The continuous ratings of a railway motor shall be the inputs in amperes at which it may be operated continuously at one-half, three-quarters and full voltage respectively, without exceeding the

*Abstract of a paper presented at the convention of the Canadian Electric Railway Association, Toronto, Ont., June 29, 1923.

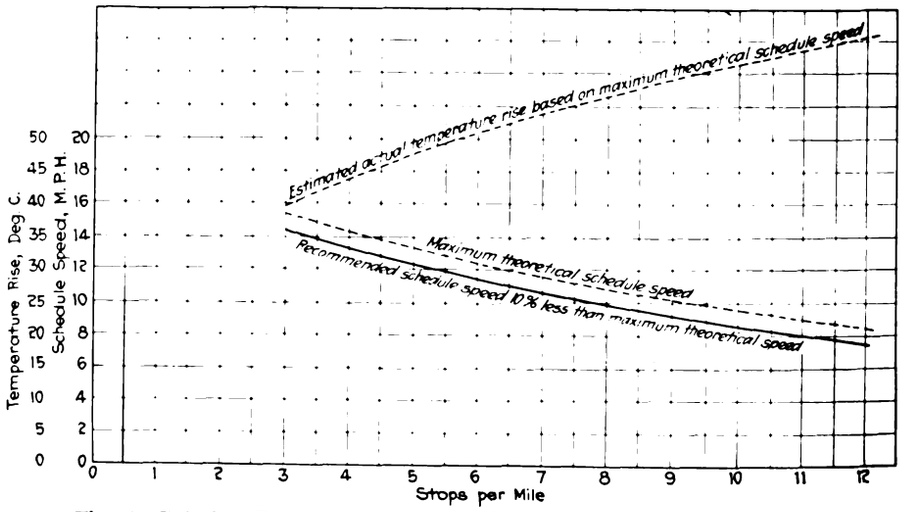

Fig. 1—Relation Between Stops, Schedule Speed and Motor Temperature

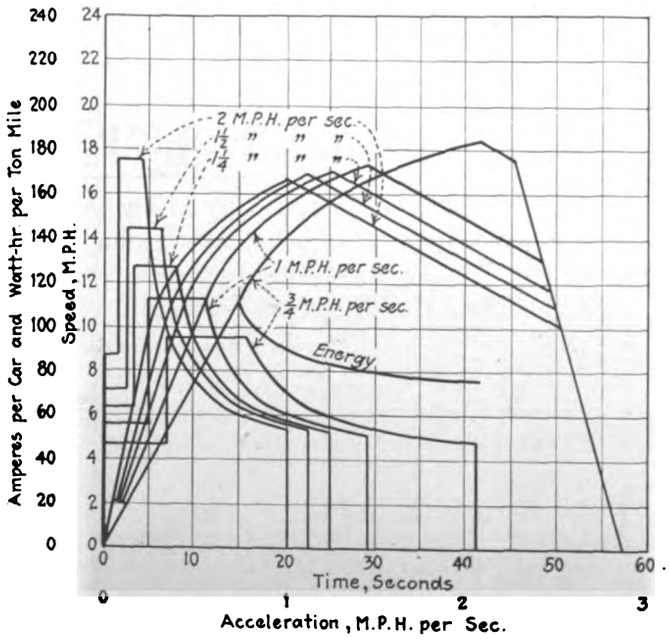

Fig. 2—Decrease in Energy as Acceleration Is Increased

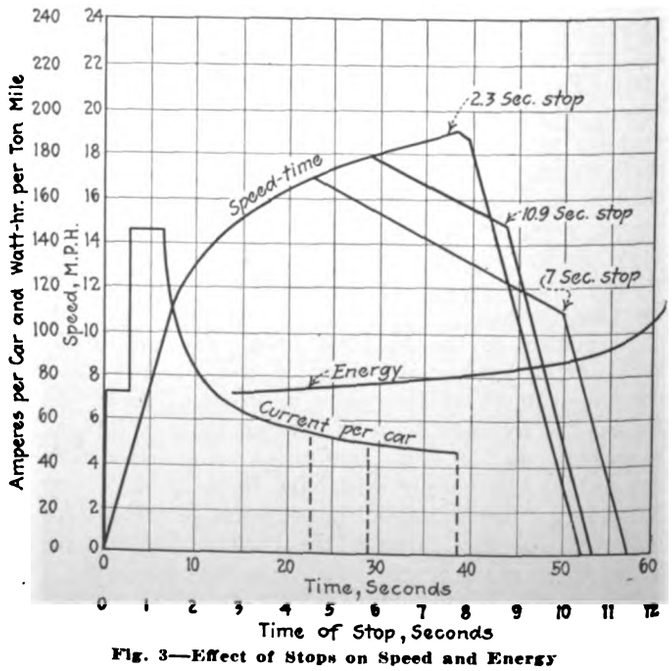

Fig. 3—Effect of Stops on Speed and Energy

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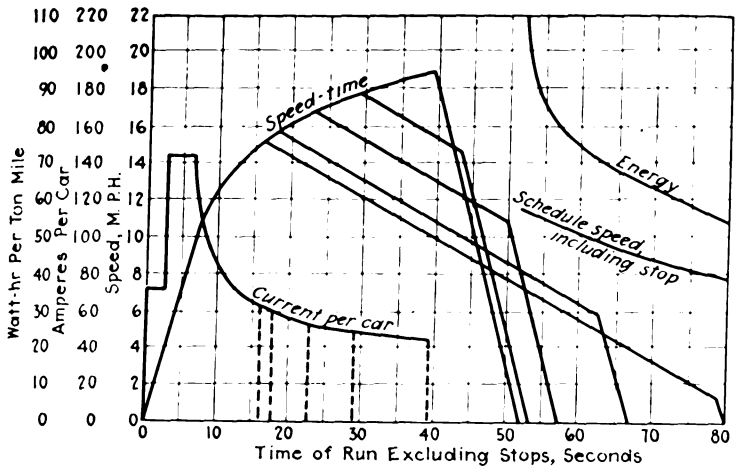

Fig. 4—Relation Between Time of Stops and Energy Consumption

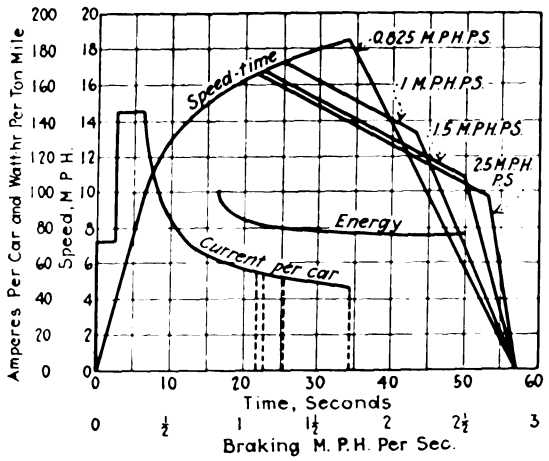

Fig. 5—Decrease in Energy with Increased Rate of Braking

observable temperature rise of 65 deg. C. for the windings by thermometer when operated on stand test with motor covers arranged as in service."

A railway motor in service goes through a series of quite irregular cycles ordinarily constituted of (1) a period of acceleration at heavy current and partial voltage, (2) a period of running at full voltage during which the car accelerates with decreasing current, (3) a period of running without power during which the car decreases in speed, which may or may not include coasting, (4) a period of rest. These periods may vary between more or less wide limits, but they will average up during a day's operation, and curves or tables can be made up from a series of tests to show the practicable schedules for a given motor under various conditions.

If for any particular service special conditions exist such as a long run with continuous grades against the car or the addition of a trailer during certain periods the run is analyzed and the equivalent heating current obtained. This is the value of the current which during the total time of the run, including accelerating, coasting, braking and stop periods, would cause a total energy loss in the windings equal to that for the run. It is equal to the square root of the average square of the current throughout the run. This is then checked against the continuous rating of the motor at the equivalent voltage, which for average conditions in city service is about 300 volts and interurban service with few stops from 400 to 450 volts.

In special cases consideration has to be given to the additional energy input to the motor during winter operation. In one case, to the writer's knowledge, this was about 15 per cent greater during winter than summer for exactly the same service.

The effect of ordinary variables on the performance may be shown best by a specific illustration. Consider a typical fully ventilated commutating pole railway motor, having a nominal rating of 35 hp. with an input of 60 amp. at 600 volts for the standard one-hour run at an armature speed of 1,050 r.p.m. The continuous ratings are 40.5 amp. on 600 volts, 39.0 amp. on 450 volts, 36.5 amp. on 300 volts.

Using four of these motors on a car weighing complete with seated passenger load 45,000 lb., the maximum theoretical schedule speed, the recommended schedule speed and the temperature rise for different stops per mile are shown in Fig. 1. The acceleration and braking are at the rate of 2 m.p.h. per second, and stops are eight seconds long.

Effects of Variables on Motor Performance

Fig. 2 shows the decrease in energy input as the acceleration is increased. The higher the rate of acceleration employed the lower the energy input, and the greater the per cent of coasting becomes, in maintaining the same schedule speed. For example at 0.75 m.p.h. per sec. acceleration the energy input is 110 watt-hours per ton-mile, whereas with 1½ m.p.h. per second acceleration the energy input comes down to 80 watt-hours per ton-mile. There is very little additional saving of energy by increasing the rate of acceleration beyond 1½ m.p.h. per second. These curves are all figured with 1,000-ft. runs and seven-second stops, with 1.5 m.p.h. per second braking, giving a schedule speed of 10.65 m.p.h.

Fig. 3 shows the schedule speed and energy consumption as affected by the number of stops per mile with the same car but with the motors geared for free running speeds of 15, 20, 25 and 30 m.p.h. respectively. With say eight stops per mile, the schedule speed is only slightly increased by using the lower gear ratios, at the expense of considerably higher energy input, whereas with one, two or three stops per mile the increased schedule speed as the gear ratio is reduced is quite marked and much more commensurate with the increased energy input.

Fig. 4 shows the increase in energy consumption to maintain a given schedule speed as the time of stop is increased. For a schedule speed of 10.65 m.p.h. with a seven-second stop the energy consumption is 80 watt-hours per ton-mile, whereas if this stop

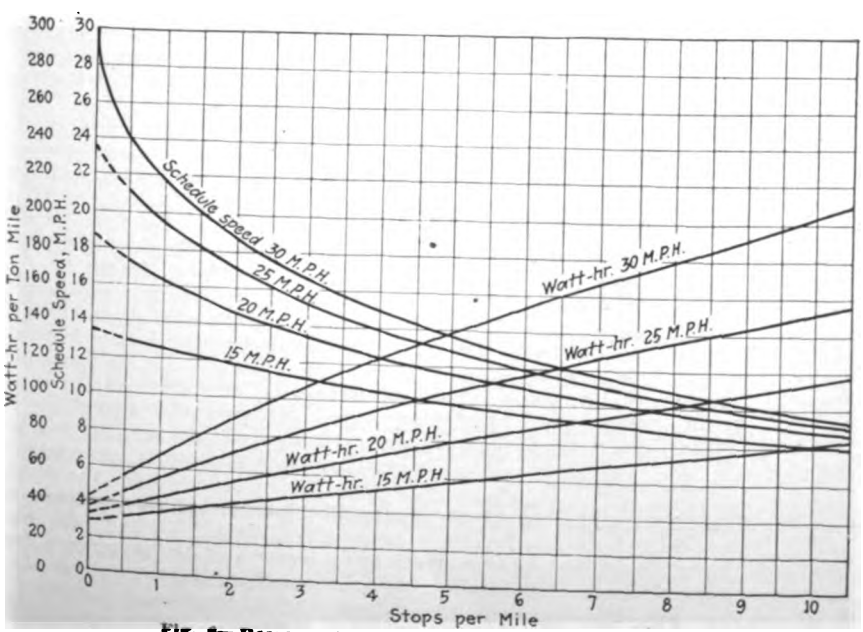

Fig. 6—Decrease in Energy with Increased Coasting

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is lengthened out to 12.3 seconds the energy consumption to maintain the same schedule speed goes up to 115 watt-hours per ton-mile.

Fig. 5 shows the decrease in energy consumption as the rate of braking is increased. With braking at 0.825 m.p.h. per second the energy consumption is 100 watt-hours per ton-mile, whereas by increasing the braking rate to 1.5 m.p.h. per second the energy consumption comes down to 80 watt-hours per ton-mile. Little additional energy saving is effected by increasing the braking rate beyond 1.5 m.p.h. per second.

Fig. 6 illustrates the decrease in energy consumption, current input and schedule speed by increasing the coasting in a 1,000-ft. run. With current on right up to where braking begins the time of run is fifty-two seconds, schedule speed 11.5 m.p.h. and energy consumption 115 watt-hours per ton-mile. With the other extreme of coasting almost to a stop the time of run is eighty seconds, schedule speed 8 m.p.h., while the energy consumption comes down to 55 watt-hours per ton-mile, slightly less than half the energy required when there is no coasting.

These figures indicate the extremes between no coasting and maximum coasting in a 1,000 ft. run and show the benefits of coasting as decreasing the energy consumption, at the expense, however, of the schedule speed.

No individual factor so affects the schedule speed as the number of stops, and this point should be kept constantly in mind.

Midwest Electric Railway Association

THE Midwest Electric Railway Association, composed of operating officials and executives of electric and interurban railways in the states of Missouri, Kansas, Nebraska, Oklahoma and Colorado, and representatives of the various manufacturers or supply companies affiliated with the industry, was organized in Kansas City, in February, 1923. It is not the purpose of the association in any way to conflict with the work of the American Electric Railway Association, but those responsible for this new association felt that much good could be obtained by closer association among the electric railway officials of these states. Each of these states has a utilities association made up largely of light and power company members, but it was thought that the railway men did not get as much recognition and benefit as could be obtained from a strictly railway association.

It is the aim of the organization to comprise all of the electric railways within these states in its membership at an early date, forming a body similar in some respects to the Central Electric Railway Association, whose territory includes Indiana, Ohio and Michigan.

The association's first meeting was held in St. Joseph, Mo., June 21, 1923. About seventy members attended the one-day meeting, which consisted of a luncheon followed by a business session. Short talks on electric railway problems were made by R. A. Leussler, Omaha, Neb.; F. G. Buffe, Kansas City, Mo.; S. B. Irelan, St. Joseph, Mo.; H. B. Cobban, Miami, Okla.; and Frank V. Cook of the Ohio Brass Company. Following these talks, there was a general informal discussion.

The next quarterly meeting will be held the latter part of September at a place to be decided on later.

The executive committee of this association is composed of Ernest Stenger, Denver, Colo.; M. M. O'Brien, St. Louis, Mo.; F. G. Buffe, Kansas City, Mo.; H. B. Cobban, Miami, Okla.; R. A. Leussler, Omaha, Nebr.; S. B. Irelan, St. Joseph, Mo.; and R. B. Campbell, Wichita, Kans.

The officers of the association are: D. L. Fennell, superintendent of transportation Kansas City Railways, president; Charles W. Ford, general superintendent Kansas City, Clay County and St. Joseph Railway, vice-president; J. A. Weimer, secretary-treasurer, Kansas City, Mo.

National Fire Prevention Exposition

ONE of the outstanding features of Fire Prevention Week, Oct. 8 to 13 inclusive, will be a National Fire Prevention Exposition in New York City. At a recent meeting of the committee of the National Fire Protection Association, 25 East Twenty-sixth Street, New York, N. Y., in charge, which was attended by representatives of the various interests involved, emphasis was placed upon the necessity of featuring the physical as well as the psychological phases of fire prevention educational effort. The need for adequate building codes was particularly emphasized by T. Alfred Fleming, chairman of the committee, and action was taken to include a nationwide campaign in behalf of safe building construction and the wider use of products and devices designed to prevent fire.

At the national exposition in New York will be shown for the first time thousands of products and devices, such as fire resistive roofing, metal doors, windows, sprinkler systems, fire extinguishers, safes, electrical goods, etc. Only those products which have passed the rigid tests of the Underwriters' Laboratories will be eligible for display.

The exposition will be participated in by many important organizations and will visualize to the public what is meant by an average fire loss of a thousand dollars per minute throughout the year.

Annual Outing on July 26

The New England Street Railway Club will have its annual outing on July 26 at Canobie Lake Park, Salem, N. H. Ladies are invited. Complete information will be published later.

Wisconsin Utilities Association

THE electric railway section of the Wisconsin Utilities Association will hold its midsummer convention the first week in August at Oshkosh. The program, which is not completed, includes an inspection trip through the new carhouse at Oshkosh and an examination of the new rolling stock of the Eastern Wisconsin Electric Company.

American Association News

Executive Committee

A REGULAR meeting of the executive committee of the American Electric Railway Association was held in New York, Friday, July 13, with just a quorum present. The business conducted was largely routine reports of standing committees. Mr. Coates read an interesting report of the publicity committee, telling of the extensive activity of this committee since the last meeting of the executive committee, and indicating that some most effective publicity matter is being put out in a timely way.

The executive committee approved the following applications for membership from manufacturers: George A. Saums Company, Plainfield, N. J., wood preserving; Reo Motor Car Company, Lansing, Mich., buses; Timken-Detroit Axle Company, bus and truck axles; J. R. McCardle Company, Trenton, N. J., body builders and repairers; J. F. Hodgkins Company, Gardiner, Maine, trolley wheels and bushings. The Kennedy Engineering Corporation, consulting engineers, automotive transportation, was approved as an associate member. Several individual memberships were also approved. The resignation of the Gothenberg Street Railway of Gothenberg, Sweden, was accepted.

F. C. J. Dell reported for the exhibit committee that on July 1, 53,900 sq.ft. of convention exhibit space had been applied for, which is 100 per cent more than on July 1 of 1920 or 1922. Up to July 13, 54,827 sq.ft. had been sold.

The committee passed a resolution, prepared by Henry W. Blake and General George H. Harries, on the death of Julius S. Walsh, whose obituary appeared in the JOURNAL March 31.

Considerable discussion was had as to whether the association should indorse the National Transportation Institute. It was finally voted that the executive committee looked with favor upon the proposed National Transportation Institute in so far as the work of its technical research division is concerned.

Mr. Ellicott reported for the special committee appointed to consider the proposal of C. E. Morgan that community sections of the American Electric Railway Association be organized. After some discussion a motion was passed that the proper changes be

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made in the constitution and by-laws to take care of this form of membership, and that the revisions be submitted to the membership for vote at the October convention. The idea of the community section is that in any community where there are two or more member companies serving a single community, and application is made by not less than twenty-five representative men, it shall be permissible to organize a section and hold meetings comprising all of the company, associate and company section members and other employees of railways and railway manufacturers and engineers in the community, to discuss railway problems, and as a means of disseminating information about the industry. A trial of the plan will probably first be made in New York City.

The executive committee approved a recommendation made by Mr. Datz, president of the Engineering Association, that this association accept membership on the advisory board to draw up specifications in line with the recommendations of Secretary Hoover on standardization and elimination of waste in industry, for federal, state and institutional use. The engineers suggested that the present engineering committee for co-operation with the Bureau of Standards be given this assignment. This committee includes R. H. Dalgleish and C. S. Kimball of Washington, D. C., and W. W. Wysor of Baltimore, Md.

Mr. Coates suggested that the country is being flooded with publicity matter of one kind and another, and that he believed the most effective way of educating the public as to the facts in the public utility field is to interest the local companies to give a series of talks to school children. This was heartily indorsed by various members, and President Emmons was requested to address a letter to all member companies urging them to seize every opportunity to talk before school children.

The final action of the committee was to accept the invitation of Barron G. Collier to hold the next meeting of the executive committee on board his yacht, on Friday, Aug. 24, in the waters off New York.

Those present at the meeting were: President C. D. Emmons, Executive Secretary J. W. Welsh, Robert I. Todd, Charles L. Henry, Frank R. Coates, Lucius S. Stores, Garrett T. Seely, A. L. Hodges, representing C. E. Morgan; L. C. Datz, C. R. Ellicott and M. B. Lambert, representing H. D. Shute.

T. & T. Executive Committee

A MEETING of the executive committee of the Transportation & Traffic Association was held in New York on July 12. The principal business was the review of the committee reports and the tentative arrangement of a program for the meetings at the Atlantic City convention.

A letter from H. B. Potter, chairman of the committee on accident prevention, was read. He stated that the report of his committee includes a classification of the causes of accidents, and a tabulation of accident statistics from an unusually large number of member companies. The question of getting qualified speakers to discuss accident prevention at the annual meeting was considered. It was decided that the subject is of such importance that the selection of special speakers is essential to the success of the program.

The report of the committee on bus operation, W. J. Flickinger chairman, was considered. It was decided that in the convention discussion, operators of experience with bus service should be invited to speak.

The report of the committee on merchandising transportation, Samuel Riddle, chairman, was discussed with care. It is divided in five sections prepared by sub-committees, the topics being weekly passes, monthly nickel permits and commutation tickets; developing passenger, freight and express business; merchandising by advertising; utilizing employees for selling; and car design from a merchandising standpoint. It was decided to outline the discussion at the convention along the lines of these reports, the five topics being taken up separately.

Reports of the committee on one-man car operation and of the committee on traffic regulations were also received.

Those present at the meeting were G. T. Seely, Youngstown, O., chairman; L. H. Palmer, Baltimore; J. K. Punderford, New Haven; J. W. Welsh, New York; W. J. Flickinger, New Haven.

Nominating Committee

THE committee which will make the nominations for officers of the American Electric Railway Association at the next convention will be as follows: J. H. Pardee, chairman, and General George H. Harries, past-presidents; Harry Reid, W. R. Alberger and W. J. Harvie, railway members; C. J. Olmstead, Western manager Westinghouse Air Brake Company, Chicago, and S. J. Cotsworth, sales agent Lorain Steel Company, manufacturer members.

Membership Campaign

THE membership committee, W. H. Sawyer, chairman, has prepared an attractive leaflet entitled "How the Association Will Help You." This is designed to give non-member railway companies, so they may learn of the value of membership, a brief outline of the activities of the American Association, including the bureau of information and service, publicity and advertising sections, and the annual convention and exhibits. It is stated that during the last six months the association answered more than 6,000 requests for information, or 30 per cent more than during the previous year. This breaks all previous records.

Chairman Sawyer states that he will appreciate the assistance of member companies in calling the advantages of membership in the association to the attention of any non-member companies in their territory. It is suggested that an executive officer of member companies write a personal letter inclosing this leaflet to any prospective member companies in his vicinity. Additional copies will be sent upon request by James W. Welsh, secretary, 8 West Fortieth Street, New York City.

Stores Accounting Discussed

A JOINT meeting of the committee on purchases and stores of the Engineering Association and the committee on stores accounting of the Accountants' Association was held in New York on Monday, June 4. Those present were B. J. Yungbluth, W. S. Stackpole, W. H. Staub, C. A. Harris, W. B. Bell, H. H. Lloyd, J. P. Dick, W. M. Ford, representing the purchases and stores committee, and R. A. Weston and C. A. Bartlett of the stores accounting committee. It was agreed that the stock book method of controlling stocks of material and supplies should be recommended to member companies. The committee has prepared a comprehensive set of instructions for the use of the stock book, and these will be included in their recommendations. It was agreed also that the annual inventory should be complete as of one date, that the fiscal inventory should be taken by the stores department under the supervision of the accounting department, and should include such materials and supplies as the latter may designate. The material on hand should be entered in the stock book for the current month, but the method of extending the inventory and delivering it to the accounting department must depend on the practice of the individual companies.

Special Reports Available

THE Bureau of Information and Service has prepared the following special reports, which are available to member companies in good standing upon request:

Fare Bulletin—A new and revised edition of the Association's regular fare bulletin, showing fare systems in effect on both city and interurban lines; the cash fare, ticket rate, transfers issued, special children's, students' and workmen's rates, effective date and former rate, based on the replies to a questionnaire sent to all electric railways in June.

Local Regulation of Motor Buses—A survey of measures adopted by municipal authorities to restrict the operation of buses or jitneys, or to co-ordinate them with existing transportation systems.

State Regulation of Motor Vehicles—A new edition of the association's compilation of March 1, 1922, with the 1923 legislation added. Contains copies of all legislation now in effect covering the operation of motor vehicles as common carriers.

State Taxes and License Fees Paid by Motor Vehicle Common Carriers—A tabulated summary of the payments required in the various states with copies of taxation laws passed in 1923.

Bonuses Paid Electric Railway Trainmen—A list of companies paying bonuses and a brief description of the method of awarding them, with particular attention to bonuses given for clean accident records.

In addition to the above compilations, supplements to the wage bulletin and cost of living studies have been prepared, bringing them up to date.

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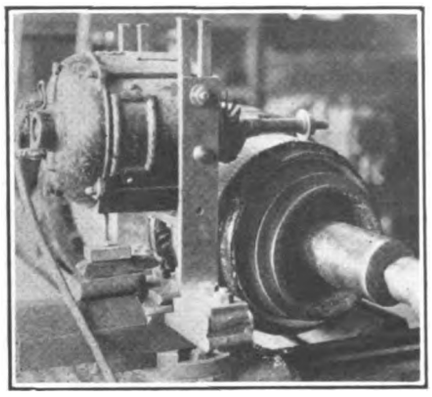
Maintenance of Equipment

Fan Clears Commutator of Slotting Dust

ARMATURE slotting is done in a small lathe at the Easton shop of the Lehigh Valley Transit Company. The apparatus was designed by C. A. Doud, master mechanic, and is shown in the accompanying illustration. A small electric motor,



Slotter with Fan for Removing Particles of Copper Dust

mounted on a fixture attached to the carriage of the lathe, drives the slotting saw. The support for the slotting motor has slots to permit raising and lowering for commutators of different size. The armature to be slotted is placed in the lathe centers so that it can be rotated to the different slots as desired. A small fan made of sheet iron, attached to the shaft of the slotter, blows away the particles of copper dust so that the workman has a clear view of his work.

Blowing Out Motors and Motor Shells

THE Cold Spring shops of the International Railway are fitted with an ingenious device for removing metallic and carbon dust, as well as other kinds of dirt, from motor shells and armatures. Compressed air is used for this purpose, and the blowing-out process is carried on within a housing, so that the dirt dislodged is taken up a stack instead of being blown in all directions by the compressed air.

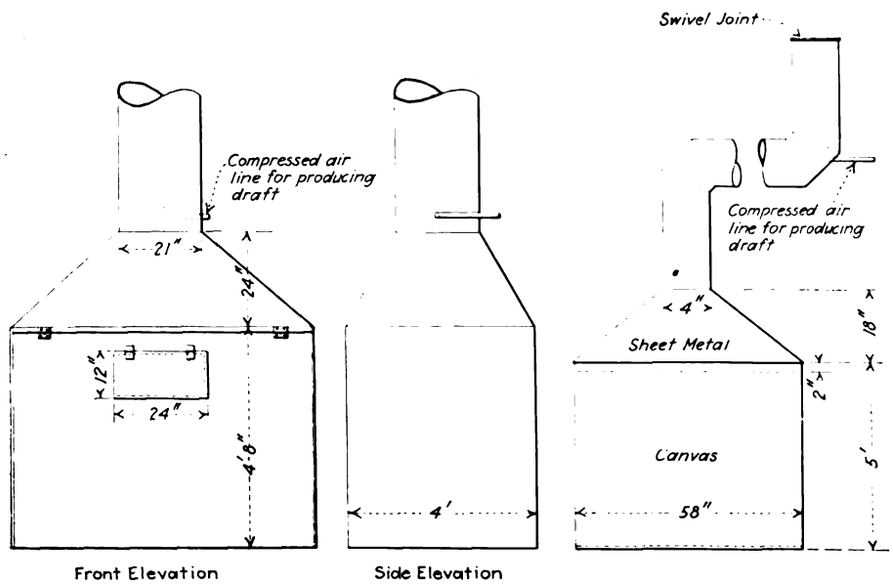
There are two of these housings in the Cold Spring shops. One housing is stationary, the other is movable. The dimensions of both are given in the accompanying diagrams.

The stationary housing is rectangular in area and is built of galvanized iron. The front is hinged at the top so that it can be raised. This front door has a small hinged opening 12 in. x 24 in.

The armature or motor shell to be "dusted out" is wheeled into place within this housing, the front is let down and the small door opened. A compressed air hose is then inserted in the opening and the carbon dust is taken up the stack through a flue, in which a draft is created by a compressed air nozzle.

The movable hood works on the same principle, but is circular and the lower part is of canvas instead of galvanized iron. This hood is supported on a swivel joint so that it can swing in an arc of 90 deg. or more. The hood is set in front of the baking oven. Before the motors are put in the oven they are placed on small trucks which run on one of four tracks which enter the oven. The hood is then swung around to cover the motors, the canvas sides are dropped, and the air is played through a hose below the lower edge of the canvas. A compressed air nozzle inside the stack, as in the former case, furnishes the draft for removing the dirt.

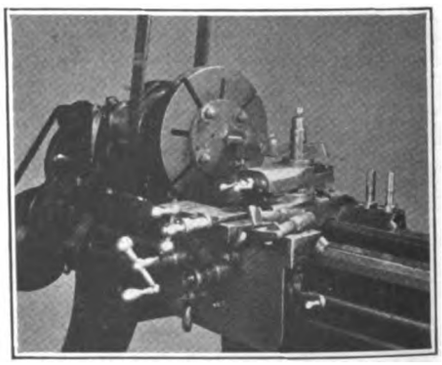
After being thus blown out the motors are run into the oven.



Stationary and Movable Housings for Blowing Out Motors and Motor Shells

Milling Machine Operation Performed on a Lathe

RAILWAY shops frequently do not have all the equipment desired for performing all machining operations and hence must devise various substitutes. For example, the finishing of the broached portions of the rotary valve key of an air-brake



Finishing Broached Portions of Rotary Valve Keys in a Lathe

valve would ordinarily be done on a milling machine. The accompanying illustration shows how this operation is performed economically in a lathe in the Fairview shops of the Lehigh Valley Transit Company. A special fixture for holding the valve stem is bolted to the face plate of the lathe.

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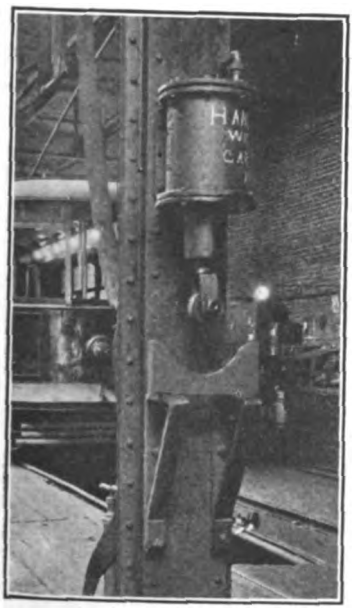
A small spirit level is used for adjusting the valve key to make certain that the surfaces to be finished for the handle fit will line up accurately with the keyed end which fits the valve stem. The finishing tool held in the tool post is started at the center of the surface to be machined and is gradually worked outward as desired while the valve key is rotated by the headstock.

Two types of valve keys are used by the railway. When the steel stems become worn a new end is built up by welding, and this is first turned to the diameter of the round part and then finished to give the desired handle fit. Composition valve stems have brass ends braised on and these are then finished in the same manner.

An Air-Operated Pipe Bender

A MUCH appreciated tool in the shop of the Terre Haute Traction & Light Company, Terre Haute, Ind., is a pipe bender in which the bending force is supplied by air pressure in a 9-in. brake cylinder. This is effective in bending conduits and other pipe for maintenance repairs up to 1¼ in. in size.

The cylinder is mounted on one of



Pipe Bending Is a Pleasure with This Simple Air-Operated Device Which Is in Constant Use in the Railway Shops at Terre Haute

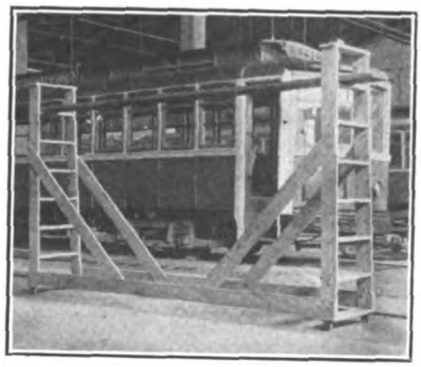
the structural steel columns of the shop building, and it carries on the lower end of the plunger rod a 4-in. roller with its surface turned slightly concave.

Supported on brackets below the cylinder is an iron block or anvil curved to a radius of about 8 in. and rounded off for bending the pipe in the manner shown in the accompanying illustration.

The valve for operating the bender is located on the side of the column to the reader's right in the picture but not visible, so that the operator can manipulate the bender with one hand while handling the pipe with the other.

A Light, Portable Platform for the Car Painter

IN ELECTRIC railway paint shops much ingenuity is expended in devising for the painter platforms which will be safe and convenient. A type which admirably meets the



The Master Painter in This Shop Thinks He Has a Portable Scaffold Design that Cannot Be Beaten

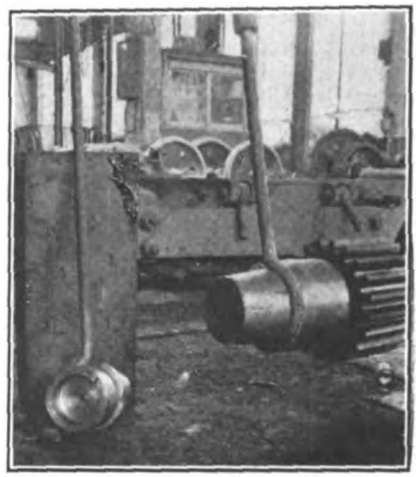
requirements in the paint shop of the Indianapolis Street Railway, Indianapolis, Ind., is made up of two special ladders mounted vertically at the ends of a simple wooden framework and securely braced, the whole resting on four casters, by means of which it can be easily rolled about. The steps in the ladders are spaced about a foot apart, and they serve to support cross planks and also to give access to these planks. Once in position a plank cannot slide off the ladders.

It is difficult to see how a scaffold so substantial, safe and portable could be constructed more cheaply than this one.

Steel Driver Prevents Battering of Pinions

WHEN a pinion is to be driven on a motor shaft in the shops of the Virginia Railway & Power Company, at Richmond, a simple tool made of axle steel is used to transmit the blow from the sledge to the pinion.

The tool consists of a short piece of steel, hollowed out on one end to



This Tool Is a Convenience in Driving Pinions on Motor Shafts

clear the end of the motor shaft and tapered at the other end to center the blow of the sledge. A groove is turned near the middle, which serves to hold in place a ring in the end of a ¾-in. iron rod which does duty as a handle. The upper end of the handle is covered with rubber hose to absorb vibration.

Advantages of Trolley Wire Versus Feeder

BY G. H. MCKELWAY.
Distribution Engineer Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y.

ON many electric railway lines the trolley wire is of a larger section than would ordinarily be used for the type of service operated over the line. The reason for this is that the trolley wire is doing double duty. It is expected not only to perform the usual service of a conductor from which the car can receive current, but in addition it is made heavier than usual so as to lessen the line drop and do away with the necessity of running a parallel feeder.

This construction gives a slight saving in the first cost of the line because the labor cost of stringing a heavy trolley wire is not much greater than that of running a lighter one. On the other hand, the feeder construction requires additional feeder arms on the poles, feeder insulators and perhaps longer poles for those carrying the feeder arms. The feeder also will cost more per foot than the same amount of copper drawn into trolley wire.

The feeder, however, can be considered as a permanent investment, while the trolley wire will wear out after several years service and will then have to be renewed. Unless the car service is of a kind particularly suited for the heavy wire it will be

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found that this large wire will have to be renewed almost as soon as a lighter wire, and if the heavy wire is suited to the service it should have been used in the first place and is therefore not being made use of solely because of its value as a feeder.

Again, the trolley wire is subjected to wear and is therefore constantly losing its conductivity, while the feeder has just as large a cross-section at the end of ten or twenty years as it had on the day that it was first put up. The insulation may be frayed and damaged by the weather, but the wire itself will be in good condition, and, as feeder wire on poles is well insulated from everything else, it is very seldom that the feeder will have to be renewed merely because the insulation woven around it has been damaged.

Not only can the feeder on the poles be considered as a permanent investment, but it is also a sort of insurance to the trolley wire, because when there is a feeder in multiple with a single trolley wire there will be no danger of annealing long stretches of the latter in case of a ground at a distance from the feeding-in point. With only a single wire, that wire will have to carry all of the current in case of a ground, while if there is a feeder in multiple with the trolley wire, the latter will carry all of the current only for the short distance between the ground and the nearest side feed tap.

On the whole, it would seem that it is seldom good policy to increase the size of the trolley wire in order to use it as a feeder, as the separate feeder will pay for itself in the long run and will give better service.

New Equipment Available

Handy Platform Used in Rail Welding

THE tool box supplied by the Metal & Thermit Corporation, New York, for use in Thermit rail welding, has recently been equipped with a platform for ramming two-part molds which are applied to the rails preparatory to welding. This innovation, shown in the accompanying illustration, provides a convenient and suitable platform for such work.

The platform can easily be moved from place to place as the welding progresses. The molds can be rammed quickly, near the point of their application, and thus the speed of rail welding is considerably accelerated.

Molds Are Rammed on This Convenient Platform

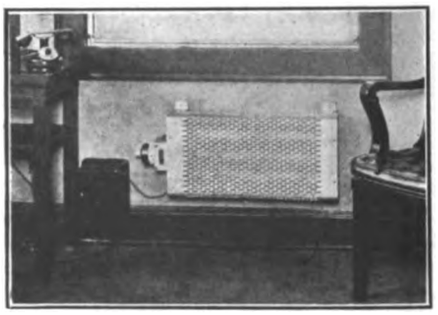
Grinding and Polishing Machines with Ball and Roller Bearings

THE St. Louis Machine Tool Company, St. Louis, Mo., is now arranging all its grinding and polishing machines to use ball and roller bearings. These bearings are made so that they can be readily assembled, and troubles from worn arbors are eliminated. The manufacturers are using a new method of applying the bearings to the machines which permits of easy removal when it is necessary to replace balls or races.

New Electric Heater

THE Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has recently placed on the market an electric air heater designed for use in such places where a gas flame would be undesirable and dangerous. It may be used for heating shops, offices, warehouses, etc., and is especially useful for heating isolated, hard-to-heat places, such as watchmen's houses and oil storage houses.

The outstanding feature of this heater is convenience. It is light, attractive and easy to install. It may be located anywhere without regard to flues or gas lines. It is very easy to operate, the temperature being regulated by a convenient three-heat snap switch.



Electric Heater Installed in Office

A heater may be placed in an inclosed room, surrounded by inflammable materials and there will be no danger of fire caused by the heater. It can be depended upon to function perfectly month after month without danger.

The heating elements consist of space heaters, firmly mounted on a steel framework. A polished aluminum reflector on the back of the heater protects the wall and directs the heat out into the room where it is used. A perforated metal cover protects the heating elements from accidental injury. The heater is protected from moisture by enamel paint being baked on the aluminum surface.

The air heater is supplied in either 1,000-watt or 2,000-watt capacity and for use on either 110 or 220-volt circuits. A marine type of heater is provided for use in places where there is an excessive amount of moisture present. This type is provided with a brass cover and all steel parts are sherardized.

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The News of the Industry

Engineer Wants System Transformed

Expert for Toledo City Plan Commission Wants $1,000,000 Spent for New Work—Buses Proposed

Complete transformation of the transit system at Toledo has been recommended in the plan submitted by E. O. Mills, St. Louis, consulting engineer of the city plan commission, in order to benefit under the Milner ordinance, which provides that the Doherty interest must bring in $1,000,000 for extensions and betterments this summer.

Members of the street railway board of control, the commissioner, and some of the city officials believe that the new plan will necessitate the raising of $1,500,000 or more to carry out the details. For that reason conferences are now being held to try to make the schedule of improvements fit with the money which will be available.

The time limit for approval of the general plan by the City Council is Aug. 1. Before that time the plan must be approved by the board of control.

One of the most revolutionary changes in the new plan will be the operation of bus routes in the city by the traction company and the barring of all individual and independent operators—making the entire transit system a monopoly under regulation of the City Council.

This would mean the taking over of three or four established lines in the city. Buses will continue to be operated as feeders to the traction lines on some routes.

A crosstown bus line is a new feature. It is estimated that this new crosstown line will require at least thirty buses each capable of carrying at least twenty passengers and to operate on an eight-minute headway. The cost is estimated at $7,500 to $8,000 for each bus purchased.

Some of the other features of the plan are: Extension of the Bancroft line to Ottawa Park and elimination of part of its present belt line; extension of the Cherry Street line and linking of it with the Dorr line; breaking up of Long and Short Belt lines into radial lines; abandonment of Indiana line entirely; linking of Western and Stickney lines with bus feeders added; abandonment of Michigan line and development of Erie line, and general rerouting of cars in the downtown district to do away with left-hand turns at important corners.

The plan also includes one with a short loop for all interurban cars into the downtown station and elimination of turns at congested corners. Mr. Mills said:

> There are at present twelve bus lines operating in Toledo. All but two of these—the Oak Street and Erie Street lines—are privately owned and operated.
>
> Without exception every one of the private bus lines is in direct competition with the transit lines, for parts of their lengths at least, though several serve districts not otherwise provided with transit service—for instance, the Ottawa bus line. Approximately 80 per cent of all bus service is a duplication of the service already provided by transit lines.
>
> It is true that the buses are operating at a lower rate of fare than trolley lines, but when you consider the type of carrier being used by most bus lines, their taxes and obligations to maintain service, the reason is quite evident.
>
> The greater the competition of the private bus with the car lines, the greater will be the cost of operating the transit system, for which the riding public using the transit lines must ultimately pay.
>
> No one in Toledo will deny, in view of experience, that the buses cannot adequately serve the city's transit needs. There is only one way in which the city can be served satisfactorily and economically, and that is by the unification of all facilities.

The revised plan of transit betterments will probably go before the Council in a few weeks.

Any wholesale abandonment would tax the depreciation fund heavily for many months.

Ottawa Employees Accept Company's Proposal

After nearly two months negotiations, a number of mass meetings and a constant threat of strike if the company did not accept the award of the board of conciliation, the employees of the Ottawa Electric Railway recently voted to accept the company's proposal, which is a renewal for one year of the agreement that became effective on May 1, 1922. The agreement means that there will be no change in wages or operating conditions before May 1, 1924.

On May 1 last a board of conciliation, appointed under the industrial disputes act of Canada, awarded the employees the eight-hour day and an increase of 6 cents an hour over the present maximum rate of 48 cents, the increase being granted to make the daily wage for eight hours the same as was formerly earned in nine. The company refused the majority report of the board, taking the ground that it could not be put into effect without an increase in fares and it did not consider that the eight-hour day was a necessity in the street railway business. The company refused, therefore, to take any step toward an increase in fares for that purpose. Negotiations have been going on since and resulted in the recent acceptance of the award by the employees.

The company's contention in dissenting from the award of the board was referred to in the ELECTRIC RAILWAY JOURNAL, issue of June 9.

Engineers Report on Accident

Expert Board Finds Brooklyn Elevated, Including Rails, Frog and Switch, in Safe Operating Condition

Expert evidence has been presented to President Menden of the Brooklyn-Manhattan Transit Corporation by a board of engineers employed by the company, to the effect that the members found the track structure at site of the recent elevated accident, including rails and timbers, in a safe operating condition and not such as would require early renewal, except in so far as repairing the damage caused by the accident.

The board that so reported was composed of J. Vipond Davies, president of Jacobs & Davies, consulting engineers; I. W. McConnell, vice-president of Dwight P. Robinson & Company, Inc., consulting and construction engineers; Louis H. Bean, vice-president of Dwight P. Robinson & Company, Inc., and George H. Pegram, chief engineer of the Interborough Rapid Transit Compnay. The report of the members, all of whom signed the report, was presented on June 29.

The members of the board said that when they viewed the structure a short section of the guard rail had been either removed or torn out by the accident, but that the remaining portions, indicating the extent to which the guard rail had operated to sustain the trucks of the cars, showed that it was sufficiently good material to perform, and did perform, all of the services that could be expected of a guard rail. They concluded their finding as follows:

"The said structure, including rails, frog, switch and timbers, was in safe operating condition."

A special meeting of the board of the railway was called for July 3 to report on the accident. Mr. Dahl, chairman of the executive committee, said that before laying before the members the engineering data and detailed reports he desired briefly to summarize what appeared to be the known facts and to present for consideration certain recommendations.

After reviewing the known facts of the accident, as reported previously in the ELECTRIC RAILWAY JOURNAL, Mr. Dahl said that the accident was the first of its kind to occur on the Brooklyn elevated lines, and so far as he had been able to ascertain was the first of its kind in the history of elevated operation in Brooklyn or in any other city. He then said that an investigation was at once started by the operating officials of the company and that as soon as the reports and evidence could be sifted, which was about midnight of the day of the accident, a preliminary

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statement was given out covering only the immediate facts of the accident as then ascertained. It was stated at that time, however, that the cause of the derailment had not been ascertained and that the investigation would continue in co-operation with the public authorities to ascertain the cause. Mr. Dahl then said:

The preliminary investigations indicated that the motorman of the train was in no way to blame. He was an experienced motorman with a good record. His train was operating at normal speed on a straight track, and the signal at the crossover where the accident occurred showed green and the switch was set clear. An examination of the switch and the signal after the accident showed that both were in perfect working order, and have, as a matter of fact, been continued in operation ever since.

The track structure at the point in question is the standard elevated structure prevailing throughout the city and in other cities, except that the guard timbers on the Fifth Avenue Line, including the point of the accident, are 8 in. high, whereas the guard timbers on the newer elevated structures, including the elevated portions of the city-built subway lines, are only 6 in. high. The entire timber deck of the Fifth Avenue Line, including the portion where the accident happened, was rebuilt new in 1912-13, and had been maintained since that date in accordance with established practice with replacements as shown to be required by inspection. In other words, the timber deck in question, including the guard rails, had been in place not more than ten years, considerably less than its average life as demonstrated by experience in this and in other cities.

The two cars constituting the train had been maintained and inspected in accordance with established standards. The two cars were in the inspection shop on June 15 last, ten days before the accident, and after inspection were reported in good condition. Since the inspection, the cars have traveled less than 1,000 miles. On the day of the accident the two cars had made nine trips over the same line past the point of the accident without giving visible indication of the development of any defects.

WILLIAM BARCLAY PARSONS RETAINED

In order to check up and report to your board on the general condition of this and other elevated lines of the company, your officers have also retained the services of the engineering firm headed by William Barclay Parsons, the distinguished engineer who designed and built the first city-built subway system, and that firm is now engaged on a comprehensive examination of the company's properties.

In the meantime, at least three other investigations as to the cause of the accident and the condition of the structure are under way. One of these investigations is under the direction of the District Attorney of Kings County, another is under the direction of the engineers of the Transit Commission and the third, we understand, is to be conducted by a committee designated by the Board of Estimate and Apportionment.

It is the judgment of your officers, in which it is felt certain that all the members of the board will concur, that everything humanly possible should be done to ascertain the cause of the accident and unearth whatever imperfections may exist in standards of construction, equipment or maintenance, to the end that the possibility of a recurrence of such an accident will be reduced to a minimum. The members of this board have undertaken the public duty and responsibility of operating these properties, with no connection with the past and with responsibility only for the future. The task of operating the transit properties of the city under existing conditions, with which all are familiar, is beset with difficulties almost without parallel, and in the efforts of this board to ascertain the causes of the accident and to profit thereby, to the end that operation of the lines may if possible be made safer for the future, the members of this board are entitled to and should receive the co-operation of all public authorities.

It was therefore recommended by Mr. Dahl that the board approve the action taken by the officers of the company as set forth above, and that the officers be instructed to continue in co-operation with all of the public authorities their investigations into the causes of the accident.

Franchise Terms Reviewed

New Car-Bus Ordinance in Saginaw Provides for Ten-Cent Cash Fare, Option to Purchase by the City—Calls for Expenditure of $400,000 for Rehabilitation Purposes

AS WAS reported in the ELECTRIC RAILWAY JOURNAL, issue of June 30, the Saginaw car-bus franchise was approved at a special election held on June 25. The new franchise is a modification of two grants which were submitted on Nov. 7 and again on April 2. The franchise gives to Otto Schupp, trustee, a fifteen-year grant to operate both motor bus lines and electric railway lines, with the privilege of supplying additional motor bus lines or car lines from time to time.

The rates of fare will be as follows: Regular ticket fare, four for 25 cents; cash fare, 10 cents, and school children's ticket fare, six for 25 cents. These rates of fare are to continue in full force and effect during the entire life of the franchise granted by the ordinance.

On the type of transportation equipment the ordinance specifies that the equipment shall be standard and first class and that the buses shall seat approximately twenty-five persons. The seating capacity of buses, however, may be changed by the Council when considered reasonably necessary. The specifications of all buses must be submitted to the Council before purchase or use. If either buses or cars become impracticable or obsolete the Council is to have the power to require the grantee to substitute such new method of transportation as will adequately serve the people.

The frequency of the service, the routes to be traversed, and the number of cars or motor buses for each particular route with the capacity, ventilation, etc., are to be subject to the supervision and approval of the City Council.

Section 7 of the ordinance states that within one year from the date of the acceptance the grantee is to expend not less than $400,000 in laying new track, purchasing buses and making other improvements necessary to put the property in good operating condition.

On the question of paving, Section 9 stipulates that the grantee shall keep in repair the pavement on all public ways on which its tracks are, or shall be located between the outer rails and for a space of 12 in. outside with such material as the City Council may order. Further, all pavement torn up or damaged by the grantee in the work of repairing its tracks is to be replaced at the sole expense of the grantee in as good condition as the original and with the same kind of material. In all paved public ways occupied by its tracks, whether such public ways are paved at the time the ordinance became effective or subsequent thereto, such repairs to pavement are to be made by the grantee on thirty days written notice from the Council.

The grantee is not to be required at any time to pay for new paving or repaving of any public way or any part thereof upon which its tracks are now or shall be laid. Whenever the grantee shall lay or relay tracks on any public way the city is to provide immediately, at its own cost and expense, the necessary paving or repaving. However, the grantee shall pay for the cost of any extra ballast or foundation. The laying of new tracks or the changing of the location of present tracks is to be made from time to time by the mutual agreement of the grantee and the City Council.

Section 12 states that the city may permit the joint use of the grantee's tracks located in the public ways of the city by any other public utility or by the city itself upon reasonable terms and upon payment of reasonable compensation.

The ordinance provides for the preservation of the benefits of interurban service to the city, and the grantee agrees that the interurban passenger and freight cars owned by it or by others may be operated over its own lines at a proper charge. The grantee, however, is not to be allowed without the consent of the City Council to operate freight cars in the downtown district after a period of one year from the date of the ordinance.

According to the terms of the new franchise the board of directors of the company is to consist of nine members, not fewer than two-thirds of whom are to be resident citizens of Saginaw. Directors so elected to the board are to be approved by a majority of the men occupying the positions of Mayor of Saginaw and Judges of the Saginaw County Circuit Court, with an alternative provided in case any one of the others is unqualified. The management of the company operating under the ordinance is to be separate and distinct from every other public utility in Saginaw and have separate offices and officers.

Section 16 says that before the grantee shall have the right or power to assign the franchise provided in the ordinance, all unpaid taxes of the Saginaw-Bay City Railway, a Michigan City corporation, due the city of Saginaw, together with accrued interest thereon, shall be paid in full.

In the event of disagreement between the grantee and the City Council, all questions will be referred to a board of three arbitrators.

The ordinance provides for the right of the city at any time to buy the railway or other property within the city and such portion as may be beyond the city limits, provided the same is actually and necessarily a part of the local service. If a just and reasonable price cannot be mutually agreed upon

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for the property, then the price to be paid is to be determined by the board of arbitrators recently mentioned. In arriving at the price to be paid for the grantee's property, no value is to be placed upon the franchise contract. As soon as the price has been determined the Council is to submit to a vote of the people the question of whether or not the property and rights of the grantee shall be purchased by the city. In the event of the purchase being made by the city the purchase price is to be raised by the issuance of bonds or in any other manner permitted by law.

On the subject of competition, the city agrees that immediately upon the acceptance of the ordinance by the grantee, it will prohibit and prevent the operation of jitneys, buses and motor vehicles in competition with the service to be rendered by the grantee. This, however, does not extend to freight and merchandise transported by motor truck or to the operation of taxicabs within the city.

Operation by the grantee can start at the earliest possible date and, as nearly as may be, within four months after the acceptance of the ordinance. The right is reserved to the city, however, upon a vote of three-fifths of the Council electors to revoke the grant if the grantee has willfully or unreasonably neglected to comply with the provisions of the contract.

The ordinance is to be assigned by the grantee named herein to a company, to be organized under the laws of the State of Michigan, to be called the Saginaw Transportation Company or some other suitable name. This company is to be organized within ninety days from the date of approval of the ordinance by the electors. The grantee, however, cannot assign the ordinance until the new company has been organized and has in its treasury the sum of $400,000 in cash.

It is nearly two years since the Saginaw-Bay City Railway suspended service. Since then it has been a question whether the jitneys or the street cars would provide the transportation for the people of Saginaw. Franchise grants submitted on Nov. 7 and on April 2 lacked only a few votes of the required 60 per cent. When the new city administration took office on April 9 steps were immediately taken to eliminate from the other contracts features that the present Council members thought had been the cause of the previous failures of approval. As soon as the finished document was approved by the bondholders' protective committee of the bankrupt Saginaw-Bay City Railway the Council resubmitted the measure.

Rochester Canal Line Will Be Operated by City

At a conference of the Mayor and his executive aids, it was decided that the new rapid transit line to be installed in the city of Rochester, N. Y., in the abandoned canal bed, will be operated by the municipality rather than by the New York State Railways. The lease of the line to the railway had been considered, but the conference voted to operate the road under city control.

The proposed route will relieve traffic congestion on Rochester business streets by the operation of interurban cars over the new route, using the old bed of the Erie Canal.

This is an innovation that has aroused a great deal of interest generally. It has been outlined in previous issues of the ELECTRIC RAILWAY JOURNAL.

Employees Receive Three and a Half Cents Increase

An agreement was reached between the Tri-City Railway, Davenport, Iowa, and its employees by which the employees are given an increase of 3½ cents an hour and the strike which had been threatened at various times since the arbitration began was averted. R. L. Smith, general manager, announced that the men on the Davenport side had agreed to the increase of 3½ cents an hour and that the contract had been signed. The new scale is retroactive from June 1 and is for one year from that date.

The settlement on the Illinois side was reached at a conference between G. G. Engstrom of Moline and H. E. Wendell of Rock Island, representing the men, and T. C. Roderick, Illinois general manager, representing the company. The committee had been given power to act by the men at a mass meeting. The car men had asked for a maximum of 75 cents an hour at first, but later cut this to 60 cents. This increase also is effective from June 1.

The new wage scales, an increase of 3½ cents an hour in each case, follow: Operators, first six months, 54½ cents; second six months, 56½ cents; after one year 58½ cents.

Presentation of Chicago Wage Case Begun

Arbitration of the wage dispute between the Chicago Surface Lines and Chicago Elevated Railroads and their employees began on July 9. The arbitration board began consideration of the surface lines case first. Daily hearings are being held in the City Council chambers in the City Hall.

The union, which is seeking an increase from 70 to 80 cents an hour, began presentation of its case. This, it was announced, will take several days. William D. Mahon, international president of the carmen's union, made an opening plea in which he charged the effort to maintain present wages is supported by the financial interests in general.

The first and only witness on the opening day of the hearings was Arthur Sturges of Washington, D. C., an economist. The evidence presented indicated that the union representatives are not seeking to substantiate a "living wage," but rather a demand that they receive wages which would allow a decent "living standard."

President Mahon has had prepared a budget showing what a street car man's family can buy on the 80 cents an hour asked, the father working 313 days a year. The budget is for a family of five, father, mother and three children. The principal items in this tabulation follow:

House rent with fuel	$728.00
Gas and electricity	84.00
Employee's uniform and other clothes	126.00
Wife's clothing (allowing no coat)	142.00
Children's clothing	75.00
Shoes for family	53.50
Union dues	18.00
Food	470.00
New furniture (including kitchen utensils)	136.40
Life insurance	25.00
Christmas extras	15.00
Physician and dentist	35.00
Recreation	27.00
	$1,934.90

Mr. Mahon said:

Our men working 313 days a year at 80 cents an hour can earn $2,003.20 a year. The budget we have prepared is not on what we believe to be a proper standard of living, but on the 80 cents an hour we have asked. We believe our men and their families should have some of the luxuries in life. Those may come later.

Another Committee on Public Utility Information Organized in South

The Louisiana-Mississippi Committee on Public Utility Information has been organized. Announcement to this effect was made on July 6 by W. J. Aicklen, chairman of the committee, at the first get-together of the membership of the organization in New Orleans to develop plans for the work to be done the first year.

The membership includes the principal public utilities of Louisiana and Mississippi, embracing electric light and power companies, electric railways, gas, telephone and water companies. All privately owned utilities are eligible, and it is expected that practically all will join as soon as the work gets under way.

The personnel of the committee follows: W. J. Aicklen, Jr., Consumers Electric Light & Power Company, New Orleans, chairman; W. E. Clement, New Orleans Public Service, Inc., secretary; Frank J. Duffy, Southern Railway & Light Company, Natchez, Miss.; E. S. Myers, Vicksburg Light & Power Company, Vicksburg, Miss.; A. D. Patterson, New Orleans Public Service, Inc.; F. J. Schwab, New Orleans Public Service, Inc.; C. A. Stair, Cumberland Telephone & Telegraph Company, New Orleans, and Thomas Walker, Baton Rouge Electric Company, Baton Rouge, La.

Dr. H. M. Blain, head of the department of journalism of Tulane University, has been named director, with Sam B. Dunbar as assistant director. Headquarters of the committee are at 420 Maison Blanche Annex, New Orleans.

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Contract Proposed for Sixty-Day Operation

Citizens of Amarillo, Tex., have opened negotiations with the city and owners of the Amarillo Traction Company with a view to having service continued, and indications are that a temporary arrangement will be made by which service will be continued for a period of sixty days and possibly longer. The city of Amarillo has operated the railway for the last three years under lease, or since the line suspended operation. A recent survey of the property by City Manager Banks Jones disclosed that at least $70,000 will be required to put the system in condition for continued operation. The present contract expired on July 5. When the city manager made his report to the City Commission, he was instructed to notify the owners of the property that the city would not care to renew its lease or to undertake to operate the property longer. The plans of the city at that time were to grant permits for the establishment of motor bus lines in the city.

When the commission's decision became known, a committee of business men got the city's approval of a plan for operation of the street cars for another sixty days by the city. The committee then was instructed to confer with the owner of the property, and get his approval of the proposed agreement.

Accident on Hudson & Manhattan Line

A westbound Hudson-Manhattan Railroad tube train ran into an empty Pennsylvania train at noon on July 11 at the yards between Harrison, N. J., and Manhattan Transfer stations. A boy was instantly killed; another boy suffered a fractured skull, and about sixteen other persons were less severely hurt.

The accident was due, according to the report of the Pennsylvania Railroad, which owns and operates the line exclusively at this point, to the failure of Frank Herbert, motorman of the tube train, to obey two signals which were set against him, warning him that a deadhead train was being switched at the yards.

The two cars—the front one of the tube train and the end one of the deadhead—left the tracks but remained upright.

Jitneys Restrained in Schenectady

The Schenectady trolley strike has now settled itself down to the final lap of a test of endurance by the company, the striking employees and the public.

On July 9 Supreme Court Justice Edward M. Angel of Glens Falls granted a sweeping temporary injunction restraining the 900 or more jitneys operating in the city of Schenectady from competing with the railway. The order was made returnable for final argument on Aug. 25. The traction company is busy preparing copies of the order and will commence individual service thereof on the jitney operators within a few days. Continued operation by a jitney driver after service of a copy of the injunction order upon him makes the operator liable to contempt of court.

Lieutenant-Governor George R. Lunn, former Mayor of Schenectady, simultaneously with the granting of the injunction order, abandoned his efforts to bring about a settlement, stating that he could find no common ground for arbitration.

News Notes

Safety Council Formed.—The Memphis Safety Council, composed of commercial and professional men, city officials and public utility representatives, was formed at a recent meeting. E. W. Ford, vice-president of the Memphis Street Railway, was unanimously elected president. W. W. Holstead of the Yellow Taxicab Company was made first vice-president.

Must Operate or Remove Tracks.—The Public Service Railway has been ordered to remove its tracks or to operate cars within the next six months in Trumbell Street, Fifth Street and West Jersey Street, Elizabeth, N. J., under a resolution passed by the Board of Works. The company claims that it does not receive sufficient revenue from the lines on the three streets, and the board contends that the franchise provides for forfeiture unless service is given.

Attempts Made to Unionize Men.—A mass meeting was called at the Labor Lyceum, Brooklyn, on July 2, for the purpose of forming plans with respect to unionizing the employees of the Brooklyn-Manhattan Transit Company. Although 14,000 men are employed on the subway and surface lines of the company fewer than 100 men were present at the meeting. P. J. O'Brien, vice-president of the Amalgamated Association, said that the organization work was started on May 1 after he had received a letter from twenty-two B. M. T. employees who said the men wanted to be unionized.

Men Make Demands.—Negotiations are taking place between the management of the Montreal Tramways and representatives of the men on the demands of the men for shorter hours and the same wage scale. The tramway men are seeking an eight-hour day and the same weekly or fortnightly wage that they have received on the present ten, eleven and twelve-hour day. They are also asking overtime at the rate of time and a half for any time over the eight hours. The present rates are 39½, 44 and 48 cents an hour for first, second and third year men respectively. Judge St. Cyr, president of the Tramways Commission, stated recently that whatever the outcome of the negotiations there would be no increase in fares on the tramways.

Foreign News

According to a proposal by a committee of the Glasgow Town Council an experiment is to be made to render the tunnels of the subway watertight. The Francois Cementation Company, Doncaster, England, is prepared to carry out what is called the cementation of over a quarter of a mile of specially leaky tunnels at an estimated cost of £6,700. The company is to receive no remuneration beyond the actual cost if the reduction of water is below 60 per cent of the total, and it will receive payments on a scale proportionate to the reduction above that amount. If the experiment is successful the company will bid for the remainder of the work on a contract basis, or if desired on the same basis.

Some hope was held out in House of Commons on June 14 for steps to be taken to electrify the suburban lines of the London & North Eastern Railway, and to construct extensions northward of the present "tube" electric railways, the present northern terminus of which is at Finsbury Park. A bill promoted by the above-named railway was before the House for second reading. Its provisions have nothing to do with London, as it deals with proposed railway improvements in the north of England.

For a considerable time there has been a popular agitation for the extension northward to outlying towns of the London tube railways which now terminate at Finsbury Park, but so far without any result, as the railway companies do not think such extensions justifiable on financial grounds. Recently more than 30,000 signatures to a petition for the extension have been obtained for presentation to the Ministry of Transport. The latter replied that it had no compulsory powers in the matter, and no effective steps could be taken until a definite scheme was prepared for submission to Parliament.

At an inquest regarding the recent serious tramway accident at Leeds, when a car ran away down hill, left the rails, and crashed into a wall, whereby several passengers were killed, the jury expressed the opinion that the car got out of control as a result of the driver losing his nerve when he found that the hand brake would not act, this lack of response being due to a defective ratchet, and that the driver forgot to apply the power brakes. The latter were found to be in good order.

The Manchester tramway department has introduced a new arrangement for indicating tramcar stopping places by means of large disks attached to the overhead wires. An oval disk in the center indicates compulsory stopping place for cars going either way. An oval disk at the side marks a compulsory stop at the side where the disk is fixed. A rectangular disk indicates request stops.

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Financial and Corporate

Traffic and Earnings Increase

Recent Operating Costs Show Rising Tendency, but Increased Volume of Riding Is Counteracting Force

The favorable conditions reflected in the reports of the electric railways for the closing months of 1922 have continued into the new year and results obtained have improved with each passing month, but the outlook for the remainder of the year is somewhat doubtful. These facts and this conclusion are the result of a study of operating returns made by Edmund J. Murphy, chief statistician of the American Electric Railway Association. Mr. Murphy refers to the numerous wage increases which have recently gone into effect, and the demands for other increases now pending before arbitration boards. As he sees it additional increases are certain to result and all of this means a heavy drain on the industry's resources. In addition, the prices of materials and supplies are also substantially higher, thus adding still further to the cost of operation. This is a statement of the unfavorable elements. As an offset to all this, however, the returns show that the companies are doing an increased amount of business.

The lowest point of the operating expenses was reached in December and since that time the trend has been upward. Increased traffic, however, has produced greater revenue, and during the first four months of 1923 this has been more than enough to offset the rise in expenses. The operating ratio in consequence has continued to drop and as this ratio is a measure of the underlying condition of the industry it can be said that the industry is in a stronger position today than it was at the end of 1922, and in fact than it has been at any time since 1916. And in comparing it with 1916 this difference should be noted. Then the trend was downward. Today it is upward. This is distinctly encouraging.

Since May, 1922, there has been a steady increase in the number of revenue passengers carried. Previous to that time traffic had been suffering from the heavy business depression which occurred in 1921 and its accompanying period of unemployment. With the resumption of good business conditions in the second half of 1922 electric railway traffic began to pick up, and in the early part of 1923, with production near its peak, recovered rapidly.

With increased traffic of course came increased revenue. The increase in revenue was not in proportion to the increase in the number of passengers. Mr. Murphy sees the reason for this in a very perceptible, although very gradual, decrease in the average rate of fare. In January, 1922, the average rate of fare was 7.46 cents, in December it was 7.11 cents, and in April, 1923, it was 7.08 cents.

On this matter of fares it is pointed out that constant pressure has been put upon the electric railways to reduce their fares. It has, however, usually been a comparatively easy matter for the company to show that such reduction would be ruinous. In only a very few cases has there been any reduction in the cash rate, but some concessions have been made with respect to special fares.

As for the recent tendency toward increased cost of labor and of materials and supplies, their effect upon financial conditions of the industry will depend upon the amount of traffic carried during the summer months and for the rest of the year. As industrial activity and employment are very nearly at a maximum, it is reasonable to expect that the electric railways for the most part will operate at capacity and thus be able to hold their present position and perhaps even improve it somewhat.

TREND OF ELECTRIC RAILWAY EARNINGS

	† Total January to December			‡ Total January to April		
	1922	1921		1923	1922	
Operating revenue	$327,679,709	$334,635,523	*D* 2.08	$104,883,554	$101,297,964	*I* 3.54
Operating expenses	236,562,147	249,929,480	*D* 5.35	75,353,102	73,488,407	*I* 2.54
Net revenue	91,117,562	84,806,043	*I* 7.44	29,530,452	27,809,557	*I* 6.19
Operating ratio	72.19%	74.69%	*D* 3.35	71.84%	72.55%	*D* 0.98
Taxes	21,525,246	21,352,512	*I* 0.81	7,468,317	6,934,557	*I* 7.55
Car miles	718,114,196	718,829,847	*D* 0.10	228,337,157	220,137,976	*I* 3.72
Passenger revenue	315,051,096	322,551,280	*D* 2.33	100,802,977	98,051,562	*I* 2.81
Revenue passengers	4,319,585,163	4,310,681,838	*I* 0.21	1,413,462,354	1,325,529,659	*I* 6.63
Average rate of fare	7.29 cents	7.48 cents	*D* 2.54	7.13 cents	7.40 cents	*D* 3.64

D Decrease. *I* Increase. † Based on reports of eighty-one companies. ‡ Based on reports of eighty companies in January, seventy-nine in February, seventy-six in March and sixty-seven in April.

Brooklyn City Railroad to Continue Independent Operation

The directors of the Brooklyn City Railroad have determined, according to an announcement made on July 7, that, in the interest of the stockholders, the property will remain independent of the reorganized Brooklyn-Manhattan Transit Corporation. In consequence expenditures have been authorized for betterments and improvements on the Brooklyn City surface system which will aggregate $5,000,000. The railroad is now carrying more than 21,000,000 passengers a month, an increase of 3,000,000 since the company began independent operation in October, 1919.

Special trackwork, involving the renewal of curves, switches and crossings, is being carried out, and fifty-four low-level center-entrance trailers are being equipped as motor cars. Seventy-five old type cars have been converted into "one-man two-man" cars at a cost of $175,000. In addition orders have been placed by the company for 200 four-motor passenger cars, referred to at length in the ELECTRIC RAILWAY JOURNAL for July 7, page 42.

Rebuilding of tracks was described as a chief task of the Brooklyn City management. Last year 12 miles of track and pavement were rebuilt and this year a further extensive track program is being executed.

It is of interest to recall that the "Brooklyn City Railroad" of today is the same company that was incorporated in 1853. It has never been through a receivership or reorganization and, in itself, has continuously been a profitable enterprise. It is now in an enviable position financially, a condition resulting largely from excellence of service.

Professor Ely to Direct Study of Credit Problem of Utilities

The Institute for Research in Land Economics and Public Utilities, with headquarters at the University of Wisconsin, announces in its first official publication, *Institute News*, that it has undertaken a study of public utilities to ascertain if the cost of their services cannot be reduced by a solution of their credit problem. The publication says:

> This study is entered upon for the purpose of discovering what is wrong with a public utility relationship which makes it necessary that these essential industries pay from 1 to 2 per cent more for their cheapest money, and up to 4 per cent more for their dearest money, than is paid by public corporations.
>
> Regulation should aim to eliminate risk and uncertainty from the investment of capital in these industries so that the rate of return would be comparable with that received from loans to public corporations.

As *Institute News* sees it public utility securities are gaining in favor with the investing public and the cost of money to public service companies is rapidly coming back to normal levels. As a basis for this statement it advances the results of a study of the relative borrowing power of public service corporations for the last twenty-five years, made by Herbert B. Dorau of the institute.

Establishment of the facts with regard to the cost of money to public service corporations is a preliminary step to an intensive study by the institute of the credit problem of regulated industries. Having determined the facts, the investigation will take the form of a detailed analysis of all the factors which make for the high cost of capital in these essential industries.

Richard T. Ely, professor of economics, is director of the institute.

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City Would Allow Only $7,215,229 Value on Denver Tramway

The city of Denver on June 28 introduced at the tramway rate of fare hearing an appraisal of the city lines of the Denver Tramway of $7,215,229, based on an inventory of the lines made by Dr. Delos F. Wilcox. His figure is less than one-quarter of that named as the worth of the company by the experts for the company, who testified that the value ran from $31,000,000 to $35,000,000.

The inventory as presented by Mr. Wilcox does not include property of the company used in the city by its suburban lines, nor the track of the company from the city limits to Aurora, and to Englewood. Mr. Wilcox places no value on the company's franchise rights, street easements, or cost of financing the company.

In a preliminary statement, affixed to his report, Mr. Wilcox states that the method followed by him in making his inventory was that of estimating the value of the company on normal or historical reproduction cost. The basis of the company's top estimate was on the theory of reproduction new at the present time.

The total value of the company's city lines Mr. Wilcox placed at $12,051,260. This amount less accrued depreciation of $4,836,031, making $7,215,229 net, is taken as the figure upon which the company should, according to the city's contention, be allowed to make a profit.

Terms of Boston & Worcester Refinancing Announced

The plan for refinancing the Boston & Worcester Street Railway has been announced. It provides for the extension of $2,260,000 of first mortgage 4½s due Aug. 1, ten years at 6 per cent, the sale of $934,000 new common stock at par, the elimination of the holding company, which will offer all the common stock of the operating company to its own preferred shareholders, and waivers of arrears of preferred dividends by shareholders of the operating company. The floating debt of the railway will be paid off under the plan. Subscription to the new common stock has been underwritten.

Sale of Youngstown Interurbans Approved

Applications of the West End Traction Company and the East End Traction Company, Youngstown, Ohio, for authority to purchase interurban properties of the Ohio-Pennsylvania Electric Company have been approved by the Public Utilities Commission. The West End Traction Company asked for authorization of $582,700 of common stock and $1,345,500 of 7 per cent mortgage bonds to finance the purchase of the interurban line from Girard through Warren and Niles to Leavittsburg and Mineral Ridge, together with its branches. The commission found that a reasonable purchase and sale value is $1,317,500 and authorized issuance of $369,500 of stock and $948,000 of bonds.

The East End Traction Company asked to issue $165,994 of common stock and $360,000 of 7 per cent mortgage bonds for the purchase of the interurban line from East Youngstown to the state line at Lowellville, with its branches. The commission ruled $392,900 would be a reasonable purchase and sale value, and authorized issuance of $114,900 of stock and $278,000 of bonds.

The sale of the railway properties by the Pennsylvania-Ohio Electric Company is being made to carry out the company's policy of separating the ownership of the different kinds of utilities.

Auction Sales in New York.—At the public auction rooms in New York on July 11 there was sold $1,000 of United Traction Company (Albany) 4½ per cent bonds, due 2004; coupons June and December, 51 per cent.

Authorizes Certificate Issue. — The Public Service Railway, Newark, N. J., has been authorized by the State Board of Public Utility Commissioners to issue $400,000, par value, of equipment trust certificates. The issue is taken under an agreement of May 1 with the Fidelity Union Trust Company as trustee. The certificates bear interest at the rate of 6 per cent.

Approves Purchase.—The Dallas City Commission has given its final and official approval for the purchase by the Dallas Railway of the property of the Dallas Standard Traction Company, which built the railway in Mount Auburn and operated service for several years. The property and franchise of the Dallas Standard Traction Company were taken over by the Dallas Railway for $25,000.

$290,226 After Expenses in Fort Worth.—The Northern Texas Traction Company, Fort Worth, Tex., has filed with the city of Fort Worth its annual statement, showing earnings and operating costs. Gross earnings for the year were $3,029,724, and operating costs $2,639,498. Visible tangible property is valued at $3,565,140. The company has an authorized capitalization of $6,000,000.

Texas Railway Sold.—The Bryan-College Interurban Railway, which extends from Bryan, Tex., to the Agricultural and Mechanical College of Texas, at College Station, has been sold at auction for $40,000. The estate of S. S. Hunter, Shreveport, La., the largest bondholder in the original company, purchased the property. It is understood that the property will be junked and the track removed. The line has not been operated for some time.

Receiver for Minnesota Interurban.—Willard Hield and E. D. Luce have been named receivers of the Electric Short Line Railway, with terminals in Minneapolis, following the filing of a petition for receivership on behalf of the unsecured creditors. The company operates a total of 59 miles of road. E. D. Luce, one of the receivers, is vice-president of the company. Built originally as an electric line, the road some time ago went over to the use of steam as motive power.

$39,871 Loss in Youngstown in May.—The Street Railway Commissioner of Youngstown, Ohio, filed a report with the City Council on July 2 showing that the Youngstown Municipal Railway had lost $39,871 during May. The deficit in the stabilizing fund on June 1 was $929,928. Gross revenues for the month were $140,060 and the operating expenses were $95,592. A surplus of $10,605 was shown in the operating fund. Maintenance costs were $24,382 and a surplus of $7,653 was shown here. In May 2,448,795 passengers were carried and the earnings per car mile were 0.3255, while the cost was 0.3783.

New Quebec Issues Authorized. — Shareholders of the Quebec Public Service Corporation, subsidiary of the Shawinigan Water & Power Company, met on June 27 for the first time under the new corporate title of the Quebec Power Company. The capital is now $10,000,000, of which $4,000,000 is 7 per cent preferred. Power was given to issue first mortgage bonds up to the maximum of $20,000,000 to be issued in series as desired. No issue is contemplated immediately. The present issue of $2,600,000 preferred will rank *pari passu* with the $1,400,000 heretofore created. It is all part of a plan of refinancing.

Reorganization Plan Declared Operative.—The plan for the readjustment of the United Gas & Electric Corporation, New York, N. Y., through consolidation with the Berkshire Corporation has been declared operative. A special meeting of the stockholders of the United Gas & Electric Corporation will be held at the company's office at Hartford, on July 20, to approve the consolidation of the former with the Berkshire Corporation. The new corporation will be known as the United Gas & Electric Corporation. A review of the terms of the proposed plan of readjustment was published in the ELECTRIC RAILWAY JOURNAL for April 28, page 739.

Tidewater Southern Lost $14,882.—The Tidewater Southern Railway, operating in Stockton, Manteca, Ortega and Turlock, Cal., reports to the Railroad Commission for the year 1922 that its operating revenue was $217,731 and operating expenses $179,810, giving a net operating revenue of $37,920. Miscellaneous non-operating revenue was $3,183. Interest, rent, taxes and other deductions totaled $55,987. The net corporate loss for the year was $14,882. The deficit at the beginning of the year amounted to $249,821. Miscellaneous additions to surplus for 1922 amounted to $5,519 and miscellaneous deductions were $26,868, leaving an accumulated deficit at end of year of $286,052.

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Traffic and Transportation

Electric Railway Comes to Shippers' Rescue

Owing to the abandonment of the Dayton, Toledo & Chicago Railway, which operated 105 miles out of Dayton, north to Delphos, Thomas J. Brennan manager of the Dayton, Covington & Piqua Traction Company, has completed plans whereby the traction company will take care of the different communities which were formerly served by this steam line.

The towns of West Milton, Pleasant Hill, Englewood, Union and Shiloh were practically put out of business last August, as far as getting their steam railroad shipments, consisting of grain, coal, stock, and other car load commodities. The Dayton, Covington & Piqua Traction Company came to the shipper's rescue, and has completed arrangements with the "Big Four" which operates through the town of Ludlow Falls, Ohio, for the interchange of equipment at Ludlow Falls. In turn the traction company will deliver the steam railroad cars to all points which were formerly served by the Dayton, Toledo & Chicago Railway.

To handle this freight business, it was necessary for the traction company to purchase certain sections of the Dayton, Toledo & Chicago tracks in the various towns along the line, building a connecting track with the "Big Four" at Ludlow Falls, also a connecting track in the above towns to be served, all of which have been completed.

The shippers and the general public in all of the communities have expressed their appreciation of the efforts put forth in having this service resumed, which will take the place of that formerly offered by the Dayton, Toledo & Chicago Railway, since that operation was suspended. In almost every instance it has been necessary to haul freight by motor truck many miles to the stations, with the result that business operations have been curtailed.

Los Angeles Traffic Report Filed

After visiting eight large Eastern cities for the purpose of adopting transit relief plans for the city of Los Angeles, Commissioner Bogardus and Chief Engineer Lorentz of the Los Angeles Board of Public Utilities have filed the final report of their findings and recommendations with the board. This report has been approved by the Board of Public Utilities and passed on to the City Council with the recommendations that detailed plans for subway systems and elevated lines in Los Angeles be undertaken at once. The report favored subways, elevated lines and surface lines with transfers to short-haul and motor bus feeder lines. The members of the board in their report declare the Pacific Electric Railway to be the logical system to supply the rapid transit service for the city. The report states:

> The proposed Hollywood tunnel or subway is the first unit toward giving this class of service to the northwest section of the city. The terminal change from the railway company's Hill Street terminal to Pershing Square is a move in the right direction, as ultimately Pershing Square should be the central point of all transportation systems either rapid transit or surface.
>
> A subway and depressed track should also radiate from Pershing Square in a southwesterly direction to Vineyard Junction, this arm to take care of the west beach district and afford loop service via Hollywood.
>
> The Pacific Electric's existing overhead viaduct east of Sixth Street terminal should be enlarged and extended easterly across the Los Angeles River and extending north to a private right-of-way, thus affording rapid transit to the northeast districts. The harbor and south coast beach districts should tie into this east and west overhead structure at Long Beach Avenue. Long Beach Avenue should either be elevated or depressed eventually, as far south as Slauson Avenue.
>
> The city should build all subways and elevated lines and lease them to the operating companies. In case the city should be unable to carry out this program and the companies are willing to undertake it, provision should be made for the city to take over such lines at its discretion and at a fair value.

As to the subway for the surface lines, it is recommended that it be built by the city and operated by the carrier engaged in that class of business on a rental basis. The board wants the surface lines unified.

The entire elimination of surface cars from the congested district of Los Angeles is a part of the proposed plan.

In the meantime the Pacific Electric Railway filed a request that it be allowed to start work at once on the proposed rapid transit subway having its terminal under Pershing Square. Ultimately, it is planned that Pershing Square will become the central terminal for subways in the city of Los Angeles, connecting remote sections and beach district rapid-transit lines.

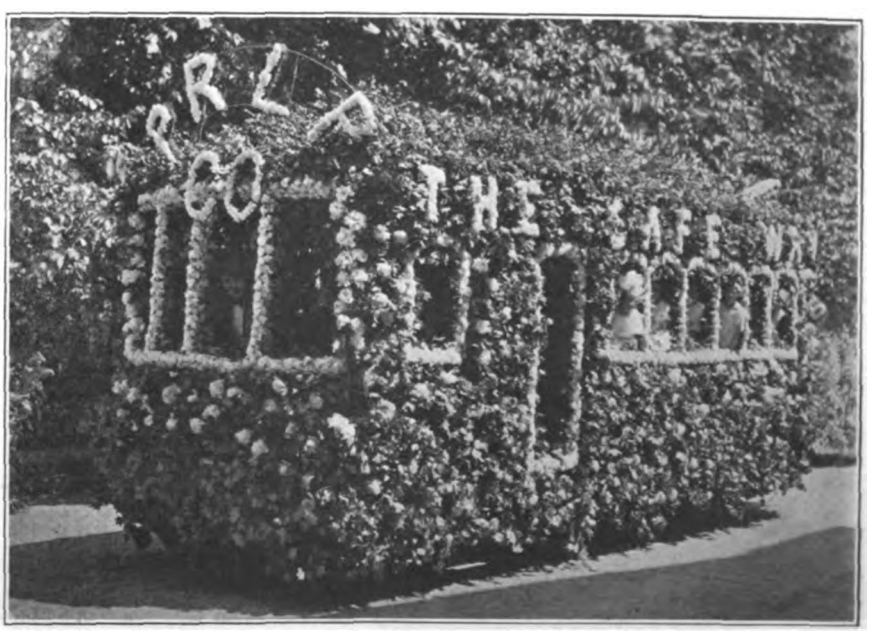
In view of the fact that the voters at the June 5 election sanctioned Pershing Square as the subway location, the railway now wants immediate action and ratification on the part of the various civic bodies of the city.

Railway Again Takes Part in Portland Rose Festival

The Portland Railway, Light & Power Company entered a "Safety First" floral float in the grand floral parade of the annual Rose Festival at Portland, Ore., June 12, 13 and 14, and won second prize in the public utility division. The float was designed to represent an actual street car and was loaded with sixteen young girls selected from the various schools, all dressed in white.

The Brooklyn school took a unique part in the famous "Rosebud (children's) parade" of the Rose Festival by entering a section devoted exclusively to "Safety First." All of the boys and girls were in uniform and bore safety first warnings on their backs and carried safety banners in the line of march. Some of the ingenious youngsters built a miniature ambulance and a miniature police patrol wagon which also took part in the procession. The accompanying photo shows the school children "at rest" during a halt of the parade.

The 250 "safety officers" of the Portland public schools were out in full force in the pageant and one of their picturesque stunts was the feeding of the 6,000 children in the parade with cookies, ice cream and milk. The feat was accomplished without halting the movement of the parade, groups of the safety officers being detailed to each of the marching divisions, handing out the goodies as the children swung by, amid the plaudits of the spectators.



Winner of Second Prize in Public Utility Division

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Expert to Study Ford Works Traffic Problem

J. Rowland Bibbins, consulting engineer on transportation, has been called to Detroit to study the special traffic conditions of the northern part of that city, centering in Highland Park, the site of the Ford Motor Works. This situation has been growing in complexity along with the city itself, due to lack of adequate development of streets, transit lines, terminals, etc., combined with the rising flood of motor traffic, buses and de luxe jitneys. The Ford Motor Works employed 14,000 men in 1914, 31,000 in 1916 and 70,000 to-day, but practically the same street car lines and terminals exist today as during the pre-war period.

Mr. Bibbins will embody in his report to the City Council a broad consideration of streets, railroads, interurban development and special transit terminals as well as specific recommendation for immediate remedies in traffic control.

Louisville Celebrates Bus Opening —Movies Aid Introduction

Fifty-five representative business men of Louisville, on June 21, expressed their interest in the start of automobile coach service in the Kentucky city by the Kentucky Carriers, Inc., a subsidiary of the Louisville Railway, by going on an excursion to Speed, Ind., where they met the first arrivals of the new automobile coach fleet.

The six coaches which were met had been driven overland from Cleveland, where they were built. They furnished the means of transportation back to Louisville. The trip up to Speed was made on a special car of the Interstate Public Service Company.

James P. Barnes, president of the Louisville Railway and of the Kentucky Carriers, Inc., issued the invitations to the excursion. Among those who went on the trip were representatives of different departments of Louisville's municipal government, officials of the railway and of the coach company, bankers, industrial leaders, representatives of civic clubs and newspaper men. Lunch was served in the community house of the Louisville Cement Company at Speed.

After the journey back to Louisville had been made, the coaches were assembled and a parade staged through the downtown district. This ended at the City Hall, where Mayor Huston Quin, who had sent a personal representative on the excursion, congratulated the officials of the Louisville Railway for having developed an auxiliary and subsidiary coach service, predicting that this service would be successful and would mean much for Louisville's future.

Moving pictures were taken of the party and coaches at Speed and at different places along the road back to Louisville. These were shown before various luncheon clubs and in moving picture theaters the week after the excursion took place.

The plan for starting bus service in Louisville was reviewed in the ELECTRIC RAILWAY JOURNAL for June 2, page 944. As stated at that time the company contemplates using twenty-four buses. Of the twenty-four cars twelve will be single-deck vehicles and twelve double-deck. The single-deck buses have Bender bodies mounted on White chassis, while the double-deck buses will be supplied complete, chassis and body, by the Yellow Coach Company, Chicago. The statement was, therefore, incorrect which was made in the ELECTRIC RAILWAY JOURNAL for June 30 that the double-deck buses would be built on the White bus chassis using bodies of the Yellow Coach Company.

Receives Permission to Operate Bus Line

Orders have been received by the Tri-City Railway from the Illinois Commerce Commission allowing the company to discontinue service on the Third Avenue line from Forty-third Street, Rock Island, to Twenty-third Street, Moline. All passengers to Moline are to be handled on the Fourth Avenue line. With the above orders, a certificate of convenience and necessity was also received which is to allow the railway to operate a bus line on Twenty-third Avenue, Moline, from Sixteenth Street to Thirty-fourth Street. This line will act as an extension on the Fourth Avenue car line.

The order means a new system of travel under the Tri-City Railway in the three cities. The buses are to be built so as to accommodate twenty-five passengers and will go into service as soon as received. The bus fare will be the same as that on the railway and transfers will be exchanged between street cars and buses.

More Five-Cent Fare Lines.—The Boston Elevated Railway has established four more 5-cent fare lines.

Mutual Benefits from Safety.—According to a new plan which became effective on June 1 motormen and conductors of the Memphis Street Railway will receive one-half of all they can save the company on accidents based on their average cost for the past five years. This is part of the new "safety first" program.

New Color Popular in Sedalia.—The City Light & Traction Company of Sedalia has adopted a new color scheme for the nine cars that are being used in that city, and instead of the canary yellow that was used on cars they are being painted traction orange color, similar to the cars of Kansas City and St. Louis.

Jitney Measure Passed in Youngstown.—The Council of Youngstown, Ohio, has passed the socalled anti-jitney ordinance granting Safety Director Hamilton full power to regulate vehicular traffic in a congested district. The new measure provides that all traffic shall go directly through the square instead of around the curves on each side as at present.

Increased Rate Allowed.—The Fairburn & Atlanta Railway has received permission from the Georgia Public Service Commission to increase its passenger fare from 5 cents to 6 cents per zone. The company, which operates gasoline cars between College Park and Fairburn, claimed that it could not meet operating expenses at the lower rate.

Pass Abandoned.—After experimenting for three months, the Seattle & Rainier Valley Railway, Seattle, abandoned the weekly pass on July 2. According to company officials, the revenues have not been adequate to warrant carrying the experiment any further. The system was adopted by the company on April 2. The charge was $1.15 for a ticket good for a week.

Group Movement Speeds Traffic.—Movement of cars in the downtown section of Los Angeles has been facilitated considerably by the establishment of a plan for grouping cars between 7 a.m. and 6:15 p.m. The plan was proposed by Capt. James McDowell, head of the police traffic department, and was referred to in the ELECTRIC RAILWAY JOURNAL, issue of June 23.

Court Refuses Plea for Reduced Fare.—The 7-cent fare for Baltimore was declared legal by the Court of Appeals on June 26. The action in which the decision was rendered was to compel the United Railways & Electric Company to reduce its fare from 7 to 5 cents. The decision of the lower court which upheld the demurrer to the injunction against the 7-cent fare was sustained.

Arranging for Motor Traffic.—The City Commission has passed an ordinance authorizing the Memphis Street Railway to remove its tracks from Lauderdale Street between Linden and Vance Avenues. The action on the part of the commission is the first move to make Linden Avenue a thoroughfare for motor traffic. The company has agreed to reroute the Glenview cars on Vance instead of Linden, from Lauderdale to Third Streets. Later the tracks on Linden will be removed.

Commissioner's Finding Protested in Fare Case. — I. Edward Herrmann, Jerome T. Congelton and George L. Record, counsel respectively for the State Board of Public Utility Commissioners, the city of Newark and Jersey City, filed exceptions on June 29 in the United States Court to the report of Special Master Thomas G. Haight, who recommended that the rate of fare fixed by the Utility Board for the lines of the Public Service Railway be declared confiscatory and that a permanent injunction be issued to restrain the board from enforcing its order for a 7-cent fare, with 2 cents additional for a transfer. The fare allowed by the court over the protest of the commission is 8 cents cash or four tokens for 30 cents, with a 1-cent charge for a transfer.

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Book Reviews

Railroads: Rates—Service—Management

By Homer B. Vanderblue, professor of business economics, Harvard University, and Kenneth F. Burgess, general attorney Chicago, Burlington & Quincy Railroad. The McMillan Company, New York. 1923. 488 pages.

Railroad regulation in the United States is accomplished by an elaborate system of governmental machinery. The purpose of this book, as stated by the authors, is to give information concerning that system, useful both to students and men of affairs, to the general public who desire to know the present methods of regulations, to students approaching an intensive study of railroad practices and to railroad officers whose duties have been restricted to limited fields.

The book is divided into four main parts: I, The Scope and Machinery of Regulation; II, Rates; III, Service, and IV, Management. These subjects have been treated from the standpoint of the transportation act of 1920 and the effect it has had on railroad operations. The treatment is distinctly from a legal standpoint, and references to court and commission decisions are made covering all of the main points.

Municipal Railways in the United States and Canada

Bulletin 18, Public Ownership League of America. Chicago, Ill., 1922.

This bulletin is a compilation of articles favoring municipal ownership of street railways gathered together from various sources. Following introductory articles by Delos F. Wilcox and Carl D. Thompson, several communities now having municipal ownership are described. The chapter on Detroit concludes with an article by J. S. Goodwin, late general manager of the municipal railway. San Francisco is covered by Jay G. Hayden and M. M. O'Shaughnessy, city engineer. The chapters on Toronto and Seattle are by Carl D. Thompson. Another chapter is devoted to seven small municipal street car lines in various parts of the country. Chapter VII on the Buffalo street car strike is by Mrs. Hiram W. Thomas. The concluding chapter "Labor Conditions Under Municipal Ownership" is by Carl D. Thompson.

In general, these articles review the various steps in the history of acquiring and operating municipal street railways in the United States and Canada. It is stated that there are now thirty cities in the United States and Canada that own and operate municipal railways, fifteen being in each country.

The purpose of the book is stated in the introductory chapter by Mr. Wilcox, as follows:

"The street car crisis is a crisis in public policy. Local regulations through franchise contracts and police power ordinances have failed. State regulations is a mere running away from the problem. Service-at-cost as a means of perpetuating the regime of private ownership and operation is a will o' the wisp. The crisis calls for one remedy and one only, and that is the full and frank acknowledgment of public responsibility for urban transportation service. Every American city needs a policy and a program looking to the complete municipalization of the street cars at the earliest possible moment."

Safety Education

A Plan Book for the Elementary School. By a committee appointed by the superintendent of schools, Chicago, Ill. Published by the Board of Education, Chicago, Ill.

As stated in the foreword, this book is a serious attempt at safety education in the elementary school through the regular subjects of the curriculum. It suggests accident prevention as at once a topic for study and as a motive for school activities. Experience in several other cities, and to a degree in Chicago, has shown that safety education in the schools has been the most effective agency in reducing the number of accidents to children.

The first ten chapters are for use during the ten months of the school session. They deal successively with these topics: Street dangers, fires, weapons, burns and scalds, poisons and asphyxiation, electrical safety, falls and falling objects, railway tracks and trains, accidents in play, drowning.

A general discussion of each topic is given, followed by slogans and jingles suitable for illustrations, and also statistics and their applications. Suggestions are given for graphic representation, dramatization and games relating to the subject, school organizations, rules and laws, projects for school and home and subjects for debate.

The remaining ten chapters form an appendix, covering the various methods of approach for the different subjects. Chapter XI, for instance, deals with slogans and jingles. A considerable amount of material is presented in this chapter, so that the teacher may be able to give this kind of instruction on each of the monthly subjects.

The book was prepared by a committee consisting of G. B. Masslich, D. F. O'Hearn, and G. L. Voorhees, under the supervision of Peter A. Mortenson, superintendent of schools. The National Safety Council and the Chicago Safety Council co-operated in the preparation of the book, and the manuscript was submitted for criticism to a list of some ninety persons. Street railway men included in this list were: W. H. Boyce, Beaver Valley Traction Company; M. W. Bridges, Chicago Elevated Railways; B. J. Mullaney, People's Gas Light & Coke Company, and John E. Wilkie, Chicago Surface Lines.

Atlas of U. S. A. Electric Power Industry

Outlining suggested regional electric power districts and proposed constant-potential transmission systems for the United States of North America. By Frank G. Baum, consulting hydro-electric engineer. McGraw-Hill Book Company, Inc., New York, N. Y.

In thirty-four charts and twenty-one pages of reading matter, the author condenses a great deal of information regarding the electric power industry and electric power transmission. In the first and second parts of the book, in addition to data on existing developments, the author suggests power districts and constant-potential transmission systems covering the entire United States. This is done with a view to utilization of all water power in the country. The third section consists of graphical statistics on natural resources, including fuels, precipitation, altitude of land, and forests.

Motor Transportation of Merchandise and Passengers

By Percival White. McGraw-Hill Book Company, Inc., New York, 1923. 486 pages.

The purpose of this volume, according to the author, is to combine and relate all phases of commercial highway transportation and to consider them in connection with other methods of transportation. The book is divided into twenty-seven chapters, dealing with various phases of the design, construction and classification of trucks and buses. A comparison of the different methods of drive for motor vehicles is discussed and the relative field of each is considered. The introduction of the bus into passenger transportation is taken up from its inception, and considerable space is given to showing its field in connection with other recognized means of passenger transportation. Advantages and disadvantages of buses as compared with trolley cars are frankly discussed.

The author's conclusions as to the future of the motor bus are that it lies mainly in two directions. The first is supplementary to existing systems of transportation, in which classification are included such applications as the Fifth Avenue bus lines, in New York, and those of the Chicago Motor Bus Company. The second application is complementary to existing systems, including such uses as extension and feeder services, as a means of helping suburbanites to reach the shopping center, or to form belt lines around congested districts, for filling in links in interurban systems, and where interurban traffic is not heavy enough to warrant a rail vehicle.

In his general conclusion, the writer warns against over-enthusiasm of some highway transportation advocates. He believes that motor-driven apparatus will be developed in harmony with the economic essentials, being used in its proper place in co-ordination with other methods of transportation.

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Personal Items

Mr. Couzens Heads Canadian Association

New President Is Favorably Known as General Manager of Toronto's Municipal Railway System

At the concluding meeting of the Canadian Electric Railway Association, held on June 30 at Toronto, H. H. Couzens, general manager of the Toronto Transportation Commission, was elected president. Since Mr. Couzens assumed the duties of his present position, Sept. 1, 1921, Toronto's transportation system has been almost entirely rehabilitated. When the city took over the lines of the Toronto Railway the system was in exceedingly bad shape, the track being almost worn out and most of the cars being old. Under the leadership of Mr. Couzens the Transportation Commission at once began the work of rehabilitation, and at the present time the track has been reconstructed on all the principal streets and many new cars have been purchased. At the convention the commission had an exhibit of eighteen different types of cars in use in Toronto, showing everything from the newest and latest motor cars and trailers to an old train which was made up of a single-truck motor car with a single-truck trailer, both of which had served as horse cars. The surprising feature of the exhibit was that trains of this latter type were in use in Toronto when Mr. Couzens took charge, and the contract between the two illustrates the thoroughness with which he has done the work.

H. H. Couzens

Born in England in 1877, Mr. Couzens received his education at the Independent College at Taunton, England, after which he served as a pupil in mechanical and electrical engineering with Allen & Sons, Taunton, and the Taunton Corporation Electrical Works. After holding a number of engineering positions he became manager and engineer of the West Ham Corporation Electric Supplies in 1909, and three years later accepted a similar position with the Hampstead Borough Council. He held the latter position only one year, resigning at the end of 1912 to become general manager of the Toronto Hydro-Electric system, with which he took up his duties early in 1913. He continued in the latter position until the Toronto Transportation Commission took over the local street railway, when he assumed his present work.

Messrs. Dick and Willis Advanced at Atlanta

J. P. Dick, purchasing agent for the Georgia Railway & Power Company, Atlanta, and H. L. Willis, operating engineer for the company, have been appointed assistants to W. H. Taylor, vice-president of the company. F. A. Jordan, connected with the company the past eight years, has been named purchasing agent to succeed Mr. Dick.

Mr. Willis, who will operate as a special engineer under vice-president Taylor, is nationally known as an electrical engineer. He is also president of the Southern Appalachian Power Conference.

E. J. Dickson New Vice-President at Providence

The new vice-president of the United Electric Railways, Providence, R. I., E. J. Dickson, whose appointment was noted in the July 7 issue of the ELECTRIC RAILWAY JOURNAL, started in the transportation industry in 1887 with the Chicago, Burlington & Quincy Railway at Galesburg, Ill. As was noted in the ELECTRIC RAILWAY JOURNAL, issue of April 7, when his complete biography was given, Mr. Dickson's career has been marked by steady advancement from the lowest position to very nearly the highest. His biggest assignment came in 1913 when he became vice-president in charge of operation of the International Railway. His resignation from this position, effective May 1, of this year caused distinct regret among the Buffalo people.

Oregon Official Appointed to Ohio Interurban

The appointment of John W. Hewitt to be general superintendent of the Columbus, Newark & Zanesville traction lines, with headquarters in Zanesville, Ohio, was announced on July 12 at the headquarters of the company at Springfield, Ohio. The post was formerly handled by C. C. Fast, also general superintendent of the Indiana, Columbus & Eastern lines, but because of increasing duties it was deemed desirable to separate the two positions. Mr. Fast continues in his present post with the Indiana, Columbus & Eastern Traction Company. Mr. Hewitt was formerly with the Sumpter Valley Railroad, a steam line in southern Oregon.

From Boston to Baltimore

H. B. Potter, Well Known New England Official, to Assist Mr. Emmons in Southern City

H. Bertram Potter, one of the most popular electric railway officials in Boston, has resigned as assistant general manager of the Boston Elevated Railway to become assistant to the president of the United Railways & Electric Company, Baltimore, Md.

In the formulation of street railway legislation in Massachusetts Mr. Potter has been of great assistance, having attended the legislative hearings at the State House and the hearings of the Public Utilities Department for many years. On many of these occasions he has been the spokesman for the Boston Elevated, but his interests extended beyond the limits of his own company.

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H. B. Potter

Mr. Potter went to Boston about thirteen years ago from Maine, where he had been identified with the building and operation of electric railways. His early connection with the Boston Elevated was as assistant to Matthew C. Brush during the eight years that the latter was first vice-president and then president of the company. When the Boston Elevated was turned over to a Board of Public Trustees, with Edward Dana as general manager, Mr. Potter became assistant general manager.

During the intensive campaign for safer operation of electric railways and vehicular traffic Mr. Potter became one of the organizers of the Massachusetts Safety Council, in which he gave much time to the prevention of accidents. He is chairman of the accident prevention committee of the American Electric Railway Transportation & Traffic Association and vice-chairman of the trackless transportation committee of the American Electric Railway Association. He has made a special study of motor bus development. He is also a member of the New England Street Railway Club.

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Mr. Shryock Made Manager Youngstown & Suburban Line

E. O. Shryock, manager of the Zanesville properties of the Columbus, Newark & Zanesville Railway, has been appointed manager of the Youngstown & Suburban Railway. He is succeeded in his former position by Ricardo Z. Zimmermann.

Mr. Shryock has been manager in Zanesville since August, 1922. His transfer to the Youngstown property comes as a well-deserved promotion. Prior to his coming to Zanesville he had had considerable experience with lighting, power and railway companies in a number of cities in Pennsylvania and Ohio. He started his business career in June, 1906, when he entered the employ of the Meadville Traction Company, the Meadville & Cambridge Springs Street Railway and the Peoples Incandescent Light Company, a jointly operated railway and lighting property in Meadville, Pa. In February, 1909, he was made superintendent of a new division which was operated under the name of the Meadville & Conneaut Lake Traction Company. Four years later a consolidation of the above companies was effected under the name of the Northwestern Pennsylvania Railway & Electric Service Company and Mr. Shryock was made general superintendent and purchasing agent of the combined properties. In May, 1920, he resigned to become superintendent of railways of the Northwestern Ohio Railway & Power Company with headquarters at Oak Harbor, Ohio, leaving this position in June, 1922, to accept appointment as superintendent of transportation with the Columbus, Newark & Zanesville Electric Railway. A few months later he was made manager of the company's activities in Zanesville upon the resignation of B. S. Waters. Mr. Shryock was prominently identified with the civic affairs of Zanesville, being a member of the Chamber of Commerce and Rotary Club.

Ellis and Way Elected Officers of the Wisconsin Company

A. K. Ellis, for many years secretary, treasurer and general superintendent of the Wisconsin Traction, Light, Heat & Power Company, Milwaukee, Wis., has been elected general manager and secretary and treasurer of that company, the property of which was recently purchased by the North American Company, New York.

S. B. Way, vice-president and general manager of the Milwaukee Electric Railway & Light Company, has been elected vice-president and a director of the Wisconsin Traction, Light, Heat & Power Company.

Dr. H. M. Blain, head of the department of journalism of Tulane University, New Orleans, La., has been named director of the newly organized Louisiana-Mississippi Committee on Public Utility Information. In addition to his teaching work Mr. Blain is experienced in both newspaper work and advertising.

Mr. Gordon on "Journal" Staff

Charles Gordon, equipment engineer of the Chicago Surface Lines, has joined the staff of ELECTRIC RAILWAY JOURNAL as Western editor, this position having been vacant since H. L. Brown was transferred to the New York office, though the JOURNAL has meantime had representation in the central territory through D. F. Hine, and more recently M. B. Knox, who continues as assistant editor in Chicago. Mr. Gordon will be located in the Chicago office.

As Mr. Gordon is considered quite generally to be one of the most competent young engineers in the country in point of car and equipment design and maintenance, he brings to the JOURNAL an invaluable practical experience that should be of particular service to the readers at this time, in view of the present great activity in this phase of railway work. He has had direct charge of the many engineering problems worked out in the last few years, under the direction of H. H. Adams, by the rolling stock department of the Chicago Surface Lines, in developing the several new types of cars and new mechanisms and original construction details that have frequently been the subject of articles in this paper.

Charles Gordon

Mr. Gordon was graduated from the University of Illinois, railway electrical engineering department, in 1912. His first position was with the Chicago Railways Company, where he was engaged in various electrical and mechanical test work under the direction of John Z. Murphy, then chief engineer. He remained with the company until December, 1917, when he entered the United States Army air service as engineer officer of the 276th Aero Squadron. On his discharge from the military service in April, 1919, he was employed in the sales and service department of the Vacuum Oil Company until his appointment in November, 1920, as equipment engineer of the Chicago Surface Lines.

Mr. Gordon is a member of the equipment committee of the American Electric Railway Engineering Association and an aggressive proponent of the advantages of uniformity and standardization, particularly as applied to the various equipment of the individual property.

Former B. R. T. Directors Not on Board of Successor Company

The personnel of the board of directors of the Brooklyn-Manhattan Transit Corporation is in sharp contrast to that of the Brooklyn Rapid Transit Company, of which the new company is the successor. It will be remembered that the old company was dominated by the so-called Brady interests. These interests are apparently not even represented indirectly on the board of the successor company. As previously noted in the ELECTRIC RAILWAY JOURNAL on the new board are: Arthur S. Somers, James H. Post, James Sherlock Davis, Charles A. Boody, William H. English and William H. Johns. These are the company's own representatives, though the official "public representatives" have been named by the Transit Commission—Travis H. Whitney, Robert Alfred Shaw and Alfred E. Marling.

Not only was Arthur S. Somers, president of the Brooklyn Chamber of Commerce, at the head of the list of directors given out after the election, but he was also made a member of the executive committee of the board of directors. Following is the executive committee: Gerhard M. Dahl, chairman; Albert H. Wiggin, Arthur S. Somers, Frederick Strauss, Matthew C. Brush and Charles S. Sargeant.

Naturally a great deal of interest has attached to the personnel of the board of the new company. Biographies of Mr. Dahl and of W. S. Menden, president, have already been published in these pages. All of the men on the board with possibly one or two exceptions are known nationally in business or financial circles. Perhaps the most prominent local man on the board is Mr. Somers. Of the other members of the board Matthew C. Brush is undoubtedly best known among electric railway men. He was formerly president of the Boston Elevated Railway. He is also a member of the executive committee of the new company. Mr. Menden, the president, is in full charge of operation. Whether or not the scheme of organization contemplates the designation of the title of general manager has not been announced.

W. C. Markham Joins Construction Company

William C. Markham, construction engineer for the Detroit Department of Street Railways, has resigned to become affiliated with the W. C. Markham Construction Company, of which he will be treasurer and general manager. General construction work and home building will be undertaken by the new company.

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Mr. Markham was the first employee of the municipal street railway department when it was organized in 1920. During his employment by the city he has supervised the construction of all railway lines as well as the new city garage for the city motor department, the largest building of its kind in the country. As engineer he also prepared the plans for subway dips which were submitted to the Rapid Transit Commission by the street railway department.

R. Z. Zimmermann Succeeds Shryock in Zanesville

Ricardo Z. Zimmermann has been appointed manager of the Columbus, Newark & Zanesville Traction Company at Zanesville, Ohio, to succeed E. O. Shryock, recently promoted manager of the Youngstown & Suburban Railway.

Mr. Zimmermann has had wide experience in public utility work. Born in Buenos Aires, Argentina, where he lived for several years, he received his collegiate training in the college of engineering, University of Pennsylvania. He was graduated from that institution with the class of 1916 after having spent his vacation periods in utility work. After leaving college, he became connected with Day & Zimmermann of Philadelphia, management engineers.

His first work for that company was being placed in charge of the field office at Erie, Pa., where the concern was constructing a 16,000-kw. generating plant for the Erie Lighting Company.

Completing the work at Erie, Mr. Zimmermann went to Greenwich Point, near Philadelphia, where he assumed charge of the field forces constructing several immense piers and warehouses for the United States army quartermaster's department. He later entered the management division of the Day & Zimmermann company as commercial and rate engineer and later was transferred to the division handling public utility reports and investigations. In March, 1922, he was sent to Salem, Ohio, as manager of the Salem Lighting Company, which serves a number of towns in addition to Salem. This position he held up to his recent promotion as manager of the traction properties in the city of Zanesville.

Percy H. Whiting, manager of the securities department of the Central Maine Power Company, has been appointed manager of the customer-ownership division of the securities department of Henry L. Doherty & Company, with headquarters at New York. Mr. Whiting has made a brilliant reputation for himself as a pioneer Eastern developer of the customer-ownership idea in utilities circles, and aside from his effective direction of various campaigns for the Central Maine Company during the past few years, has frequently been retained as a consultant by central-station companies on this class of work.

James H. Drew with Ohio Brass

James H. Drew has been appointed manager of the line material division of the Ohio Brass Company, Mansfield, Ohio.

Mr. Drew was one of the founders of the Indianapolis Brass Company, which started the manufacture of electric railway line material in 1906. In 1913 he bought the railway business of the Indianapolis Brass Company and formed the Drew Electric & Manufacturing Company of Indianapolis, Ind., and later of Cleveland. Of this latter company he served as president until July 1 of the present year. During the past two and one-half years Mr. Drew has been associated with Arthur G. McGee & Company, Cleveland, who took over the management of the Drew Electric & Manufacturing Company in the early part of 1921.

Mr. Drew will direct the development, engineering and sales of the line material division of the Ohio Brass Company.

J. H. Drew

Mr. Drew is widely known among electric railway men over the country, but has been particularly popular and active in the Central States. He is a regular attendant at association meetings, and has played no small part in making the meetings of the Central Electric Railway Association successful and pleasant.

P. H. Mulcahy, the new general manager of the Utah-Idaho Central and the Utah Rapid Transit Company, has been auditor and assistant manager of the above-mentioned properties since 1917. Prior to that time he spent three years with the Wells Fargo Express Company, and was also associated with the Southern Pacific Company in various capacities. Mr. Mulcahy steps up into the position made vacant by William A. Whitney, who has been made active head of the Mount Hood & Sumpter Valley Railroad in Oregon, as well as manager in charge of operation of the Oregon Lumber Company mills in Oregon and Washington. He, however, will remain with the two Utah electric railroads as vice-president and director. Mention of Mr. Whitney's change and the subsequent promotion for Mr. Mulcahy was made in the ELECTRIC RAILWAY JOURNAL for June 16.

Obituary

E. H. Eckert

Edgar Hampton Eckert, formerly associated with the Toledo Railways & Light Company as legal representative, died recently in Toledo. Mr. Eckert was born in Maumee. He was educated in Toledo and Maumee schools and was graduated from the law school of the University of Michigan. In the early years of the franchise controversy between the city of Toledo and the Toledo Railways & Light Company, prior to the entrance of Henry L. Doherty into Toledo, Mr. Eckert was one of the leaders in trying to obtain a franchise for his company. When the old Everett-Moore syndicate disposed of its interests to Henry L. Doherty. Mr. Eckert severed his connection with the company and eight years ago went to New York. He had been an invalid for the past five years.

F. W. Little

Francis W. Little, who promoted the predecessor of the Springfield Light & Traction Company, Springfield, Mo., died recently at his home in Minneapolis. Mr. Little had greater influence in the development of Springfield than has been generally recognized. He was the first man to bring the matter of water power development to a definite head in the Springfield region by having a survey made of the entire region and exhaustive investigation conducted on every source of supply. Largely as a result of this work the water power development of White River in the Ozark section took place.

Mr. Little headed a company that bought the local lighting plant at Springfield from E. Henning in 1903. He modernized the equipment and made many improvements. In 1906 he and George Macomber of Maine bought the street railway system and consolidated it with the lighting plant. He sold out his interests in Springfield in 1911 to the Federal Light & Traction Company.

He was a lawyer by profession, but had never practiced, giving his time over to the promotion of public utilities and particularly electric street railway systems. Even before the work which he did in Springfield Mr. Little was interested in the railway and other public utilities in Lincoln, Neb. One of his closest associates was John R. Walsh, the Chicago financier.

Frank L. Henry, formerly electrical engineer of the St. Joseph Railway, Light, Heat & Power Company, was killed recently in a coal mine accident at Los Cerillis, N. M., and the body was taken to St. Joseph for burial. He left St. Joseph about a year ago to engage in electrical engineering work in New Mexico.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Western Cedar in Demand for Poles

Supply of Eastern Cedars Is Being Rapidly Exhausted—Bark Disease Has Killed Many Chestnuts

The annual demand in the United States for poles of various kinds is more than 4,000,000. Ninety per cent of these are supplied by three species: Cedar, chestnut and pine. According to the Forest Service of the U. S. Department of Agriculture, sixty per cent of the pole supply has heretofore come from the various species of cedar. Chestnut and pine have supplied about 30 per cent more, the remaining 10 per cent coming from cypress, oak, spruce, tamarack, redwood and others.

Past Sources of Supply Much Depleted

Of the cedars, the Northern white, Western red, Southern white and Southern red cedars have been the most important. The supply of all the Eastern cedars is being depleted quite rapidly. In the Lake states the heavy operations in pine are practically a thing of the past and cedars, hemlock and the hardwoods are now the principal species cut. It is not expected, therefore, that Eastern cedar will long remain on the pole market.

Chestnut throughout the East has been one of the chief sources for poles. The end of this supply also is practically in sight because of the ravages of the chestnut bark disease, which is spreading throughout the range of chestnut and is killing practically all of the trees it attacks. Timber killed by this disease is entirely suitable for poles or other uses, but since there is no renewal the exhaustion of the present stands will virtually mean the end of chestnut timber.

Longleaf pine and the other pines of the South have been very abundant on the market for many years. But the drain on the supply of these species has been so heavy that it is predicted that within ten or fifteen years the stands of saw timber will be depleted to a stage where lumber operations in the South will be at a low ebb. While there will be some pole timber left after the stands of saw timber have been cut, the better poles, everything considered are those cut from mature trees. It is probable that an inferior class of poles can be depended upon from the Southern pines for quite a long time.

Western red cedar, which occurs chiefly in northwestern Montana, northern Idaho, Oregon, Washington and British Columbia, is an admirable pole timber. The supply is very extensive. Many virgin stands of it have not yet been exploited. Western red cedar has been increasing in importance for a number of years largely due to the depletion of the Eastern pole timbers near the heavy consuming markets. The demand for red cedar poles is beginning to have its influence in the rapidly increasing stumpage prices for desirable pole timber. It is probable that for many years this species will be the chief source of supply for the larger transmission poles.

Other pole possibilities are the Douglas fir of the Northwest, California redwood, lodgepole pine of the Rocky Mountain region, jack pine of the Lake States and, to a less extent, Western yellow pine. Douglas fir is an excellent pole tree, but it is quite heavy and has the additional disadvantage of being at a great distance from the heavy consuming centers of the eastern part of the country.

California redwood makes a good durable pole, but it is necessary that poles from this species be sawed. The expense of this operation together with heavy transportation charges to the East coast will prevent its active competition with cedar of the northeast.

Lodgepole pine occurs in great abundance through the northern Rockies. This tree, although of good pole form, is small in diameter and height and non-durable. For rural lines and the places where small poles will suffice, no doubt this species will be of increasing importance in the future. The jack pine of the Lake States is very similar to lodgepole, although of the two the lodgepole is the better pole timber.

Western yellow pine, a tree occurring over a wide range in the western part of the country, will supply an inferior class of poles. In comparison with cedar this wood is non-durable and also in other respects it is far from being as desirable as the Western red cedar.

There are several other species of trees which are used locally for poles, and no doubt these will become increasingly important in the future. They are tamarack, Western larch, Western hemlock, the white firs and spruces. Preservative treatment will, of course, be required for best service with such species.

Laconia Car Company Is Busy

The recent order of cars for the Boston Elevated Railway and repair orders for the Boston & Maine Railroad are keeping the Laconia Car Company busy. The earnings for the first seven months of the fiscal year to May 1, after deducting interest and charges, are said to have amounted to more than the earnings for the full 1922 fiscal year. This is explained in part, however, by the fact that the plant was closed for three months during 1922.

Zinc Industry on Up-Grade

The year 1921 and the first part of 1922 witnessed the lowest gross output of zinc in this country since 1879. Increased prices for zinc and lead in the last few months of 1922, however, helped the mines to make a modest recovery, and the production and development during the first six months of 1923 promises a very considerable increase for this year. The industry appears to be approaching the condition of the more prosperous years from 1912 to 1918. Some of the mines that were developing during the period of low zinc prices from 1919 to 1922 have been able to respond quickly to the increased price. Many mines temporarily shut down are again active, and improvements and additional machinery are being installed in several places.

Bituminous Production Gains

Although the rate of soft coal production continued steadily downward for four consecutive weeks, the fifth week, ended June 30, showed a slight increase. The total output for that week was 10,609,000 net tons, against a revised figure for the preceding week of 10,422,000 tons. The average daily rate of production is now slightly above the low rate during mid-April. The total production during the first 154 working days in 1923 was 273,423,000 net tons. This is slightly less than in 1917 and 1918, years of great activity, and slightly more than in the year 1920, which is also classed as a year of activity. It is greatly in excess of the production in the years 1919, 1921 and 1922, years of depression. The production for this year to date is slightly in excess of the average for the three years of industrial activity already mentioned, and greatly ahead of the average for the years of depression. In spite of the four consecutive weeks in which the rate of production per working day decreased, however, there seems little reason for apprehension at the present time.

Metal, Coal and Material Prices

Metals—New York	July 10
Copper, electrolytic, cents per lb	14.437
Copper wire base, cents per lb	17.25
Lead, cents per lb	6.05
Zinc, cents per lb	6.43
Tin, Straits, cents per lb	38.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.375
Somerset mine run, Boston, net tons	2.50
Pittsburgh mine run, Pittsburgh, net tons	1.95
Franklin, Ill., screenings, Chicago, net tons	1.675
Central, Ill., screenings, Chicago, net tons	1.375
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$7.45
Weatherproof wire base, N. Y., cents per lb	18.50
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal	$1.08
White lead, in oil (100-lb. keg), N. Y., cents per lb	11.85
Turpentine, (bbl. lots), N.Y., per gal	$.94

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Rolling Stock

Birmingham Railway, Light & Power Company will install motors on five trailers. The motors are expected within ninety days. The trailers must be remodeled to some extent to serve as motor cars.

New Haven & Shore Line Railway, New Haven, Conn., has ordered six passenger cars of the semi-convertible type, 13 tons weight, for early delivery from the J. G. Brill Company's Wason car shops at Springfield.

Dallas Railway may be in the market for thirty additional cars as a result of suggestions by John W. Everman, supervisor of public utilities, in his recommendations that the 6-cent fare be continued.

Eastern Texas Electric Company, Beaumont, Tex., has placed an order with the American Car Company for seven double-truck safety cars to be delivered in September. The specifications of these cars follow:

Seating capacity 45
Total weight ..... 26,000 lb.
Length over all ..... 40 ft., 1 in.
Truck wheelbase ..... 5 ft. 1½ in.
Width over all ..... 8 ft. 5 in.
Height, rail to trolley base ..... 12 ft. 5 in.
Body ..... Semi-steel
Interior trim ..... Mahogany
Roof ..... Arch
Airbrakes ..... Westinghouse, 100% Control
Armature bearings ..... Ball
Car signal system ..... Faraday
Control ..... G. E., K-35
Destination signs ..... Hunter
Door-operating mechanism, Safety Car Devices Company
Fare boxes ..... Johnson
Wheelguards ..... H. B. Life Guards
Gears and pinions ..... G. E.
Hand brakes ..... Peacock staffless
Heater equipment ..... None
Headlights ..... Golden Glow, SM-95
Journal bearings ..... Friction
Journal boxes ..... Brill
Motors, type and number ... Four G. E. 258
Motors ..... Inside hung
Seats ..... Brill Waylo Special
Seating material ..... Rattan
Slack adjuster, American Brake Co., Type U
Trolley catchers or retrievers, Ohio Brass Company
Trolley base ..... Ohio Brass Company
Trolley wheels or shoe ..... Wheels
Trucks ..... Brill 77-E.
Wheels ..... 26 in., rolled steel
Special devices, etc ..... Bennett roll screens, door selector mechanism, air-operating fare box.

Eastern Wisconsin Electric Company, Sheboygan, Wis., recently received five new cars from the St. Louis Car Company, the order for which was placed several months ago. The detailed specifications of these cars follow:

Type of car ..... Light-weight
Seating capacity 44
Total weight ..... 36,760 lb.
Bolster centers, length ..... 5 ft. 2 in.
Length over all ..... 43 ft.
Truck wheelbase ..... 5 ft. 4 in.
Width over all ..... 8 ft. 9½ in.
Height, rail to trolley base ..... 12 ft.
Body ..... Steel
Interior trim ..... Birch
Headlining ..... Agasote
Roof ..... Arch
Air brakes ..... General Electric
Armature bearings ..... Sleeve
Axles ..... Forged open hearth steel 5 in.
Bumpers ..... Steel
Car signal system ..... Faraday
Car trimmings ..... Bronze
Center and side bearings ..... Ball bearing
Conduits and junction boxes ..... Loom
Control ..... G. E. K-35
Couplers ..... Standard radial drawbar
Curtain fixtures .... Curtain Supply No. 90
Curtain material ..... Pantasote
Destination signs ..... Hunter
Door operating mechanism. General Electric
Fare boxes ..... Wood
Fenders or wheelguards ..... Pilot
Gears and pinions ..... General Electric
Handbrakes ..... Peacock staffless
Heater equipment ..... Consolidated and Peter Smith
Headlights ..... Golden Glow
Journal bearings ..... 3¾ in. x 7 in. M.C.B.
Journal boxes ..... St. Louis Car Company No. 10912
Lightning arresters ..... General Electric
Motors ..... G. E. 265-A
Motors ..... Inside hung
Paint, varnish or enamel .. Sherwin Williams
Registers ..... Ohmer
Sanders ..... St. Louis Car Company
Sash fixtures ..... O. M. Edwards
Seats ..... St. Louis Car Company
Seating material:
Coach ..... Green plush
Smoker ..... Pantasote
Slack adjuster ..... Turnbuckle No. 12247
Springs .... Railway Steel Spring Company
Step treads ..... Feralun
Trolley retrievers ..... Earl No. 5
Trolley base ..... Ohio Brass
Trolley wheels ..... 5 in.
Trucks ..... St. Louis Car Company Commonwealth pedestal type
Ventilators ..... Peerless
Wheels ..... 26-in. Standard Wheel Works ¾ in. x 1 in. flange 2½ rim

Track and Roadway

Duluth Street Railway is constructing an extension which will mean an addition to its system of 1.66 miles of single track.

Los Angeles Railway has started double tracking West Seventh Street between Hoover and Vermont. The work involves half a mile of double-track construction and will be completed within two months.

Trenton & Mercer County Traction Corporation, will relocate 4,500 ft. of track through Lawrenceville, N. J., and place the track in the center of the road. The company will also lay new rails and ties over the same route at a cost of $15,000.

United Electric Railways, Providence, R. I., has been granted permission to install passing tracks and crossovers in North Main Street. A new curve will be installed at Dorrance and Westminster Streets, and the track will be relocated at Massasoit and Waterman Avenues, East Providence.

Power Houses, Shops and Buildings

Western Ohio Railway, Lima, Ohio, has received a turbine generator of 2,000 kw. capacity, to act as a secondary unit to a turbine of 4,000 kw.

Wisconsin Public Service Corporation, Green Bay, Wis., plans to increase the output of its hydro-electric plant on the Menominee River with the installation of a vertical 3,000-hp. turbine.

Eastern Texas Electric Company, Beaumont, Tex., during the next four months will make the following improvements: Will build an addition to present office building; 33,000-volt power line, Port Arthur to Beaumont; fuel oil storage tank, 55,000 bbl.; switchboard bay at Port Arthur station and will reconstruct present meter storeroom and line department building.

Trade Notes

Reginald M. Campbell, who was appointed last year special representative of the American Copper Products Company with headquarters in New York City, recently resigned. For eight years previous to his association with the American Copper Products Company Mr. Campbell was identified with the Habirshaw Electric Cable Company, which he joined when he severed his connection with the Ohio Brass Company. He is well known in electric light and electric railway circles and also in the steam railroad field. Mr. Campbell is a member of the New England Street Railway Club and the Railroad Club and Engineers' Club of New York. His present address is Engineers' Club in New York.

National Pneumatic Company, New York, N. Y., announces the appointment of J. H. VanderVeer as sales engineer, with headquarters at Rahway, New Jersey. Mr. VanderVeer is well known by electric railway men through his work for the rapid transit and surface lines in New York and for Stone & Webster. He started in as an office boy in the legal department of the Brooklyn Rapid Transit Company and later worked up to the position of subforeman of inspection at the Coney Island elevated terminals. He resigned this position to take a course in Stevens Technical Institute in mechanical engineering and after graduation entered the management division of Stone & Webster, for which firm he was engaged on railway engineering and maintenance work for the Chicago Elevated Lines and for companies in Georgia, Florida and Louisiana. During the war Mr. VanderVeer was sent to Cuba by Stone & Webster to manage a small electric light and water property. Returning to the United States, he became master mechanic of the Annapolis Short Line. Next he was engaged for Stone & Webster upon appraisals of railway properties in New York, Brooklyn, Richmond, and other cities. From Stone & Webster Mr. VanderVeer went to the position of assistant superintendent of equipment of the Third Avenue Railway System under J. S. McWhirter, leaving there after more than two years service to join the National Pneumatic Company.

New Advertising Literature

Electric Service Supplies Company, Philadelphia, Pa., has issued a new 688-page catalog on car equipment and supplies, which undoubtedly is the most complete catalog of its kind. It contains elaborate wiring diagrams, tables and other useful information, including extensive listings of Golden Glow headlights, Keystone-Hunter destination signs, Keystone gear cases, Faraday signals and the various other Keystone car specialties, including the usual car supplies and carhouse shop equipment.

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New York, Saturday, July 21, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 3

The Master Mechanic of the Future —and His Job

IF ELECTRIC railways are to give the public the attractive transportation service that will get business under modern competitive conditions, they must have good, well-maintained rolling stock. This is axiomatic, you say? Maybe so, but that does not mean that the fact is fully appreciated in practice. Just as important as buying good cars is having the right kind of men in the mechanical department.

The department that is responsible for the quality and condition of cars is extremely important. These are the tools of service. They must be good. To keep them so requires brains and skill of high order. But in reality the mechanical department, speaking broadly, is not given the executive consideration that its essential character warrants. The head of the department is not chosen with the care, nor paid the salary, that will insure the right caliber of master mechanic or, more properly, superintendent of equipment.

One of the prime considerations is to get a man who will be bigger than his job. He should be one who will not be satisfied merely to keep the equipment at some previously determined standard of repair, but will furnish the leading thought on the whole subject of rolling stock. To the extent to which he is supported he will insure the use of the most appropriate cars that the art affords.

That the situation thus pictured is worthy of attention is indicated by the statement to the writer, by the manager of an important railway, that the place of the master mechanic is one of the most difficult to fill at the salary that can be paid. This indicates that the supply of well-qualified men is not sufficient, or that the salaries offered are not attractive, or both. Another critic of the present situation complains that as compared with manufacturing methods electric railway shop practice is many years behind.

If a given railway is a back number, and is sooner or later to be replaced by other means of getting about, it does not matter much what is done in the shops or elsewhere. But if it has a definite place in the local transportation field, then it is high time to encourage the high-grade men now in the mechanical department and to lay plans to improve future quality by bringing in men who are worthy of training for high places in the department. In fact, the quality of maintenance work is one of the important factors that will determine whether or not some smaller railways are going to continue or go out of business. These men must be practical, of course, but they need vision and executive ability more than manual skill with tools. In fact, a man may be an excellent "master mechanic" without being a mechanic at all, in the usual sense of the term.

In this outline of the duty of the management toward the shops it is not meant to imply that the master mechanic himself is doing all that he could to remedy the situation; but that is another story. Both must realize that it is up to them to improve conditions. Selection of better men and payment of salaries sufficient to get and hold them is the task of the management. If you, Mr. Manager, don't believe it, make a new research on your own property and see if your shop methods meet 1923, rather than 1893, standards. We have a word also for the shop man, but will whisper it to him when you're not around.

Cleanliness of the Shop Premises Is a Profitable Virtue

ONE of the greatest hazards from the fire insurance standpoint in a railway repair shop or carhouse is the refuse which is apt to accumulate in corners, under machinery, between pits and in other out of the way places. There is so much that is inflammable about a car body and in the material, like oil, paint and varnish, used in and about a carhouse and shop that when a fire once gets well started it is apt to spread. Hence an even greater effort should be made to prevent a fire starting than to put it out when it does begin.

Of course, most of the buildings recently erected for the repair and storage of cars have been constructed to reduce fire hazards, but there is far more connected with this object than the form of construction used. Of almost, if not quite, as great importance is the kind of "housekeeping" practiced in the shop or carhouse. In fact, this is one of the major matters considered when fire underwriters establish their premium rates, so that the repair shop or carhouse foreman who looks out for this matter and impresses the need of it upon his men may often be the means of saving a large sum for his company. Here are some of the simple rules that such a foreman can enforce.

He can see that all combustible refuse is put in waste cans and that these are emptied daily, that dirt in general does not collect in obscure places, that men keep their shop clothing in their lockers when they leave for the night and that discarded clothing is taken away, that they do not hang clothing or other things on electric wires or fixtures, that the building wiring in general is maintained in good electrical condition, that material does not lean against it and that the wiring is not in a position where it is subject to mechanical injury, that the drip from oil barrels and oil tanks is caught before it can fall on the floor, that empty oil barrels are promptly removed, and in general that the premises are kept tidy with a place for everything and everything in its place.

There is much, of course, in the way of fire protection which can economically be installed with the expenditure of money, but there are also many things, like those mentioned above, which cost nothing but a little care and consideration, and the returns from this expenditure are enormous.

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High Labor Cost Stimulates Development of Maintenance Economics

THERE was a time when much of a mechanic's energy was spent in doing things that required little or no mental effort. This is still true to some extent, but much less than formerly. The improvement is due to the use of good hoisting and transporting machinery; to the routing of work so as to eliminate lost motion; to the application of machine tools properly adapted to the operation to be performed; to the keeping of good cost records; to the exchange of information among railway properties, which results in higher standards of performance; to the wonderful development in the art of reclamation, and, last, but in many ways most important, to the spread of the real educational spirit throughout the shop organization.

The best and therefore most highly paid physician is he who keeps his clients well. By analogy the best master mechanic is the one who keeps cars out of the shop rather than the one who repairs them quickly when they are pulled in. This means two things: First, a thorough knowledge of the causes which make repair work necessary, and, second, the best possible facilities for doing first-class maintenance work. Managers seem to be waking up to the fact that a definite part of their success depends on having a first-class shop, run in accordance with modern methods. Otherwise maintenance costs would be much higher than they are.

It follows, then, that the increasing difficulty which electric railway master mechanics are having in getting reliable craftsmen for the several shop departments is not without compensating advantages. It is forcing attention to shop economics as nothing else could possibly do. In other words, as expert labor is now recognized as a commodity of relatively high unit cost, every effort is being made to utilize it effectively. The result is improvement all along the line. Everything that can be done to substitute machine work for hand work is a matter of great interest. As far as possible manual operations are being confined to special, rather than routine work.

Cultivate the Habit of Observation

THE human mind frequently fails to assimilate things that are seen by the eye. Whether the hour of six is indicated on the face of his watch by a Roman or an Arabic numeral is a question which many a man cannot correctly answer. We often find it extremely difficult to describe objects with which we are familiar from daily observation. There is, of course, a great difference between individuals in this respect; details which make a deep impression upon one man are entirely overlooked by another.

The trainmen of an electric railway can materially assist in the maintenance of equipment by observing and reporting defects. The average motorman or conductor, however, is not as useful in this respect as he might be. A minor defect is often allowed to continue unknown to the mechanical department until it grows into a major defect which cripples the car. Frequently this could be avoided. The time to fix a hot journal, for instance, is when it first begins to squeal, rather than after the waste is on fire and the babbitt melted, but in order to notice such things at the beginning, trainmen must have the habit of observation.

In a general way, it may be said that keenness of observation depends directly upon the interest taken by the individual. An aviator notices the slightest variation from the rhythmic hum of his machine, because his life depends upon it. The driver of an automobile soon notices the slightest knocking of his engine. But the operator of a railway car often goes blithely along heedless of clatter and bang, or a dragging sensation, that ought to tell him there is something wrong.

If the trainmen can be persuaded to watch with a keen eye for the slightest defects in the equipment, to develop good "mechanical sense" so to speak, they can render great assistance to the mechanical department. They are in a better position to observe such things than are the shopmen, and the men themselves, the company and the public will all benefit by catching car ailments at the first indication of trouble.

Increased Life Obtained Justifies Welding of Manganese Steel

MANGANESE steel is used quite generally in special trackwork construction at points where traffic is heavy. At such points frequent relaying or replacement is costly and it is therefore quite essential to prolong the life of the trackwork as much as possible.

Building up and patching manganese special trackwork by welding has been used to a considerable extent for the past ten years. The results obtained are not of a permanent character, but they do prolong the life of the various pieces and so extend the time when entire renewal is necessary. Most track engineers feel that if the life of the trackwork is extended two or three years the expense of welding is justified, and some say that even one year of additional service will justify welding.

The constant pounding produced by the wheels of rolling stock on the manganese frogs at crossings causes low spots. The metal becomes fatigued, and sagging results. The building up of these points and grinding smooth gives a new surface. While not as good as the original, still with proper cohesion of the added metal a surface is obtained that may last for several years.

Manufacturers of special trackwork have argued against such repairs, as they do not produce a permanent remedy, and must be considered as a rather temporary expedient. The objection has been put forward that the physical properties of the manganese are altered by welding, but from the maintenance man's point of view this makes no great practical difference, since if welding repairs were not made the piece would have to be replaced anyway. The steel in close proximity to the weld no doubt is changed in character. General observation, however, indicates that this change is not detrimental, as the manganese parts after welding wear well, and in most cases give from two to five years additional service.

The various methods used have not produced manganese steel of the same character as that used in the original switch or frog. The heat treatment used in the original process cannot be duplicated in welds made in the open under service conditions. The additional service obtained in most cases, however, proves that real economy results from welding, and the increased life obtained is satisfactory.

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An Electric Welding Car in St. John, N. B.

Standard Welding Equipment Has Been Mounted in a Motor Car to Provide a Portable Unit Suitable for Track or Shop Use

By C. L. Boxler
Chief Welder New Brunswick Power Company, St. John, N. B.

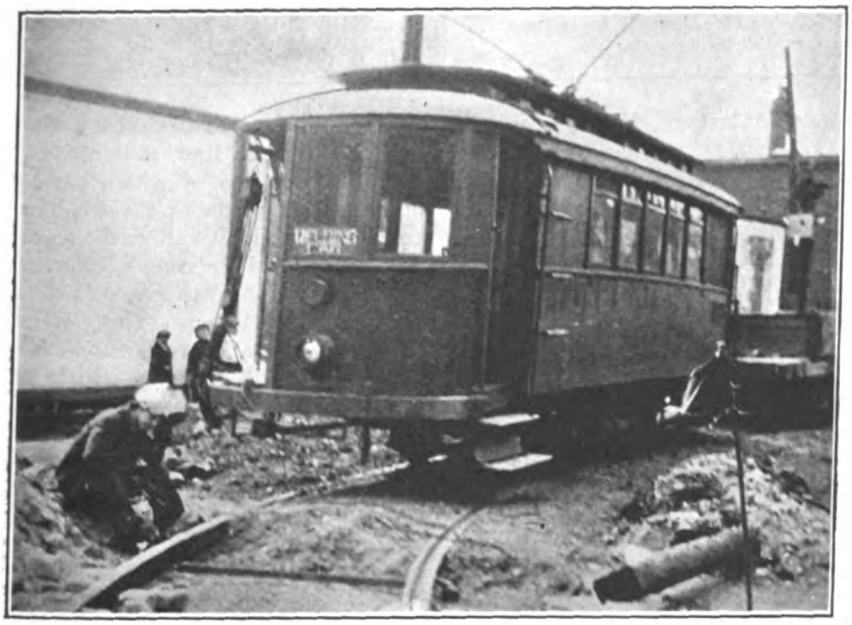
IN ST. JOHN, N. B., we began the use of the electric welder in the year 1917. Until last fall the dynamotor used for supplying the welding current was mounted in the original cart, and was used for trackwork almost exclusively, being hauled from one location to another by a team, a slow process when jobs are small and far apart. Due to switchboard and commutation troubles the machine did not render very good service for this work, and it was found unsatisfactory in the shop.

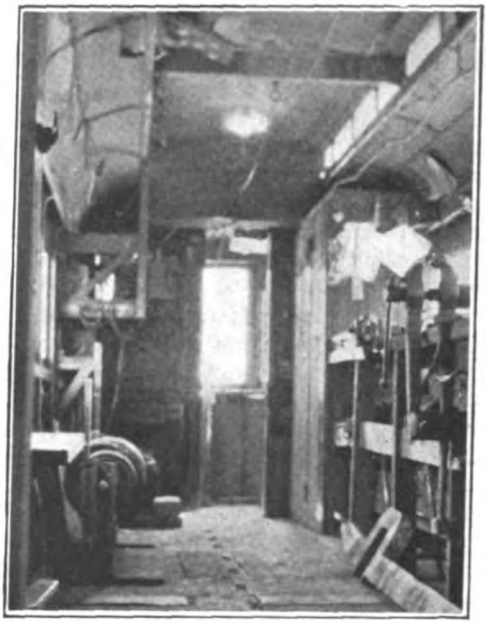
Being confronted with the alternatives of either making this machine operate efficiently or purchasing a new outfit, and desiring better welding facilities at the repair shop, we conceived the idea of changing the design of the machine so that it would be mounted complete in a car, thus providing a portable welding room suitable either for track or shop work. This idea has been worked out very satisfactorily for use on this property.

We used an old single-truck car which had originally been an open car. This was sheathed up on the sides and windows were fitted. A bench was built on one side running the entire length of the car except for a space at one end occupied by a supply cupboard and a clothes locker. Spaces were partitioned off beneath the bench for the storage of helmets, welding rods, carbons, and other supplies, and drawers were provided for tools.

Two cross beams were installed overhead to accommodate a block and tackle, and a small roller dolly was constructed for use in running heavy articles into the car. The front vestibule of the car was completely inclosed, and the rear one inclosed for about two-thirds its width, thus leaving a small open deck over which rails, truck frames and other long articles could be put directly into the car. A davit was installed at the rear of the car body, carrying a hoist, and arranged to swing over the side. Heavy articles are lifted easily and swung inside onto the dolly, on which they are pushed forward to the proper place for welding. Being an open car originally the floor is level from end to end, facilitating this method of loading.

Three steel frames were built, one for axles, one for armatures, and one of adjustable length for smaller shafts. These were all fitted with lathe centers to support the object while being welded, permitting easy turning. All three frames may be removed from the car and stored outside when desired. The frame for supporting armatures is so arranged that it will fall forward with the centers on a level with the shaft of an armature resting on the dolly. The centers are then screwed into place, after which the whole apparatus is easily swung back to the normal position, carrying the armature with it, ready for welding. Axles are placed in their frame by means of a hoist.





At Left, Welding on Dead Track in Daytime. At Right, Inside View of Car, Showing Armature in Position for Welding

The welding machine is mounted on the floor in the front left-hand corner of the car, with a switchboard of our own design mounted above it. Both the motor and the generator circuits are grounded to the car truck, the generator also being grounded to four iron floor plates, one bench plate, and a vise. This is to obviate the use of a ground cable, as the articles being welded make contact through one or another of these devices. In addition to this, floor traps may be lifted and work

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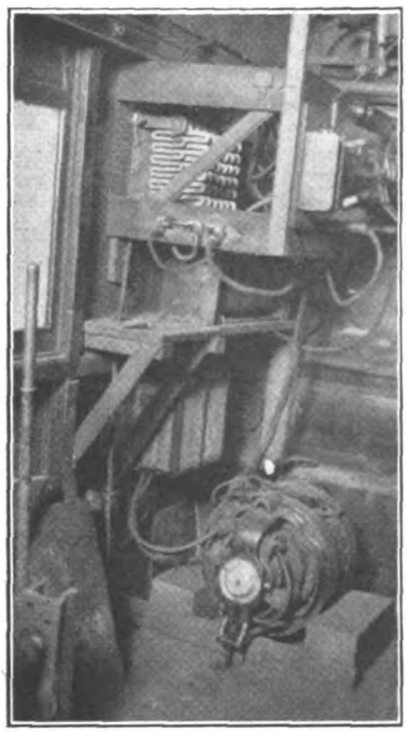
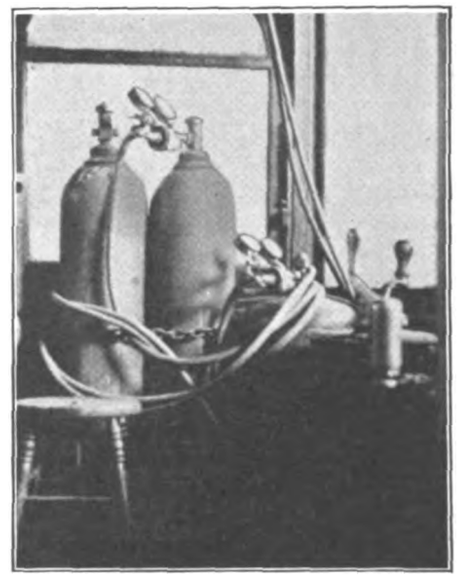
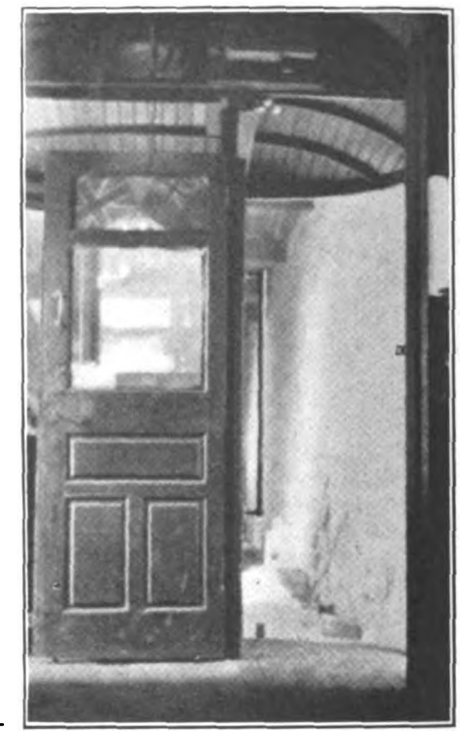




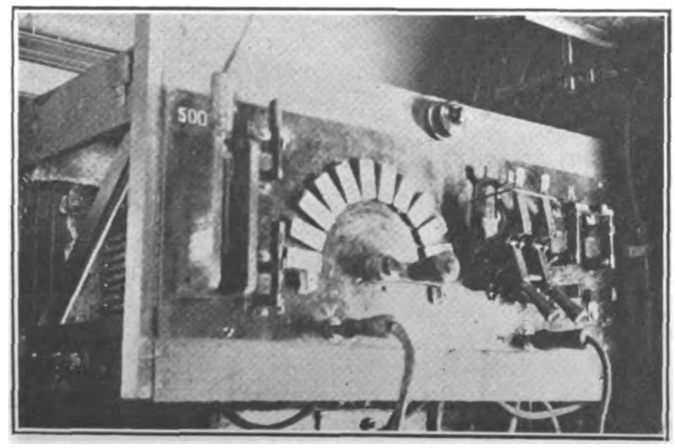


At Left, Welding Unit and Switchboard. In Center, Acetylene Outfit Mounted on Platform. At Right, Door for Allowing Insertion of Long Objects Into Car

lowered through to the track level, grounding against the car axle, if desired. The armature and axle frames, when in use, rest on a floor plate for grounding. A ground cable is provided for use in grounding articles outside the car, and which are not in contact with the track, which of course is in direct connection with the car truck.

A welding cable is carried along the wall on hooks in such a manner that it is convenient for use at any point in the car. Another cable is arranged similarly, to permit changing from metallic to carbon arc without changing the electrode holders. An extra welding cable is kept on the front bulkhead for outside use, this cable being plugged into outside receptacles, of which one is located at each end of the car. These are connected to the machine through a single-pole double-throw switch which permits ready reversal of the polarity.

A "surge control" unit obtained from the manufacturer of the machine, a new bank of grids and a new switchboard were installed, resulting in the perfect operation of the machine. The surge control consists of a bank of resistance connected to the line switch on one side and to the armature on the other. The 500-volt current is taken from the car trolley to a line switch near the ceiling. This switch is opened when the machine is shut down for any length of time or when the car is running. From this switch the current goes to a second line switch on the board, then to the fuse, the surge control, and the machine. A cord connected to this second switch runs through the car in a manner similar to a bell cord, so that the machine may be shut down from any point in the car.



Close-Up View of Switchboard

The switchboard is mounted vertically above the dynamotor. It carries the second line switch, two single-pole single-throw switches, one of which parallels five grids and the other six grids in the welding resistance. These are used principally in carbon arc work. A twelve-point rheostat dial is connected with the welding resistance. The starting resistance is controlled by the original breaker switches. These were at first mounted horizontally, and were responsible for part of our trouble. They have been remounted in a vertical position and are now entirely satisfactory. A double-pole double-throw switch controls the stabilizer resistance, increasing or decreasing it, as designed by the manufacturer. The stabilizer itself, together with the welding resistance, is mounted behind the switchboard. The stabilizer is short-circuited by a single-pole single-throw switch on the board, while the carbon arc is in use, the switch being open for metallic arc work. A bell is connected to the breaker switches so as to ring if the breakers open while the machine is in operation. This feature is of use when work is going on outside the car. There are two cable receptacles on the board, one for the welding cable and the other for the ground connections, these cables being reversed to change the polarity of the floor plates.

An oxyacetylene outfit is carried on the front platform at one side of the controller, where it readily may be removed from the car for use when needed.

We have no car traffic on our lines between the hours of 12:30 and 5:45 a.m. All our work on track is done within these hours, except on dead track under construction and surface work, which occasionally is done during

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the daytime. Light is provided by means of a bank of lamps outside the car, and a single-lamp extension cable which may be plugged into an outlet outside of the vestibule. This outlet is connected to a two-way switch which cuts out one inside lamp when the extension is to be used.

The trackwork done consists of joint welding, bonding, some surface work, building up of broken rail heads, repair of special work, and all acetylene work. The car is run to the job, being timed to arrive as soon as the last regular car has passed, and leaves before the first one arrives in the morning. Two men compose the crew, each man being able to handle the machine, the oxyacetylene outfit, and to operate the car. In winter weather they work in turns, one welding outside while the other is warming up. When the oxyacetylene set is being used, the second man does shop welding, thus making a saving of time.

By Working at Night Welder Is Used Twelve to Fourteen Hours Daily

Both men work from 12 o'clock midnight to 6 a.m. on trackwork in the summer, one putting in from three to four hours additional in the morning on shop work, the other spending a like amount of time in the afternoon. This gives us twelve to fourteen hours use of the machine each day. Enough work is available in the winter in the way of handling maintenance and in preparing work for the welder to keep the second man busy, it being necessary at times to stagger their hours in order to obtain a longer day for the machine so as to keep up with the work.

The shop work we do generally consists of truck frames, armature shafts, brake gear, motor cases, gear cases, rebuilding trolley bases, repair of journal boxes, tools of all sorts, automobile parts, power-house work, machine parts, etc., including the welding of brass and cast iron. The acetylene is used almost entirely for preparing for welds and cutting of rails, bolts, rivets and scrap.

Trackwork is performed more efficiently because of the constant trolley voltage available at night and the absence of traffic interruptions. We find that very nearly as much work can be done at night in five or five and one-half hours as can be done in nine hours in the daytime, and what is done is done better. Shop work may be carried on inside the car if trackwork is interrupted by rain, and little time is lost in getting from one job to another, work being done in widely separated places in one night. When necessary, 30-ft. rails may be carried along to the job in the car along with a shop-full of tools, the welding machine, the acetylene outfit and the track gang. Welding is done directly on other cars by spotting the welding car on an adjacent track or the same one, thus obviating dismantling the car for welding. Of course, this can only be done occasionally.

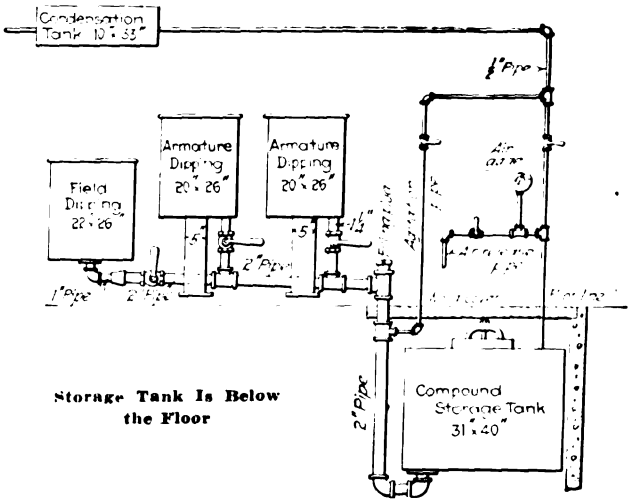
By arranging the welding unit in this form so that it is flexible and mobile we have made it do both for shop and track, thus avoiding the investment in a second unit which probably would lie idle most of the winter. The original outfit was supplied by the Rail Welding & Bonding Company, which also furnished the surge control resistance.

The results obtained in St. John have fully justified the construction of the outfit. Its flexibility permits us to use it for many jobs at widely separated points where welding would not be attempted if the ordinary outfit had to be hauled around.

New Armature Dipping Tanks at Erie Filled by Air Pressure

Apparatus Is So Designed that an Extremely Small Quantity of Compound Is Required—The Fire Hazard Is Reduced and the Speed of Operation Is Increased

THE installation of a new armature dipping and baking plant has just been completed at the East Twelfth Street shops of the Buffalo & Lake Erie Traction Company. For convenience in handling the varnishing compound and economy in the quantity of

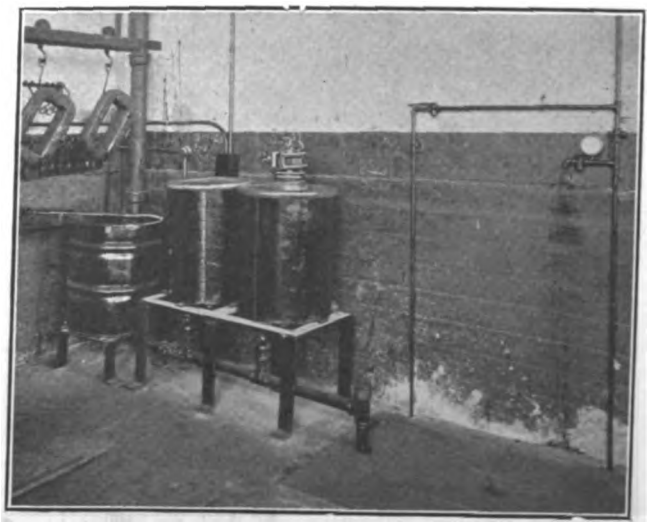


Storage Tank Is Below the Floor

compound used, the method followed in these shops is a distinct improvement over common practice. The dipping tanks and the general layout were designed by P. J. Wood, master mechanic of the company, and the ovens are of the standard type manufactured by the Westinghouse Company.

The varnishing compound is kept in a small underground tank of 2-bbl. capacity. Near by are two vertical cylindrical tanks for armature dipping and a rectangular vat for the treatment of field coils. All the dipping tanks have direct pipe connection with the tank of compound, so that filling and emptying is merely a matter of turning a few valves.

An armature is placed with axis vertical and commutator end up in the cylindrical tank, which is 16 in.



The Compound Is Forced Up from a Tank Below the Floor by Air Pressure

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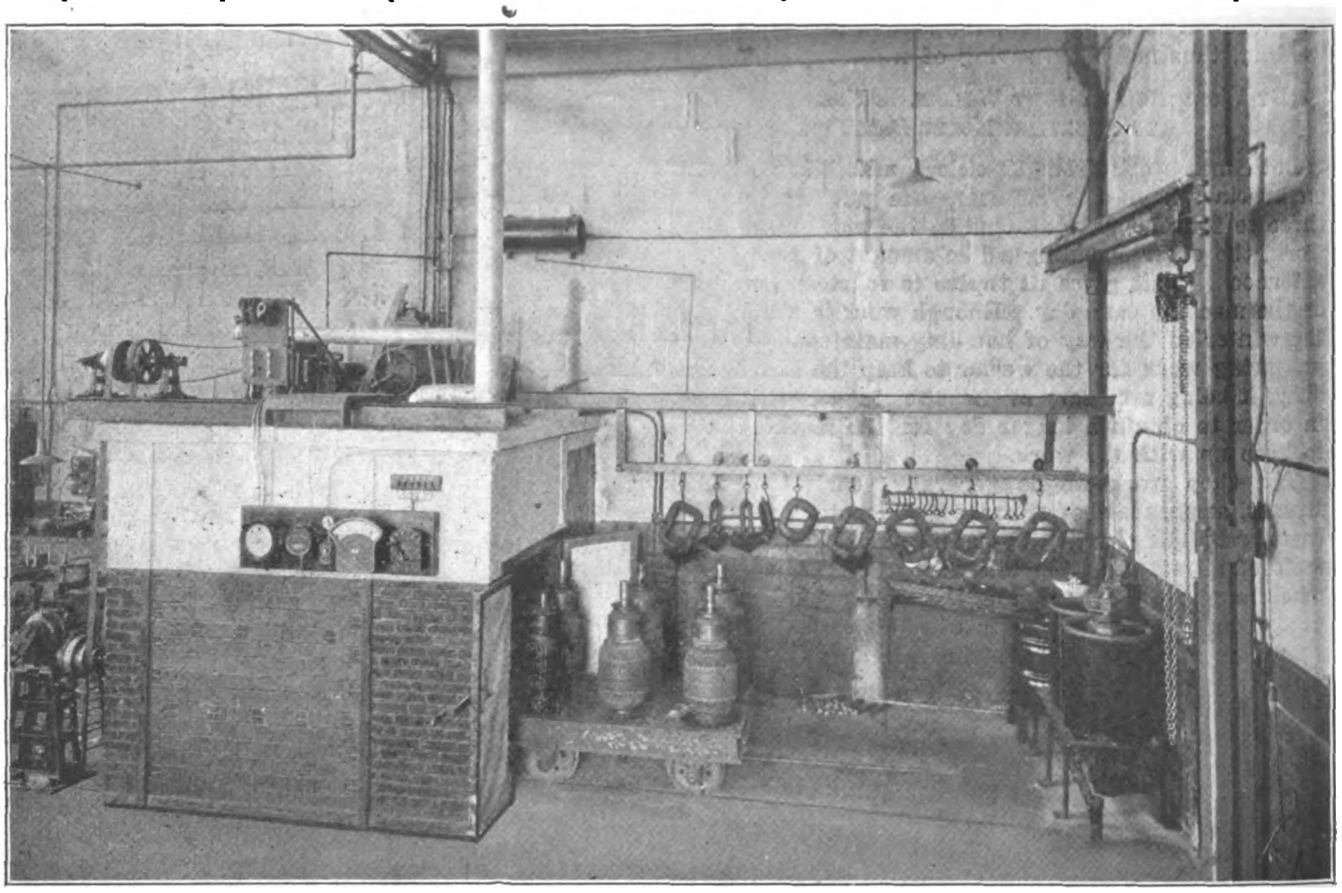
deep and has a diameter of 20 in. The pinion end extends downward into an opening especially provided for it, and a felt gasket on which the hood rests prevents varnish from running down onto the pinion.

The compound is admitted to the body of the tank at the bottom by an inlet pipe which comes from the main supply. Varnish is allowed to flow in until the level in the dipping tank has risen high enough to cover all parts to be treated, but the valve is closed before the varnish reaches the commutator. It requires only a small quantity of compound completely to fill the dipping tank because the armature itself occupies the greater part of the space. Thus economy is achieved in the use of varnish, the fire hazard is reduced, and the speed of the operation is improved.

is admitted through a special agitator pipe leading to the bottom of the tank. The air introduced here rises through the varnish and escapes through the vent, stirring up the varnish.

The comparatively small amount of compound required completely to surround an armature in the dipping tank makes possible an unusual heating method, in which the armatures themselves are heated, instead of the varnish, as is usually the case. A short, straight section of narrow-gage track connects the dipping tanks with the baking oven. On this track is a little car arranged to hold six armatures. The car is loaded and pushed into the oven, where its load is thoroughly heated. Then it is pulled back to a position where a jib crane can lift out armatures and put them



Field Coils Are Carried by Monorail Into the Baking Oven

The supply tank has been placed underground, and compressed air is used to force the varnish through the pipes. The main air pressure, controlled by a convenient valve, is admitted to the underground tank through the top at one end. At the bottom at the opposite end is an outlet pipe which connects with each of the dipping tanks. When the valve is opened, admitting air pressure into the supply tank, the compound is forced out at the bottom and up in the inlet pipes of the various dipping tanks. By manipulation of individual valves as much varnish as desired can be admitted to each tank.

After the filling process is ended, the main air pressure is shut off from the supply tank, and when it is eventually desired to empty a dipping tank, the air vent of the supply tank is opened and the compound flows back again, until the dipping tank has been drained. This air vent serves another useful purpose also, as it is sometimes desired to agitate the varnish stored in the supply tank. To do this the vent is opened and air

in the dipping tanks. A hot armature is placed in each tank, which is immediately filled with varnish.

The quantity of heat absorbed by the armature while in the baking oven is more than sufficient to raise the temperature of the surrounding varnish to the required degree. Armatures are allowed to remain in the dipping tanks until all bubbling has ceased, which usually takes about ten minutes. The first two are then removed from the tanks and returned to their places on the little car. Two more pairs are treated in the same way, and then the car is pushed back into the oven while the armatures are baked.

A rectangular dipping tank for field coils is located beside the two cylindrical tanks and is filled and emptied in the same manner. For their transportation to and from the oven a continuous overhead monorail track has been constructed. The field coils are suspended from small trolleys which are pushed along the monorail into the oven, around a loop inside, and out again when the baking has been completed.

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Rail Joint Tests on the Detroit Municipal Railway

The Department of Street Railways in Detroit Has Conducted an Extended Series of Tests on Seam-Welded Rail Joints—Full Particulars Are Given, with Comments on a Large Number of Cast-Welded Joints Removed During Track Rehabilitation

DURING the last two years the electrical department of the Detroit municipal railway, under the direction of H. M. Gould, electrical engineer, has made an extensive study of the strength of seam-welded rail joints and incidentally of the mechanical and chemical structure of cast-welded joints. The investigation of the qualities of seam-welded joints was conducted because this joint had been adopted as standard for all new work by the Department of Street Railways of the city of Detroit. The study of the cast-welded joint was made because a large number of these joints were formerly used on the Detroit system and are being taken up as the city track is being rehabilitated or renewed by the Department of Street Railways.

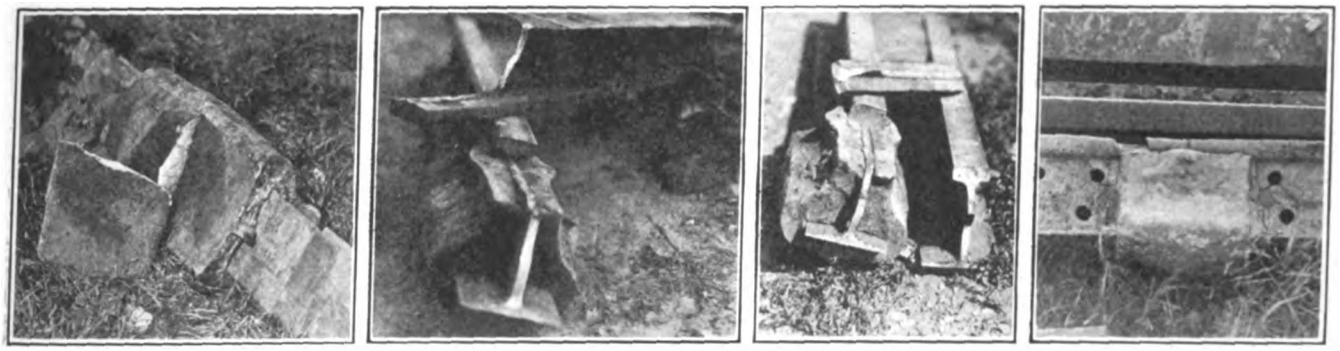
The installation of rail joints in Detroit has been assigned to the electrical department partly because of the important function which the joint has in the return circuit and partly because the problems of electrical welding would naturally be assigned to this department. The study of the cast-welded joints removed was undertaken by this department as a matter of scientific interest.

Of all the cities which employed cast welding for rail joints when that method was followed, the process was probably most extensively used in Detroit, Minneapolis, Milwaukee and Brooklyn. It was thought, therefore, that the track rehabilitation at Detroit afforded an excellent opportunity for a comprehensive inventory of the cast-welding process for rail joints, at least as employed in that city.

Tests with Electrically Welded Joints

The standard type of track construction in Detroit under the present management, as described in the issue of this paper for July 23, 1921, is monolithic, except at special trackwork. The present standard for construction calls for International twin steel ties 5 ft. 6 in. average centers; the standard A.R.A. Type A 100-lb. plain girder rail; seam-welded joints; and the base of the rail welded to the tie at every joint and at every third intervening tie. The first track laid, for about 60 miles, was with 91-lb. 7-in. T-rail. The Street Railway Department knew what might be expected from concrete, rails and ties, but the quality of electrically welded joints was largely unknown. Hence, beginning about October, 1920, when an extensive construction and rehabilitation program was being planned, a series of tests on rail joints, seam-welded in different ways, was begun. The actual tests were made at the Perry Testing Laboratory in Detroit, under the direction of the electrical department.

In the various forms of joints tested, with two exceptions, the metallic arc was used. One reason for this was that at the time the trackwork in Detroit was done, practically all of the joint welding was on new tracks where no trolley current was available. The metallic arc requires about 150 amp. at 30 volts, and the carbon arc approximately 300 amp. at 60 volts, and as at that time there were no welding machines on the market that would take care of two carbon arcs, the metallic arc was adopted. The welder used was the two-arc gasoline-driven welding machine of the Wilson Welder & Metals Company, mounted on a track lorry. Altogether, tests have been made on forty different types of welded joints. As the tests were begun with the 7-in. 91-lb. rail they were continued with that rail to have the results comparable, though a change has been made in the company's standard as described. The essential data obtained from each test are given in the accompanying drawings. The following comments give further particulars of the tests and present the opinion of the electrical department on the results shown.



These Types of Failure Are Common in the Cast-Welded Joints Removed from Track in Detroit

Particulars of Individual Tests

Case 1 was a joint set up with 20-in. plates and two ⅞-in. bolts, but not welded. This test was made to determine the strength given to the joint by two bolts without any welding.

Case 2 was a joint set up in a similar manner with four bolts and no welding. The results of Cases 1 and 2 were about of the same order.

Case 3 was seam welded for the full length of the

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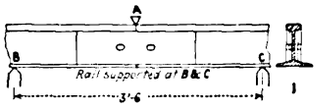
Case 1

No Welding

91 lb. 7 in. tee rail, ⅜ in. x 20 in. plate, two ⅞ in. bolts.



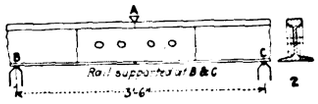
Load Applied At "A"	Deflection in in.
25,000 lb.	.0938
40,000 lb.	.2187
50,000 lb.	.4375
75,000 lb.	1.3437
90,000 lb.	2.2187
99,200 lb.	See below

At 99,200 lb. test was discontinued on account of bottom of rail touching base of testing machine. Small crack in plate near bolt hole. Plate and rail badly bent, bolt head slightly sheared.

Case 2

No Welding

91 lb. 7 in. tee rail, ⅜ in. x 20 in. plate, four ⅞ in. bolts.



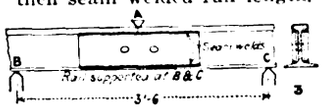
Load Applied At "A"	Deflection in. in.
25,000 lb.	.0625
40,000 lb.	.1250
50,000 lb.	.2188
75,000 lb.	1.3125
90,000 lb.	2.4063
96,350 lb.	See below

At 96,350 lb. test was discontinued on account of bottom of rail touching base of testing machine. Small crack in plate near bolt hole. Plate and rail badly bent. Bolts O.K.

Case 3

Electric Arc Weld

91 lb. 7 in. tee rail, ⅜ in. x 20 in. plate, two ⅞ in. bolts upper and lower edges of plate were scarfed to 45 deg. and then seam welded full length.



Load Applied At "A"	Deflection in in.
70,000 lb.	.4375
75,000 lb.	.50

Plates cracked from bottom scarfing. Plates split entirely across at 75,000 lb.

Case 4

Electric Arc Weld

91 lb. 7 in. tee rail, ⅜ in. x 20 in. plate, two ⅞ in. bolts, plates seam welded full length.

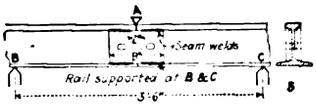
Load Applied At "A"	Deflection in in.
50,000 lb.	.125
60,000 lb.	.187
70,000 lb.	.250
75,000 lb.	.281
80,000 lb.	.312
90,000 lb.	.437
100,000 lb.	.499
110,000 lb.	.562

One plate cracked all the way across at 110,000 lb.; both plates split on continuing load. Probable elastic limit of ⅜ in. plates, 78,650 lb.

Case 5

Electric Arc Weld

91 lb. 7 in. tee rail, ⅜ in x 9 in. plate, two ⅞ in. bolts, plates seam welded full length except for 2 in. lap at joint.



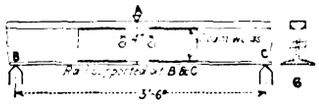
Load Applied At "A"	Deflection in in.
25,000 lb.	.3063
40,850 lb.	3.000

At 35,900 lb. plate distorted and pulled away from welds on ends. At 40,850 lb. weld failed completely and rails spread about 2½ in. at bottom.

Case 6

Electric Arc Weld

91 lb. 7 in. tee rail, ⅜ in. x 20 in. plate, two ⅞ in. bolts, plates seam welded full length except for 4 in. lap at joint.



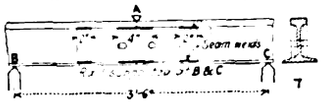
Load Applied At "A"	Deflection in in.
25,000 lb.	.125
50,000 lb.	.375
85,330 lb.	See below

Plate broke at 85,330 lb. test continued until second plate broke.

Case 7

Electric Arc Weld

91 lb. 7 in. tee rail, ⅜ in. x 20 in. plate, two ⅞ in. bolts, plates seam welded 2 in. at each end and 4 in. at joint.



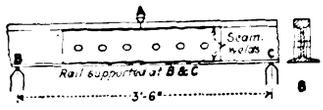
Load Applied At "A"	Deflection in in.
40,000 lb.	.0625
50,000 lb.	.1250
60,000 lb.	.2187
75,000 lb.	.3437
97,750 lb.	See below

Both plates cracked at 97,750 lb. Bottom center welds sheared off. One end weld on each fish plate intact; all others started to shear off. All welds stood up in good shape until plate broke.

Case 8

Electric Arc Weld

91 lb. 7 in. tee rail, 26 in. Cleveland plate, six ⅞ in. bolts. Plates seam welded full length.



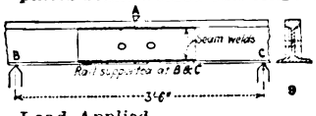
Load Applied At "A"	Deflection in in.
40,000 lb.	.1250
50,000 lb.	.2812
60,000 lb.	.3437
75,000 lb.	.4687
90,000 lb.	.6562
109,000 lb.	See below

Plates cracked at 109,000 lb. and broke at 116,250 lb. Welds on both plates, top and bottom, sheared off about half way back from joint, due to distortion of plates. Welds showed no signs of shearing until plates broke.

Case 9

Electric Arc Weld

91 lb. 7 in. tee rail, ⅜ in. x 20 in. plate, two ⅞ in. bolts, plates seam welded full length.



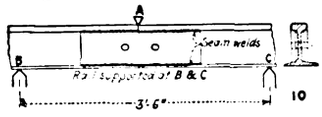
Load Applied At "A"	Deflection in in.
25,000 lb.	.0625
40,000 lb.	.0937
50,000 lb.	.2812
75,000 lb.	.7500
90,000 lb.	.9688
114,350 lb.	See below

Both plates cracked at 114,350 lb., bottom welds on both sides sheared off about one-third of way from joint. Top welds let go near joint. Welds held well until plates broke.

Case 10

Acetylene Weld

91 lb. 7 in. tee rail, ⅜ in. x 20 in. plate, two ⅞ in. bolts, plates seam welded full length acetylene weld made by Oxweld Acetylene Co. of Detroit. Rails preheated before welding.



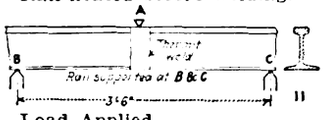
Load Applied At "A"	Deflection in in.
70,000 lb.	.187
75,000 lb.	.219
80,000 lb.	.266
90,000 lb.	.296
117,000 lb.	See below

Probable yield point 76,870 lb. Plate broke at 117,000 lb. weld intact.

Case 11

Thermit Weld

91 lb. 7 in. tee rail, no. plate. Thermit weld made by Metal & Thermit Corporation Rail heated before welding.



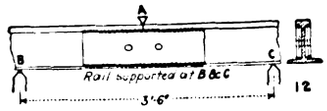
Load Applied At "A"	Deflection in in.
75,000 lb.	.125
80,000 lb.	.125
90,000 lb.	.141
100,000 lb.	.157
110,000 lb.	.188
120,000 lb.	.203
130,000 lb.	.250

Probable yield point 127,500 lb. Ultimate strength, 203,500 lb. The "Center Punch Marks" on weld metal and rail metal indicated that the yield was taking place in the weld metal. The failure seemingly took place outside the weld.

Case 12

Electric Arc Weld

91 lb. 7 in. tee rail, ⅜ in. x 20 in. plate, two ⅞ in. bolts, plates scarfed on upper and lower edges at 55 deg. angle scarfing ½ in. wide. Plates seam welded full length.



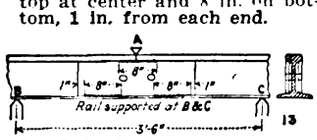
Load Applied At "A"	Deflection in in.
25,000 lb.	.023
50,000 lb.	.091
60,000 lb.	.132
70,000 lb.	.262
80,000 lb.	.406
90,000 lb.	.953
93,630 lb.	1.661
95,580 lb.	Complete failure

Weld started to break at 80,000 lb. Rail broke through flange and web at 90,000 lb. Rail showed brittle structure.

Case 13

Electric Arc Weld

91 lb. 7 in. tee rail, ⅜ in. x 20 in. plate two ⅞ in. bolts, plates seam welded 8 in. on top at center and 8 in. on bottom, 1 in. from each end.



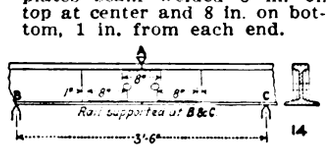
Load Applied At "A"	Deflection in in.
25,000 lb.	.053
50,000 lb.	.132
60,000 lb.	.215
70,000 lb.	.346
80,000 lb.	.553
90,000 lb.	.909
96,850 lb.	1.062
98,156 lb.	Complete failure

Welds started to break on top and bottom at 90,000 lb. Fish plates broke at 92,000 lb.

Case 14

Electric Arc Weld

91 lb. 7 in. tee rail, ⅜ in x 20 in. plate, two ⅞ in. bolts, plates seam welded 8 in. on top at center and 8 in. on bottom, 1 in. from each end.



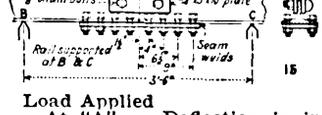
Load Applied At "A"	Deflection in in.
25,000 lb.	.0312
50,000 lb.	.0937
75,000 lb.	.3125
91,250 lb.	See below

One bolt sheared, weld broke on top and bottom on both sides of joint. Plate broke on one side.

Case 15

Electric Arc Weld

91 lb. 7 in. tee rail, ⅜ in. x 3 in. x 10 in. splice bars bolted with two ⅞ in. bolts not welded. ⅜ in. x 7 in. x 20 in. plate bolted to base with eight ⅜ in. bolts. Plate seam welded to base of rail.



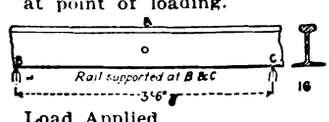
Load Applied At "A"	Deflection in in.
25,000 lb.	.0312
50,000 lb.	.0625
75,000 lb.	.1250
100,000 lb.	.1562
125,000 lb.	.2500
150,000 lb.	.4062
171,530 lb.	See below

One rail fractured through base and web in two places, fracture extended up into ball of rail, weld broke at joint, and between fracture points.

Case 16

Continuous Rail

91 lb. 7 in. tee rail, continuous rail, 1 in. tie rod hole at point of loading.



Load Applied At "A"	Deflection in in.
25,000 lb.	.0625
50,000 lb.	.0937
75,000 lb.	.1250
100,000 lb.	.1560
125,000 lb.	.1875
150,000 lb.	.3125
Prob. elas. limit 156,000 lb.	.3437
Prob. elas. limit 220,000 lb.	1st crack noted
241,000 lb.	2nd crack noted
245,100 lb.	Breaking strength of rail

Records of Detroit Joint Tests, Cases 1 to 16 Inclusive

These include tests of one acetylene weld, one thermit weld, eleven electric-arc welds, two splice-bar joints and one continuous rail.

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joint plates, with the plates scarfed at a 45-deg. angle, top and bottom. This was done to determine whether a greater penetration could be procured between the plate and the rail, through the medium of scarfing the plates. In this test the plates cracked from the bottom scarfing and split entirely across at 75,000 lb. The inference drawn from this test was that when the plates were scarfed, only a knife edge of virgin metal was left in the plates at the "fishing" sections.

Case 4 was seam welded for the full length of the plate, top and bottom. This is the method followed by the Department of Street Railways in its seam-welded joints.

Case 5 used a 9-in. plate. When track construction on a large scale was begun in Detroit, difficulty was experienced in procuring all of the 20-in. plates needed, but there were on hand a large number of 9-in. plates which the track department used for lining up the track. It was thought worth while to try these plates to see if they could be satisfactorily used in permanent construction. The test showed, however, that the joint with the 9-in. plate started to give at 35,900 lb., at which pressure the plates became distorted and pulled away from the weld on the ends. The weld failed completely at 40,850 lb.

Case 6 was where 4 in. of unwelded section had been left for 2 in. on each side of the joint, top and bottom. This arrangement was tested because of a suggestion that the action of the arc, while the seam weld was being made, changed the structure of the metal in the rail. If this was so, presumably the worst effect would be right at the joint between the rails.

Case 7 was tested to determine whether it was necessary to weld the full 20 in. of the plate, or if 8 in. of weld, properly distributed along the joint, would not be sufficient to develop the full strength of the plate, and at the same time give sufficient electrical conductivity.

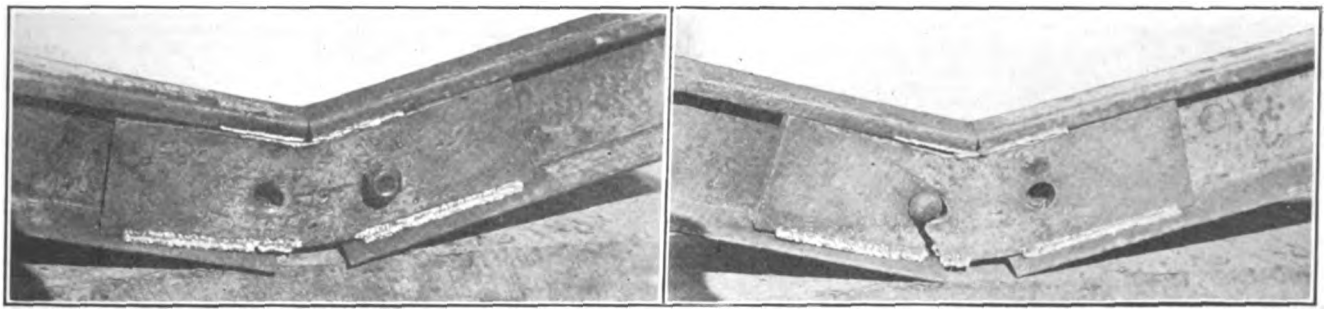
Case 8 was made up of a 26-in., six-bolt plate. All of the other tests, through Case 14, used a 20-in. plate, except Case 5, with a 9-in. plate, and Case 11, which was a Thermit weld. It will be noted that the welds in Case 8 sheared off due to the distortion of the plates. A comparison of the results with the 26-in. plate, 20-in. plate and 9-in. plate, indicates that the 9-in. plate is too short, and the 26-in. plate is too long. This leaves the 20-in. plate seemingly a happy medium. The distortion observed in Case 8 was in the plates.

Case 9 was a check test on Case 4.

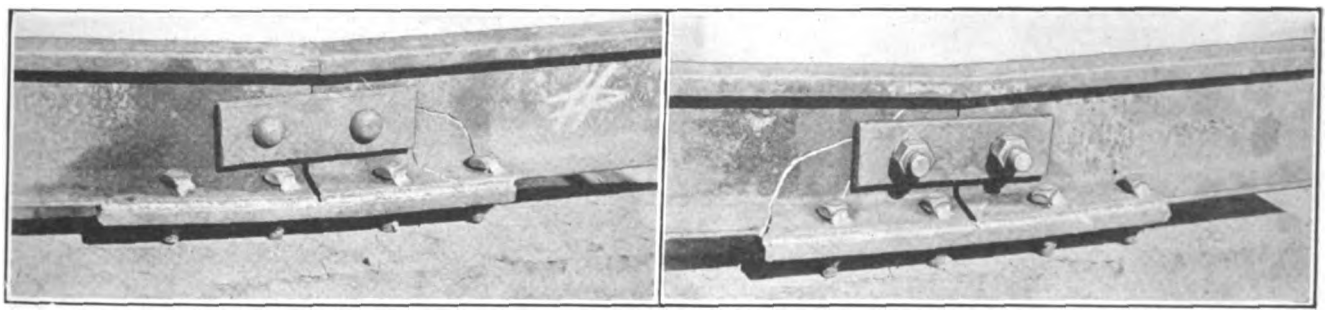
Case 10 was a check test on Cases 9 and 4, the only difference being that in Case 9 the rail was preheated and the acetylene weld was used instead of a metallic arc.

Case 11 was a Thermit weld. This test piece was made up by the Thermit company and showed up well, but no further tests were made because the standard track construction in Detroit calls for supported joints, and the Thermit weld would mean a suspended joint.

Case 12 was a full-length weld, top and bottom, with the plates scarfed 55 deg. instead of the 45 deg. shown in Case 3. The failure in Cases 12 and 3 is attributed in both instances to a lack of bearing between the plates and the rail in the "fishing" sections.



Case 8—Views of Both Sides of Joint After Failure



Case 15—Views of Both Sides of Joint After Failure

Case 13 was a test made with a joint having 8 in. of seam weld on the top seam and 16 in. on the bottom seam; the two lower seams beginning back 1 in. from the ends of the plate. This was done to find out if there was any evidence of "nicking" where the welds stop, and also to check the claim that a perfect joint should have the same deflection as the rail itself. Actually, the test showed that the two places where the weld stopped in the middle of the plate provided points for the weld to start ripping. This tendency to rip is naturally greater at the center of the plates than at the sides because there is a greater stress in testing this center point. Case 13 was checked by Case 14.

Case 15 was designed to test the theory that the use of a base plate increases the strength of the joint. A base plate welded for its full length was used, and in addition this plate was bolted to the base of the rail. The splice plates were used simply to keep the rails aligned and were not welded. It will be noted that this case shows notably greater strength than any of the joints previously tested.

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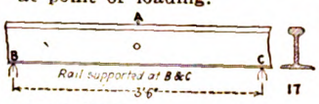
Case 17

Continuous Rail

91 lb. 7 in. tee rail, continuous rail, 1 in. tie rod hole at point of loading.



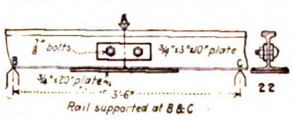
Load Applied At "A"	Deflection in in.
25,000 lb.	.0625
50,000 lb.	.0937
75,000 lb.	.1250
100,000 lb.	.1562
125,000 lb.	.2187
150,000 lb.	.3437
Prob. elas. limit	
166,150 lb.	.4687
1st crack noted	
184,000 lb.	
Beam of scale dropped	
226,000 lb.	2nd crack noted
229,050 lb.	See below

Rail buckled slowly in web below the ball at point of center loading and above tie rod hole and continued to twist to such an extent that the test was discontinued.

Case 22

Electric Arc Weld

91 lb. 7 in. tee rail., ¾ in. x 3 in. x 10 in. splice bars bolted with two ⅞ in. bolts, not welded. ¾ in. x 20 in. plate seam welded to base of rail.



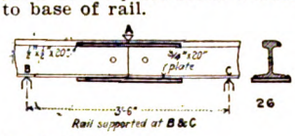
Load Applied At "A"	Deflection in in.
25,000 lb.	.0625
40,000 lb.	.0937
50,000 lb.	.0937
60,000 lb.	.1093
75,000 lb.	.1250
90,000 lb.	.1562
110,000 lb.	.1875
160,000 lb.	See below

Rail broke starting at the end of the seam weld on the base, welds did not break.

Case 26

Electric Arc Weld

91 lb. 7 in. tee rail, ½ in. x ½ in. x 20 in. plate welded to ball of rail, top seam only. ¾ in. x 20 in. plate seam welded to base of rail.



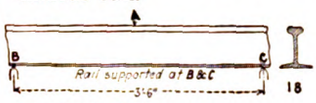
Load Applied At "A"	Deflection in in.
25,000 lb.	.0625
40,000 lb.	.1250
50,000 lb.	.1250
60,000 lb.	.1406
75,000 lb.	.1562
86,000 lb.	See below

Rail broke starting at the end of the seam weld on the base. Welds did not break.

Case 18

Continuous Rail

91 lb. 7 in. tee rail, continuous rail.



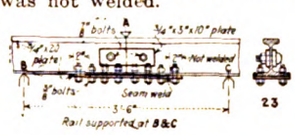
Load Applied At "A"	Deflection in in.
25,000 lb.	.0312
50,000 lb.	.0625
75,000 lb.	.0937
100,000 lb.	.1250
125,000 lb.	.1875
150,000 lb.	.2812
Prob. elas. limit	
175,000 lb.	.4375
213,000 lb.	1st crack noted
232,000 lb.	2nd crack noted
243,650 lb.	See below

Rail buckled in web just below the ball at the point of center loading, and continued to twist to such an extent that the test was discontinued.

Case 23

Electric Arc Weld

91 lb. 7 in. tee rail. ¾ in. x 3 in. x 10 in. splice bars bolted with two ⅞-in. bolts, not welded. ¾ in. x 20 in. plate bolted to base with eight ¾-in. bolts. Plate seam welded to base of rail except for 2 in. at each end of plate, which was not welded.



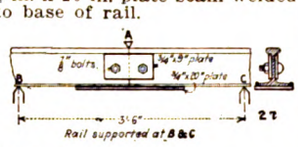
Load Applied At "A"	Deflection in in.
25,000 lb.	.0625
40,000 lb.	.0937
50,000 lb.	.0937
60,000 lb.	.1250
75,000 lb.	.1562
90,000 lb.	.1875
110,000 lb.	.2187
147,100 lb.	See below

Rail broke, starting at the end of the seam weld on the base. Welds did not break.

Case 27

Electric Arc Weld

91 lb. 7 in. tee rail, ¾ in. x 9 in. splice bars bolted with two ⅞ in. bolts, not welded. ¾ in. x 20 in. plate seam welded to base of rail.



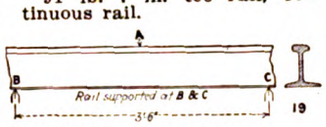
Load Applied At "A"	Deflection in in.
25,000 lb.	.0000
40,000 lb.	.0156
50,000 lb.	.0312
60,000 lb.	.0312
75,000 lb.	.0625
80,200 lb.	See below

Rail broke starting at the end of the seam weld on the base. Welds did not break.

Case 19

Continuous Rail

91 lb. 7 in. tee rail, continuous rail.



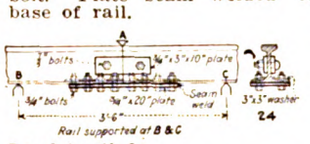
Load Applied At "A"	Deflection in in.
25,000 lb.	.0312
50,000 lb.	.0625
75,000 lb.	.0937
100,000 lb.	.1250
125,000 lb.	.1875
150,000 lb.	.3281
Prob. elas. limit	
175,000 lb.	.5625
229,250 lb.	See below

Rail buckled in web just below the ball at the point of center loading and continued to twist to such an extent that the test was discontinued.

Case 24

Electric Arc Weld

91 lb. 7 in. tee rail ¾ in. x 3 in x 10 in. splice bars bolted with two ⅞ in. bolts, not welded. ¾ in. x 20 in. plate bolted to base of rail with eight ¾ in. bolts, using a 3 in. x 3 in. washer with every bolt. Plate seam welded to base of rail.



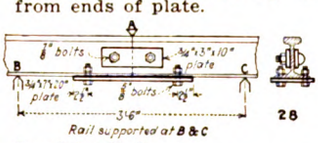
Load Applied At "A"	Deflection in in.
25,000 lb.	.0937
40,000 lb.	.1250
50,000 lb.	.1562
60,000 lb.	.1562
75,000 lb.	.1875
90,000 lb.	.2188
110,000 lb.	.2500
148,350 lb.	See below

Plate welded to base broke at the joint.

Case 28

Electric Arc Weld

91 lb. 7 in. tee rail. Splice bars bolted with two ⅞-in. bolts, not welded. ¾ in. x 20 in. plate seam welded to base of rail and bolted with four ⅞-in. bolts, each bolt 2½ in. from ends of plate.



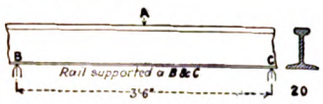
Load Applied At "A"	Deflection in in.
25,000 lb.	.0312
40,000 lb.	.0625
50,000 lb.	.0625
60,000 lb.	.0781
75,000 lb.	.0937
90,000 lb.	.1562
110,000 lb.	.1562
121,320 lb.	See below

Rail broke, starting at the end of the seam weld on the base. Welds did not break.

Case 20

Continuous Rail

91 lb. 7 in. tee rail, continuous rail.

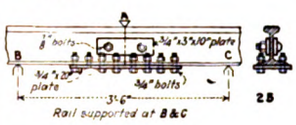


Load Applied At "A"	Deflection in in.
25,000 lb.	.0312
50,000 lb.	.0781
75,000 lb.	.0937
100,000 lb.	.1250
125,000 lb.	.1560
150,000 lb.	.2031
175,000 lb.	.3125
Prob. elas. limit	
258,730 lb.	See below

Rail buckled in web just below the ball at the point of center loading and continued to twist to such an extent that the test was discontinued.

Case 25

91 lb. 7 in. tee rail, ¾ in. x 3 in. x 10 in. splice bars bolted with two ⅞ in. bolts, not welded. ¾ in. x 20 in plate bolted to base of rail with eight ¾ in. bolts, not welded.



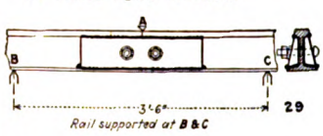
Load Applied At "A"	Deflection in in.
25,000 lb.	.0937
40,000 lb.	.2812
50,000 lb.	.4062
60,000 lb.	.5000
75,000 lb.	.6875
83,600 lb.	.9375
See below	

Bolts started to shear off at 83,600 lb. and continued until all bolts had sheared.

Case 29

Electric Arc Weld

91 lb. 7 in. tee rail 20 in. triangular splice bars seam welded top and bottom. Two ⅞ in. bolts spot welded.



Load Applied At "A"	Deflection in in.
25,000 lb.	.0312
40,000 lb.	.0312
50,000 lb.	.0312
60,000 lb.	.0312
75,000 lb.	.0625
90,000 lb.	.0937
110,000 lb.	.1093
140,520 lb.	See below

Rail broke at end of splice bars, weld did not break.

Records of Detroit Joint Tests, Cases 17 to 29 Inclusive

In these cases, tests were continued with the continuous rail and with the electric-arc weld in which a plate seam welded to the base of the rail was used. (There was no Case 21, for reasons explained in the text.)

Cases 16 to 20 inclusive show the results of transverse tests on straight rails. Cases 16 and 17 had tie-rod holes opposite the point of application of the load. All of these tests show very much higher strength than any of the joints. This seems to indicate that the welding in some way may weaken the rail.

There was no test No. 21. This number was left open for another test on a continuous rail if such a test should be considered desirable.

Case 22 was a joint with a seam-welded base plate without any bolts in the base of the rail. This was a check test on Case 15 to learn the effect of the bolts. It will be seen that in Case 15 the rail broke at 171,530 lb., and in Case 22 at 160,200 lb.

Case 23 covered a joint with a base plate bolted and welded, the weld being stopped 2 in. from the end of the plate. This was done to see whether this arrangement would stop trouble from nicking.

Case 24 covered a joint with a base plate seam-welded for its full length and bolted to the rail, but with a bevel washer under the head of the nut to distribute the strain over a greater area on the rail base.

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Case 25 covered a joint made up with a base plate bolted but not welded. It will be noted that its strength is far less than when the base plate is seam welded but not bolted, as in Case 22.

Case 26 covered a joint with the base plate welded to the base of the rail for its full length, and a guide plate welded to the head of the rail to take the place of the ordinary joint plates. In this case the rail broke, so that the real value of this construction is hardly shown.

Case 27 had a seam-welded base plate with a pair of splice plates set up high to give a head support to the rail. This test was not conclusive because the rail broke at 80,200 lb.

Case 28 had a seam-welded base plate with four bolts instead of the eight bolts shown in Cases 15, 23, 24 and 25.

Case 29 had special solid triangular fish plates, seam welded top and bottom.

Case 30 had one-half of an International twin steel tie, seam welded to the base of the rail for its full length. The tie split entirely across at 193,800 lb.

Cases 30 and 31, which are of the same set-up, show conclusively the effect of a properly welded base plate as compared with anything that can be done in seam welding the fishplates. These give a strength of joint practically equivalent to that of a continuous rail.

Cases 32 and 33 show joints made up of the department's standard full-length seam weld of the joint plates, and a 6-in. weld between the base of the rail and International twin tie. In both these cases the rail broke at the base, starting at the end of the weld next to the tie and extending up through the bolt hole. In both these cases it would seem that there was too great a concentration of heat at the point where the short welds stop.

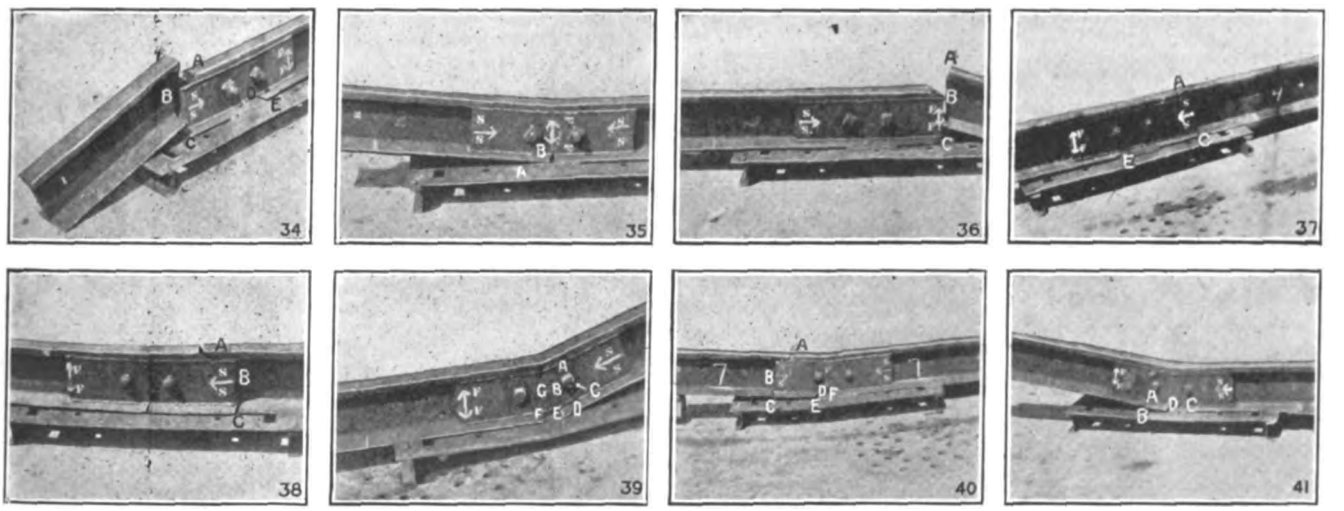
It will be noticed that in most of these tests the weld showed no sign of breaking down, but in practically every case either the plate or the rail broke.

Desirability of Preheating or Post-Heating

Cases 34 to 41 inclusive were made up to test (a) different methods of welding the rail to the International steel tie and (b) the desirability of preheating or post-heating. A record was kept in these cases of the points where the welding of the splice bar to the rail was started and finished. If the joint broke at the point where the weld was started, it would be obvious that preheating is required, since as the arc is continued along the seam weld it automatically preheats ahead of it. On the other hand, if the weld broke at the point where the welding was stopped, it would seem that post-heating is needed.

Case 34 was a joint made up in a manner similar to Cases 32 and 33, except for the spot welding of the bolts and nuts. The rail broke at two points, showing complete failure near the end of the joint plate and partial failure of the base of the rail at the center. Other welds were intact, except a short section of the bottom weld of one joint plate. In the photograph of the broken specimen, *ABC* is the rail break, and *DE* the crack in the rail base. In the drawings and photographs *S* shows the starting point and *F* the finishing point of the seam welds between splice bars and rail.

Case 35 was a check test on Case 34 except in the direction in which the welds were made. Here the base of the rail and part of the web broke near the joint. One tie seam between the base of the rail and the tie showed partial failure. The joint plates and the other welds were intact. In the photograph, *AB* represents the break in the base of the rail.



Views of Joints 34 to 41 After Failure

Case 36 was made up the same as Case 34, except that both the tie welds were lapped back at both ends for about 1½ in. Here the rail broke in two places, a complete rail failure at the end of the joint plate and failure of the rail base near one end of the tie seam. Other welds, the joint plates and the tie plate were intact. The rail failure is shown as *ABC* in the photograph.

Case 37 was a check test on Case 36. The rail broke in two places—completely near the end of the joint plate, and the rail base at the end of the tie seam. One joint plate cracked from the bottom to the bolt hole. Otherwise, welds and plates were intact. In the photograph, *ABC* is the rail failure, and *DE* the base break.

In cases 34 to 37 inclusive the failure was at about the same magnitude of load application. The breakage was in the rails, the welds holding up well.

Case 38 was made up in a manner similar to the four preceding cases, except that two tie welds each 3½ in. long at the ends were substituted for the 6-in. or 6½-in. weld at the center of the tie. Here the rail broke at one end of the joint plate, and the tie weld between one end of the steel tie and the rail failed. Otherwise, plates and welds were intact. The photograph shows *ABC* as the broken rail.

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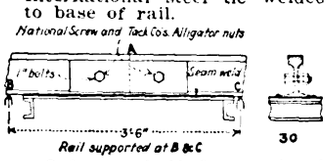
Case 30
Electric Arc Weld

91 lb. 7 in. tee rail, ⅜ in. x 20 in. splice bars bolted with two 1 in. bolts, not welded. International steel tie welded to base of rail.



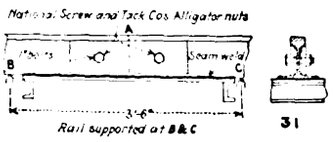
Only one-half International steel tie used.

Load Applied At "A"	Deflection in in.
25,000 lb.	.0625
40,000 lb.	.1250
50,000 lb.	.1250
75,000 lb.	.1875
90,000 lb.	.2500
100,000 lb.	.3125
177,800 lb.	Prob. elas. limit
193,800 lb.	Failure

Tie split entirely across at line of junction of the two rail sections. Weld unbroken, both bolts stretched allowing plates to warp slightly.

Case 31
Electric Arc Weld

91 lb. 7 in. tee rail, ⅜ in. x 20 in. splice bars bolted with two 1 in. bolts, not welded. International steel tie welded to base of rail.



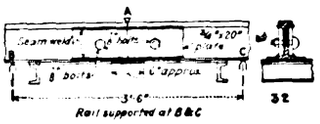
Only one-half International steel tie used.

Load Applied At "A"	Deflection in in.
25,000 lb.	.0000
40,000 lb.	.0312
50,000 lb.	.0625
75,000 lb.	.0937
90,000 lb.	.1250
100,000 lb.	.1250
125,000 lb.	.1562
150,000 lb.	.2500
229,700 lb.	.8750

Failure occurred at 229,700 lb. Results same as in Case 30.

Case 32
Electric Arc Weld

91 lb. 7 in. tee rail, ⅜ in. x 20 in. splice bars bolted with two ¾ in. bolts. Plates seam welded top and bottom. Base of rail welded to one-half of International steel tie.

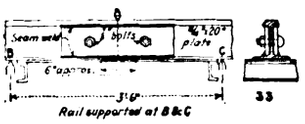


Load Applied At "A"	Deflection in in.
25,000 lb.	.0625
40,000 lb.	.1250
50,000 lb.	.1250
62,400 lb.	.1875
75,000 lb.	.2500
82,000 lb.	.9062
82,400 lb.	3.3125

Rail broke at one end, starting at end of weld to tie, extending up through bolt hole. Splice bar broke at bottom, extending up through bolt hole.

Case 33
Electric Arc Weld

91 lb. 7 in. tee rail, ⅜ in. x 20 in. splice bars bolted with two ¾-in. bolts. Plates seam welded top and bottom. Base of rail welded to one-half of International steel tie.

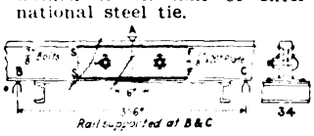


Load Applied At "A"	Deflection in in.
25,000 lb.	.0312
40,000 lb.	.0937
50,000 lb.	.1250
75,000 lb.	.1875
87,000 lb.	.3437
87,100 lb.	3.1875

Results same as in Case 32.

Case 34
Electric Arc Weld

91 lb. 7 in. tee rail, ¾ in. x 20 in. splice bars bolted with two ¾ in. bolts, bolts and nuts spot welded, plates seam welded top and bottom, base of rail welded to one-half of International steel tie.



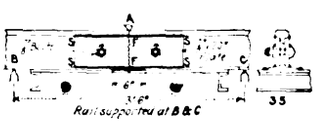
Load Applied At "A"	Deflection in in.
25,000 lb.	.0625
40,000 lb.	.0625
50,000 lb.	.1250
60,000 lb.	.1250
75,000 lb.	.1250
90,000 lb.	.1875
92,000 lb.	1st report
100,000 lb.	.2500
105,950 lb.	See below

Rail failed at two points, welds intact, except part of bottom weld of one splice bar.

Note.—For explanation of "F," "S" and wavy lines for this and following tests, see note under Case 41.

Case 35
Electric Arc Weld

91 lb. 7 in. tee rail, ¾ in. x 20 in. splice bars bolted with two ¾ in. bolts, bolts and nuts spot welded. Plates seam welded top and bottom. Base of rail welded to one-half of International steel tie.

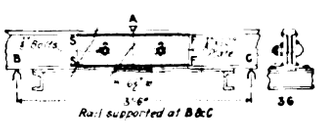


Load Applied At "A"	Deflection in in.
25,000 lb.	.0625
40,000 lb.	.0625
50,000 lb.	.0625
60,000 lb.	.1250
75,000 lb.	.1250
90,000 lb.	.1562
100,000 lb.	1st report
105,170 lb.	.1875
118,700 lb.	1.2812

Rail failure near joint. Partial failure of one tie seam. Other welds and splice bars intact.

Case 36
Electric Arc Weld

91 lb. 7 in. tee rail, ¾ in. x 20 in. splice bars bolted with two ¾ in. bolts, bolts and nuts spot welded. Plates seam welded top and bottom. Base of rail welded to one-half of International steel tie.

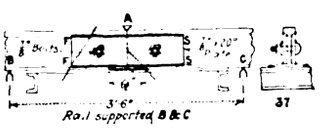


Load Applied At "A"	Deflection in in.
25,000 lb.	.0156
40,000 lb.	.0312
50,000 lb.	.0468
54,000 lb.	1st report
60,000 lb.	.1250
75,000 lb.	.1562
90,000 lb.	.2187
96,100 lb.	See Below

Rail broke at 2 points. Welds and splice bars intact.

Case 37
Electric Arc Weld

91 lb. 7 in. tee rail, ¾ in. x 20 in. splice bars bolted with two ¾ in. bolts, bolts and nuts spot welded. Plates seam welded top and bottom. Base of rail welded to one-half of International steel tie.

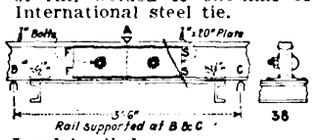


Load Applied At "A"	Deflection in in.
25,000 lb.	.0312
40,000 lb.	.0468
50,000 lb.	.0625
60,000 lb.	.1250
72,000 lb.	1st report
75,000 lb.	.1406
90,000 lb.	.1562
103,900 lb.	See below

Rail broke at two points. One splice bar cracked from bottom to bolt hole. Welds intact.

Case 38
Electric Arc Weld

91 lb. 7 in. tee rail, ¾ in. x 20 in. splice bars bolted with two ¾ in. bolts, bolts and nuts spot welded. Plates seam welded top and bottom. Base of rail welded to one-half of International steel tie.

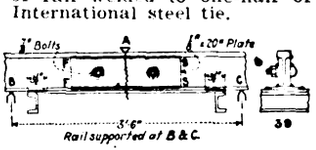


Load Applied At "A"	Deflection in in.
25,000 lb.	.0312
40,000 lb.	.0625
50,000 lb.	.0937
53,000 lb.	1st report
60,000 lb.	.1250
75,000 lb.	.1250
90,000 lb.	.1562
95,000 lb.	2nd report
100,000 lb.	.1875
110,000 lb.	.2031
120,000 lb.	.2500
138,000 lb.	1.0000

Rail broke at end of splice bar. Tie weld at one end failed. Plates and other welds intact.

Case 39
Electric Arc Weld

91 lb. 7 in. tee rail, ¾ in. x 20 in. splice bars bolted with two ¾ in. bolts, bolts and nuts spot welded. Plates seam welded top and bottom. Base of rail welded to one-half of International steel tie.



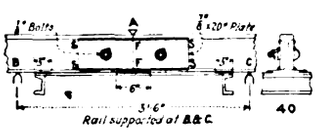
Load Applied At "A"	Deflection in in.
25,000 lb.	.0000
40,000 lb.	.0156
50,000 lb.	.0468
60,000 lb.	.0781
75,000 lb.	.1250
85,000 lb.	1st report
90,000 lb.	.1250
100,000 lb.	.1718
110,000 lb.	.2031
120,000 lb.	.2500
128,100 lb.	3.1250

Complete Failure

Both splice bars split at center. Numerous breaks in joint plate welds. Tie welds at one end failed.

Case 40
Electric Arc Weld

91 lb. 7 in. tee rail, ¾ in. x 20 in. splice bars bolted with two ¾ in. bolts, bolts and nuts spot welded. Plates seam welded top and bottom. Base of rail welded to one-half of International steel tie.



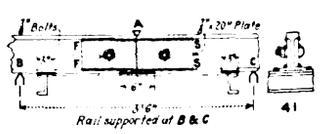
Load Applied At "A"	Deflection in in.
25,000 lb.	.0000
40,000 lb.	.0000
50,000 lb.	.0000
60,000 lb.	.0312
75,000 lb.	.0625
90,000 lb.	.0625
100,000 lb.	.1250
110,000 lb.	.1250
120,000 lb.	.1406
130,000 lb.	1st report
132,650 lb.	

Complete destruction

Rail broke in two places. One splice bar weld failed at one end. Tie welds at one end failed. Splice bars intact.

Case 41
Electric Arc Weld

91 lb. 7 in. tee rail, ¾ in. x 20 in. splice bars bolted with two ¾ in. bolts, bolts and nuts spot welded. Plates seam welded top and bottom. Base of rail welded to one-half of International steel tie.



Load Applied At "A"	Deflection in in.
25,000 lb.	.0000
40,000 lb.	.0000
50,000 lb.	.0312
60,000 lb.	.0625
75,000 lb.	.0937
96,000 lb.	.1250
100,000 lb.	.1406
110,000 lb.	.1562
120,000 lb.	.1875
127,600 lb.	1st report
130,100 lb.	2.3750

Test Discontinued

Rail broke near joint. One splice bar split. Tie welds at one end of tie failed, other welds intact.

Note:

Previous to Case 34 no record was kept of start and finish of weld, or of point of fracture.

"S" shows starting point of welding on seam welds between splice bars and rail.

"F" shows finish point of welding on seam welds between splice bars and rail.

Wavy lines show where rail and splice bars broke under load as applied.

Records of Final Detroit Joint Tests, Cases 30 to 41 Inclusive

These all relate to seam-welded joints with an International steel tie welded to the base of the rails

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Case 39 was a check test on Case 38. Here both joint plates split at the joint and through the bolt holes. There were numerous cracks and breaks in the joint plate welds, and both tie welds at one end of the tie failed. In the photograph, *ABC* and *G* show the breaks in the joint plates, and *DEF* the points of failure of the plate welds.

Case 40 was made up with tie welds at the rail joint and at the ends of the tie. In this case the rail broke in two places; complete failure at one end of the joint plate and breakage of the base of the rail near the center joint. The joint weld cracked on one end near the bottom center, and the tie welds at one end of the tie failed. The joint plates remained intact. In the photograph, *ABC* shows the rail break, *DEF* the rail base failure.

Case 41 was a check test on Case 40, except in the direction in which the welds were made. Here the base of the rail broke near the joint, one joint plate cracked and the other plate split through the center. The tie weld at one end of the tie failed, with the other welds intact. In the photograph, *AB* shows the break in the base of the rail, and *CD* the break and split in the joint plates.

Conclusions from Cases 34-41 Inclusive

The most effective method of welding the tie to the rail is by a short weld at each end of the tie. This gives a distinctly stronger joint than with a tie weld just at the joint. When tie welds are used at the ends of the tie, it is more or less superfluous to make the center tie weld.

No definite conclusions could be drawn as to the desirability of preheating or post-heating. Records were kept of the point of starting and finishing each joint plate weld, but these welds held up almost uniformly, and where failure took place, it was not consistent in its relation to the point where the weld was started or finished.

Welding Wire

During the course of these experiments the department has used a number of different makes and kinds of welding wire. A great variation has been found in the chemical composition of the numerous welding wires now on the market, as well as in their qualities of "laying in" without sputtering during the welding process. The wire used recently by the department for track welding has been the No. 9 wire of the Wilson company, but tests are now being made at the department chemical laboratory to determine whether changes in the chemical composition of this welding wire for Detroit conditions can be made to advantage.

Cast-Welded Joints

As about 80 per cent of the Detroit city rail joints in the past have been made by the cast-welded process, the department has naturally taken out many of these joints in its work of rehabilitation. Altogether, nearly 700 of these joints have been removed, though this does not represent the total number of cast-welded joints discovered to be defective during the work of reconstruction. When a cast-welded joint in track which is not being replaced is found mechanically good but electrically defective, the department simply bonds around it. If mechanically defective, a section of rail 6 ft. in length is cut out and replaced by a section seam welded by joint plates to the adjoining rails.

The largest proportion of cast-welded joints removed were defective because (1) the ball of the rail had broken out of the joint and the rail was pumping, (2) the rail was split vertically, generally at the casting, or (3) the bottom part of the weld was split off horizontally. Table I gives a record of cast-welded joints removed between May 15, 1922, and April 9, 1923.

Typical forms of broken joints are illustrated.

Chemical Analysis of Cast-Welded Joints

To determine any chemical and physical effects in the rail at the joint caused by the cast-welding process, a typical joint was selected, and a chemical analysis made. Test specimens were taken of the casting at five points and of the rail at two points. The results are given in Table II.

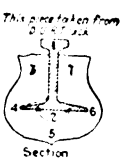
TABLE I—RECORD OF CAST-WELDED JOINTS REMOVED BETWEEN MAY 15, 1922, AND APRIL 9, 1923

Cracked underneath the ball of the rail	579
Ball of rail broken in casting	64
Casting broken	14
Rail broken through the web inside the casting	9
Rail broken at the end of the casting	7
Rail broken, beginning at the casting and ending some distance away	1
Solid joints	6
Total joints removed	680

As will be seen from the table, no great change was made in the chemical composition of the rail by the process, but the hardness of the section of the rail not inclosed by the weld is higher than at the base of the rail. It is thought this may be due to a slight softening of the base of the rail when the molten metal was poured on it with the slow cooling of the heavy mass. It may also be possible that the head of the rail became compressed and so harder than it was originally through pounding of the car wheels over it in service. The test also showed that the only place at which there was any fusion in the joint was near the bottom of the rail evidently on the side where the molten metal was poured into the mold surrounding the rail end. This is indicated in the drawing, in which the dotted line represents the original form of the rail and the solid line shows the actual edge as it existed in the weld.

TABLE II—CHEMICAL ANALYSIS AND HARDNESS RECORD OF TYPICAL CAST-WELDED JOINT REMOVED

Carbon Per Cent	Phosphorus Per Cent	Manganese Per Cent	Sulphur Per Cent	Silicon Per Cent	Brinell Hardness	No.
0.741	0.041	0.722	0.0367	0.073	292	1
0.762	0.041	0.734	0.0285	0.085	278	2
3.28	0.434	0.428	0.0364	1.70	142	3
3.58	0.446	0.476	0.0426	1.53	134	4
3.57	0.443	0.459	0.0372	1.69	134	5
3.54	0.428	0.476	0.0356	1.57	133	6
3.54	0.454	0.453	0.0426	1.65	144	7



One cause of the poor results in these cast welds is believed to be the lack of care as to the quality of the iron used in the welding cupola. The cupola was evidently used as a catch-all for all kinds of scrap iron about the property, such as broken car wheels and brakeshoes. In one case a half fused bolt was found imbedded in the weld, evidently having passed through the gate before it was fully melted.

Summary

In summary, it may be said that the tests on seam and cast-welded joints in Detroit indicate (1) that the cast-welding process, besides being more inconvenient to apply, is less reliable for rail joints than the seam-welding process; (2) that the method of joint construction with seam-welded joints used in Detroit is effective both mechanically and electrically, and (3) that further study of the metallurgy of electrically welded rail joints is desirable.

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The Line Car Is Insulated for High Voltages

Self-Propelled Line Car Useful on Interburban

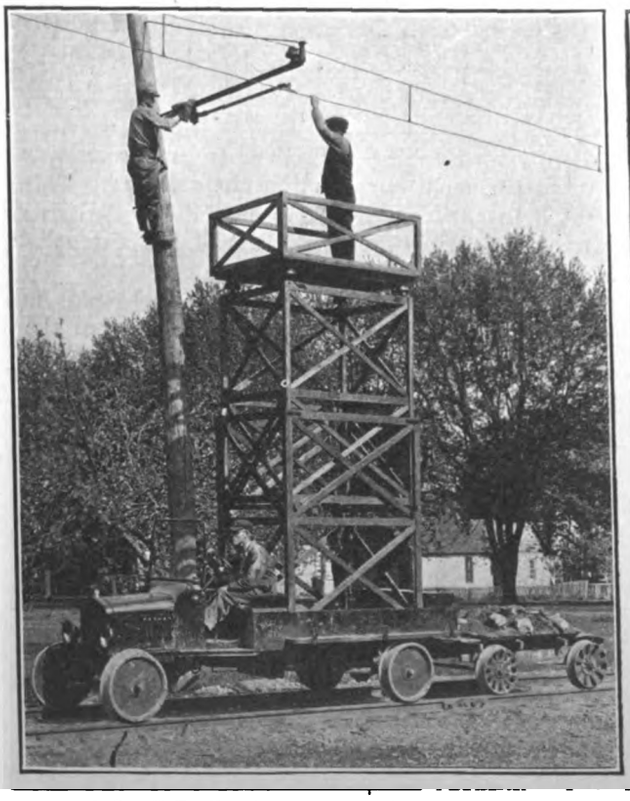
Line Car Made from Ford Truck Can Go Anywhere, Even Though Power Is Off—Useful Both for Line Work and General Construction

A VERY flexible type of line and work car has been constructed by the Windsor, Essex & Lake Shore Railway at Kingsville, Ont. This machine has been in use for several months and has been found especially advantageous for all purposes. A standard Ford truck chassis was used as a basis, the pneumatic tires and wheels being removed and wooden wheels with steel tires having an M.C.B. tread substituted. These wheels were supplied by the Kalamazoo Railway Supply Company. On the bed a collapsible tower was built of longleaf fir. This was carefully dried out and given three coats of insulating varnish. On top of the tower directly beneath the platform were mounted four 66,000-volt insulators, which give sufficient protection when the men are working on the high-voltage trolley wire. The railing on the tower can be folded flat, as shown in one of the illustrations, so that when the tower is lowered and the railing dropped, the total height above the ground is only about 12 ft. This enables it to pass under any ordinary obstruction.

By removing the four bolts that hold the car to the bed, it can be taken off and the body used for transporting material; seats also can be supplied so that the car can be used as a passenger car to carry twelve men. The engine has sufficient power to drive the car at 20 m.p.h. on the track. It is also possible to haul a small lorry or a flat car to carry a load of material.

The valuable feature of this car, especially in interurban work, is that it can run when the wires are dead. Since this is a single-track line a break in the trolley wire would in certain cases require taking off all power, so that it would be quite difficult to reach an isolated location if an electric line car were used.

In remodeling the Ford truck the steering device was not removed from the front wheel, but was merely tightened up. It is possible to take the car off the track by means of a derailing block, and run the



A Small Trailer Can Be Hauled by the Line Car

The Car Can Travel on an Ordinary Road Under Its Own Power

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machine onto a road, just as well as the ordinary construction gang can a hand car. The machine can be operated for considerable distances on its own power by laying boards for the wheels to run on. In fact, it is possible to run without the use of boards.

Where it is not possible to run the car off the track for turning it around a novel arrangement can be used. A point at the exact center of the car is marked on the chassis. A small telescoping hydraulic jack is carried in the equipment. The car can be stopped so that its center is directly over a tie, so that the car can be jacked up at the center and spun around. Even though it may not be in exact balance one or two men can take care of the excess weight and swing the car with little difficulty.

The work of constructing the car on the Ford chassis was all done in the company's plant, and the cost of the entire outfit was less than $1,000. It was designed by Albert Eastman, formerly vice-president and general manager of the system.

Specifications for Labor

The Power and Equipment Department of the Connecticut Company Has Drafted Specifications for the Work Required in Car Overhauling and Periodic Inspections—It Also Has a Simple System for Tabulating and Charting Essential Data

AS EXPLAINED in an article which appeared in the July 7 issue of this paper, the power and equipment department of the Connecticut Company has developed charts covering the functions and duties of the heads of the various departments. In addition, the department maintains graphical records of every element of the power and equipment operations and has established a series of monthly ratings for stimulating the power and equipment work among the various divisions of the company. It has also drafted a series of specifications for such equipment work as overhauling, mileage inspection and daily inspection, so that each department and each department head may know exactly what is to be done under each of these classes of work. In other words, the department has applied to labor the same principles of standardization by specification as it applies to material purchased, with a resulting more definite understanding by every one along the line of what is wanted.

All shop work is done by specifications, drafted as carefully as if they were specifications for the purchase of material. There are three general specifications for shop work, namely (1) covering general overhaul of rolling stock; (2) covering mileage inspection, based on a service of 1,000 miles for city cars and 1,500 miles for interurban cars, and (3) daily inspection. On page 98 a few extracts of the specifications for overhaul are printed to give an idea of their nature. The specifications for mileage and daily inspection follow and are published in full.

There are several points about these specifications which are not apparent in their text, but they add much to the convenience of their use. One of these is that practices in the work of overhaul which are likely to change are made the subject of supplemental instruction rather than being embodied in the main specifications which are printed and consequently semi-permanent. An example of the practice method is shown under the specification on painting which says that the work shall be carried out in accordance with letter of instruction 179, with the application of colors given in two other letters of instruction. In this way it is pos-

DAILY REPORT OF CARS REMOVED FROM SERVICE DATE ________ 19__

________ COMPANY ________ DIVISION ________ CAR HOUSE

CAR No.		BODY AND MECH.												
	Damaged	Body Defect	Register	Brok. Trol or Reg C'rd	Gong	Sand Out	Sand Clogged	S. B. Failure	Catcher or Retriever	Scrapers	Broken Glass	Signs	Fender	Miscellaneous
	1	2	3	4	5	6	7	8	9	10	11	12	13	14

CAR No.	ELEC. EQUIP. BODY														
	Trol. Wheel or Fork	Trol. Pole or Stand	Circuit Breaker	Controller	Resistance	M.U.Controll or Rev.	M.U. Miscellaneous	Headlight	Heaters or H. Switch	Misc. Switches	Lights Out	Power Wiring	P. B. Signals	Lgt-Heat-Air-Wiring	Miscellaneous
	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29

CAR No.	MOTORS									
	Hot bearings	Lead Wires	Flashing	Arm G'd or B. O.	Fields G'd	B. H. or Yoke	Pin or Gear	Gear Case	Broken Bolts	Miscellaneous
	30	31	32	33	31	35	36	37	38	39

CAR No.	TRUCKS									
	Hot Bearing	Frame Defect	Wheel Defect	Axle Defect	Shoe Defect	Shoe Head Defects	Brake Rods	Turn Buckles	Slack Adjuster	Miscellaneous
	40	41	42	43	44	45	46	47	48	49

CAR No.	BRAKES													MOTOR-MANS No.
	Brakes Poor—Hand	Brakes Poor—Air	Comp. Mech. Trouble	Comp. Air or Field	Comp. B. H.	Comp. Air Governor	Fuse Blown	Engr's Valve	Pipe—Leak or Break	Miscellaneous	No Trouble Found	Repairs or Inspection	Misc. Trouble	
	50	51	52	53	54	56	56	57	58	59	/	X	—	

CORRECT	EXAMINED	EXAMINED	APPROVED
....	....	....	....
CAR BARN FOREMAN	SUPT.	M. M.	MANAGER

Every car that is taken off a run for a reported trouble or inspection must be noted on this report by a dot in proper column and opposite car number. Dot inside of a circle indicates a removal due to operating condition and is not considered a mech. or elec. failure or defect.

These reports shall be made out daily in duplicate by the Car Barn Foreman, who will send both to the Master Mechanic or Superintendent, who will retain the copy, sending the original to the Division Manager.

This Is Half of the Form Kept by the Statistical Department to Give a Continuous Record of Causes of Pull-Ins

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THE CONNECTICUT COMPANY

ENGINEERING DEPARTMENT SPECIFICATION NO. 627-72122 SUPERSEDING SPECIFICATION NO. 627-21421 COVERING GENERAL OVERHAULING OF ROLLING STOCK

SCOPE

General.—This specification covers in general the overhauling of motor cars at the expiration of a predetermined mileage and is intended to cover so-called "Back Shop Work," consisting of general overhauling or heavy repairs.

Mileage.—All double-truck closed passenger cars shall be overhauled according to this specification at the expiration of a 100,000-mile period of service.

All single-truck closed cars, all express, stone and other revenue, motor freight and express cars shall be overhauled in line with this specification at the expiration of a 75,000-mile period of service.

All non-revenue cars, such as service cars, work cars, line cars, supply cars, snow plows, snow sweepers, etc., shall be overhauled when they require it.

Each master mechanic is expected to keep in very close touch with the physical condition of rolling equipment under his charge, and if there are any cars of any nature that are not safe to operate or, in the case of cars which are overhauled on a mileage basis and which cannot complete the mileage specified above, the car should be immediately withdrawn from service and the matter taken up with this department for permission to overhaul the car in advance of its regular schedule.

A. E. R. A. Standards.—In so far as it is practical it is the intention of the engineering department to follow the standards as adopted by the American Electric Railway Engineering Association. Each master mechanic is expected to make himself conversant with these standards and will be advised which of these standards have been adopted by the Connecticut Company in whole or in part.

CAR BODIES

General.—Car bodies shall be lifted from the trucks, thoroughly inspected, cleaned and overhauled. They shall be washed and all necessary repairs made to frame, roof, floors, platforms, steps, bumpers, etc. A careful inspection shall be made for loose fittings or parts, such as grab handles, door hinges, window catches, screws, nails, and any parts liable to cause accident, inconvenience or poor appearance shall be repaired or renewed.

Car bodies need not necessarily be painted when general overhauling is made unless they actually require it.

Painting.—When it is necessary to repaint cars (this need not necessarily be at the same time the car is overhauled) the enamel system of car painting shall be used, unless otherwise specified by the engineering department. This work shall be carried out in accordance with letter of instruction No. 179. For details as to use of different colors see letter of instruction No. 203, and for special paint and colors see letter of instruction No. 247.

Curtains, Car.—All curtains are to be washed and where required removed, repaired and renovated. On all renewals standard curtain material will be used, which is dark green double-coated Pantasote, color No. 86, except in cases where it does not match up with existing curtains. In so far as possible the practice shall be followed of equipping one car complete with new standard curtains and using the curtains removed from this car to match up with old style curtains in other cars.

All curtain fixtures shall be thoroughly gone over. Springs so adjusted that curtain will operate properly, catches lubricated and curtain placed in first-class operating condition.

Curtains, Vestibule.—All vestibule curtains shall be thoroughly cleaned and applied in accordance with letters of instruction Nos. 84 and 159. The height of the bottom of the curtains from the floor shall be approximately 36 in. The material of all curtains shall be brown denim, supported by iron rings (not over 6-in. spacing) on iron rods. All cars that are now equipped with roller curtains shall be changed to the sliding type of curtain.

Steps.—Car steps shall be thoroughly gone over and necessary repairs made. Where treads or risers are badly worn they shall be replaced. The heights shall be checked in accordance with letter of instruction No. 261, namely: Where underframe and equipment construction will permit doing so on the closed cars now in service the distance from the top of the rail to the top of the step must not be more than 15 in. From the top of the step to the vestibule floor shall not exceed 13 in., and under any circumstances these heights shall not exceed 16½ in. and 15½ in. respectively. On double-truck open cars the first, or bottom step, of the double folding steps shall not be over 16 in. above the top of the rail and the second step shall not be more than 13 in. above the first step, and not more than 13 in. below the floor of the car.

Closed cars purchased previous to 1916, when requiring new steps or treads, shall be equipped with standard car step as shown on drawing No. C-404 and covered by letter of instruction No. 148.

Heaters and Heat Regulation.—Heater switches to be inspected, tested and placed in good condition. Broken handles, burned fuse clips and connections to be renewed and covers closed properly. Heaters shall be properly fastened in place and circuits closed. Each circuit shall be tested with an ammeter to find if heaters are up to requirements and no short circuits and irregularities exist. In repairing heaters all enamel crimp rods shall be renewed with porcelain. Heaters and automatic heat regulators shall be carefully inspected and cleaned and connections tested. The heat regulator should be operated by short circuiting thermostat connections to determine if in working order and the heat regulator boxes locked in accordance with letter of instruction No. 201.

Lighting Circuits.—All lighting circuits to be thoroughly inspected and tested. Sockets of the same type shall be used throughout in individual cars. If it becomes necessary to change the headlinings in the older type of closed cars they shall be rewired in accordance with letter of instruction No. 103, drawing No. C-572. All lighting switches and fuse blocks to be thoroughly cleaned and tested and defective ones replaced. Each switch and fuse shall be marked distinctly "Light Circuit" in small letters. For standard types of snap switches, receptacles, sockets, plugs, cleats, rosettes, combination shade holders, sockets and shades see letter of instruction No. 144.

BRAKES

General.—Extreme care must be taken in inspecting and overhauling brake equipment and foundation brake rigging. The brake rigging shall be checked to see that the present braking power, i.e., the relation between brake-shoe pressure and the empty weight of the car, falls within the range of 90 and 100 per cent with 55 lb. of air pressure. This should be checked in accordance with the formula shown on drawing No. C-6.

Compressors.—Compressors shall be thoroughly cleaned and inspected. All bearings shall be tested for wear, lost or defective bolts replaced, valves removed and cleaned, vents cleaned out, back head and pistons removed, cylinders cleaned, greased, reassembled and tested for leakage. Compressor then refilled with oil while at rest and given a five-minute performance test. Compressors requiring extensive repairs shall be sent to the reclamation shop.

Governors.—Governors shall be thoroughly cleaned, wearing parts lubricated, arcing tips inspected and governor tested for proper operation.

Strainers.—Strainers to be removed and inspected. Hair-packed type to have hair removed, cleaned and repacked. Oil strainers to be washed out with kerosene and refilled. Strainers shall be installed on cars in accordance with letter of instruction No. 156.

Hand Brakes.—All hand-brake gearing, guides and bearings to be cleaned and oiled, care being taken that they are free from fouling, preventing unrestricted action. Hand brakes should work in harmony with air brakes.

Piston Travel.—Piston travel should be free and unrestricted and after the car is overhauled and with the car standing, should not exceed a maximum of 4 in. in accordance with letter of instruction No. 171.

CONTROL

General.—Controllers, main switches, line switches, switch guards, reversers, circuit interrupters, etc., shall be carefully inspected and thoroughly cleaned. Badly-worn fingers and segments to be replaced. Contacts that are badly burned to be filed smooth and adjusted or replaced by new ones. All charred insulating surfaces to be scraped and shellacked. Tighten bolted connections. All wires, cables, leads, bushings, connections, etc., shall be placed in first-class condition, well cleated with no loose connections.

Controllers.—All controllers shall be thoroughly blown out, cleaned and repainted and lubricated where necessary. All controllers shall be equipped with wooden covers. All controller fingers to be cleaned, filed and adjusted and replaced where necessary. For adjustment of fingers see letter of instruction No. 164.

Excerpts from Specifications for Overhaul

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sible for a change to be made in the methods of painting or in colors without requiring a change in the general specifications.

Another point is that the second number in the specification number gives the date on which the specification was issued, so that this date is apparent to anyone using the specifications. Thus there are two numbers at the head of the specification covering general overhaul. These numbers automatically declare that the specification on overhaul issued on July 21, 1922, superseded the specification for general overhaul issued on Feb. 14, 1921.

Comparative Record on Overhauling

The specifications declare what system and methods should be used, but if the work were not followed up they would be of little value. The same thorough method of following up work is employed, however, as in specifying in the first place what is wanted.

The company requires from the foreman of each of its nine repair shops a report of the number of cars overhauled during each week. This information is tabulated to include also the number of cars overhauled during the year to date, the cars reported due for overhauling at the time the report is filed and the percentage of cars scheduled for overhauling that have been completed up to that date. Copies of this tabulation are sent to the president, manager and chief engineer of the company and also to the master mechanic and the superintendent of each division.

All overhauled cars have to be viséd by an inspector from the main office before being put back into service. There are two of these traveling inspectors, one for the northeastern and the other for the southeastern part of the state. They report on the condition of every part of the car, by means of the "Car Inspection Report" reproduced. A copy of this report is sent to the master mechanic of the division on which the car was inspected, and a copy is kept in New Haven.

Checking Pull-Ins

On these reports the master mechanic is required to list the cause or causes for which every car is removed from service, the purpose of course being to determine if any car has a chronic ailment. In the method followed, however, the clerical work required at division shops or division headquarters in making out these reports on cause of failure has been reduced to a minimum.

CAR INSPECTION REPORT

Division _____ Date 19 Car No. Rating

CAR BODY

Cleanliness
Bell and Cord
Register and Fittings
Hand Straps and Rod
Curtains and Fixtures
Glass
Ventilators
Signs
Seats and Cushions
Floor
Doors, Car and Vest
Sand Boxes
Grab Handles
Steps and Hangers
Guard Rails
Scrapers
Draw Bars and Cage
Dashers
Gongs
Roof

TRUCKS, JOURNALS AND BRAKE RIGGING

Brake Handle
Brake Staff
Brake Dog
Brake Chains
Brake Rods
Brake Levers
Brake Pins
Brake Heads
Brake Shoes
Center Plates
Side Bearings
Wheels
Wheel Gauge
Truck Frames
Springs
Truck Yokes
Axles
Journals
Journal Bearings
Journal Boxes

MOTORS

Motor Axle Bearing
Axle Collars
Armature Bearings
Armature Dust Guard
Gear and Casing
Pinions
Motor Suspension
Motor Bolts
Motor Clearance
Armature Clearance
Motor and Field Loops
Motor Covers
Hand Hole Covers
Motor Leads
Cables
Resistance Grids
Leads and Connections
Brushers and Holders
Lightning Arrester
Choke Coils

TROLLEY AND MISCELLANEOUS ELECTRIC EQUIPMENT

Trolley Wheel
Trolley Bushing
Pin and Harp
Springs and Washers
Hook and Pole
Base and Spring
Tension
Catchers and Cord
Power Circuits
Lamps and Fixtures
Light Circuit
Headlight Circuit
Heater Circuit
Sign Lights
Buzzer Circuits
Door Circuits
Door Switches
Push Buttons
Heaters

AIR BRAKES

Compressor
Brake Cylinders
Piston Travel
Air Pipes
Air Valves
Air Fittings
Engineer's Valve
Emergency Valve
Governors
Whistles
Air Gauge
Reservoir

Remarks

Inspectors from the Main Office Pass on Each Car Overhauled and Use This Blank

Thus, the first information about a pull-in which comes from the carhouse is in the form of a report made out by the carhouse foreman and signed by the superintendent, master mechanic and manager of the division. This report is sent to the chief engineer and gives the number of the car removed and the cause. To save clerical labor, the fifty-nine most common causes for removals are listed at the top of this blank,

KEY

BODY AND MECH. EQUIPMENT

1 Damaged
2 Body Defects
3 Register
4 Brok. Trol. or Reg. Cord
5 Gong
6 Sand Out
7 Sand Clogged
8 S. B. Failure
9 Catcher or Retriever
10 Scrapers
11 Broken Glass
12 Signs
13 Fender
14 Miscellaneous

ELEC. EQUIPMENT—BODY

15 Trolley Wheel or Fork
16 Trolley Pole or Stand
17 Circuit Breaker
18 Controller
19 Resistance
20 M. U. Controller or Rev.
21 M. U. Miscellaneous
22 Headlight
23 Fixture Switch
24 Misc. Switches
25 Lights Out
26 Power Wiring
27 P. B. Signals
28 Lt., Heat, Air, Wiring
29 Misc.
30 Hot Bearings
31 Lead Wires
32 Flashing
33 Arm. Gd. or B. O
34 Fields Gd.
35 B. H. or Yoke
36 Pin. or Gear

MOTORS

37 Gear Case
38 Broken Bolts
39 Miscellaneous
40
41
42
43
44
45
46
47 No Trouble Found

NOTE.—Circle, O, around figure Indicates that Removal was Due to Unavoidable Operating Condition and is not Considered a failure or Defect.

Day of Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Removals Per Car	Mileage
WEATHER																																	
Car No.																																	
865	3							30		30	30				30								30			30							
732																																	

Clerical Work Is Saved on This "Individual Record of Cars Removed from Service" by Using a Code Number for the Kind of Defect

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as shown, and all that the carhouse foreman has to do is to check the space indicating the ailment and indicate whether the removal was due to operating conditions or to a mechanical or electrical failure.

After this report is received and noted in the office of the chief engineer, it is sent to the statistical department, which is a part of the auditing department.

From these reports the statistical department tabulates by car numbers on a sheet 20 in. wide by 12 in. high a monthly "individual record of cars removed from service." The upper part of this form is reproduced. As will be seen, it shows at a glance whether the defect for which the car was removed is a chronic one, as would be the case in the example given if, during four days in eight, the car had to be removed for "30," which stands for hot bearings. A copy of this report is laid daily on the desk of the supervisor of repairs, and one is sent to the local master mechanic.

From this report a monthly summary for each carhouse is prepared, totaling the number of defects which have occurred among the fifty-nine varieties of possible causes. This report obviously makes clear whether any undue number of defects of any one kind develop in any carhouse. This report also gives the percentage which the total cars removed from service bears to the total number of cars operated from that carhouse.

Finally, the statistical department prepares a compilation of the relative standing of the carhouses of all the properties on the basis of total defects per 1,000 car-miles. In this table, which is printed in red and blue, a red figure (reproduced in the table in italics) indicates a decrease in defects and a betterment in the relative standing, while a blue figure, reproduced in Roman) shows the opposite. This table is also compiled on the basis of car-miles per defect, as this figure has the advantage of being larger. It is perhaps

STATEMENT SHOWING RELATIVE STANDING IN CARHOUSES OF ALL PROPERTIES, ON THE BASIS OF TOTAL DEFECTS PER THOUSAND CAR-MILES

Relative Standing for 1922							Total Defects per 1,000 Car-Miles		
Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Carhouses	1923	1922	1921
7	4	4	3	1	1	New Britain	0.084	0.067	0.159
10	11	14	8	7	2	Middletown	0.130	0.081	0.114
21	7	7	11	12	3	Derby	0.180	0.585	0.568
12	18	18	18	11	4	Wethersfield	0.195	0.111	0.283
3	12	9	6	2	5	Norwalk	0.207	0.213	0.520
1	1	1	1	16	6	Willimantic	0.210	0.000	2.750
8	9	11	7	6	7	Manchester	0.215	0.169	0.217
2	3	6	9	8	8	State Street	0.219	0.206	0.257
5	10	3	2	4	9	West Haven	0.225	0.171	0.188
14	16	19	19	9	10	Meriden	0.231	0.214	0.507
16	8	13	10	10	11	Vernon St.	0.260	0.198	0.222
11	15	12	15	13	12	James St.	0.262	0.088	0.191
5	14	8	5	5	13	Milldale	0.295	0.151	0.555
22	21	10	21	15	14	Dayville	0.314	0.266	0.181
19	20	17	13	14	15	Grand Ave.	0.319	0.300	0.255
5	5	2	17	17	16	Stamford	0.328	0.142	0.482
18	19	20	20	19	17	Torrington	0.417	0.750	0.437
19	5	23	22	18	18	Congress St.	0.515	0.410	0.730
7	6	15	4	3	19	Montauk Ave.	0.548	0.136	0.057
20	22	21	16	21	20	East St.	0.657	0.440	0.347
23	23	24	23	23	21	Waterbury	0.734	0.277	0.414
4	13	5	12	20	22	Greenville	0.789	0.059	0.204
24	24	22	24	24	23	No. Bennington	1.335	0.545	0.190
13	17	16	14	22	24	Zylonite	1.445	0.723	1.111

Italic figures indicate decrease in defects and betterments in standing.

THE CONNECTICUT COMPANY

Engineering Department

SPECIFICATION No. 629-21621.
COVERING
MILEAGE INSPECTION

This specification is intended to cover a systematic inspection of railway equipment after it has made a definite number of miles, and outline a definite program of inspection to meet the average conditions on the different divisions.

With this in view the following systematic inspection of railway equipment should be followed as far as practical:

Service—Interurban..Every1,500 miles.
Service—City.....Every 1,000 miles.

1. Run the cars into the inspection shed and carefully examine their mechanical details, such as trucks, brakes, air piping, etc.

2. Inspect the electrical equipment, wiring, etc., and check for grounds and faulty operation.

3. Motors, controllers, switch groups and all auxiliary apparatus should be cleaned thoroughly by means of dry compressed air.

4. Necessary repairs to the car body and the details of the car should be made.

5. All wearing parts of the equipment such as bearings, commutators, brush-holders, carbons, trolley wheels, control contact tips, and drum rings should be overhauled and put in smooth running condition.

6. Gears, pinions, wheels, axles, trucks and brake details should be inspected and all worn or broken parts repaired or renewed.

7. Examine the arc chutes, electrical insulation and the car wiring, to see that they are in safe operating condition.

8. All covers on electrical apparatus and on motor bearings and journal boxes should be made to fit tightly, so as to keep out dust, snow and water.

9. Tighten all bolts on motors, gear cases, trucks, etc., and make all necessary repairs so that the cars will leave the inspection shed in such condition that they will require no further attention (other than that which is provided for by Specification No. 628-21621, daily inspection) until the next mileage inspection period.

10. Cars should be oiled on this inspection where possible and if it coincides with the general lubricating schedule. If, however, the general lubricating schedule does not coincide with the date on which the inspection under this specification is made the lubrication of the car should be very thoroughly gone over and if there is any doubt as to its ability to operate until the regular schedule date for lubrication the car should be oiled when this inspection is made.

11. Cars with bumpers, trolley poles, and other black iron work in rusty or dingy condition to have such iron work thoroughly scrubbed and cleaned and a coat of quick-drying black paint to be applied.

12. All mileage inspection shall be made in connection with Form E-215, "Car Inspection Report," which shall be signed by parties making inspection, approved by the foreman in charge, and then permanently filed in the office of the Master Mechanic.

[*Signed*] H. W. BEEBE,
Supervisor of Equipment.

Approved:
[*Signed*] P. W. RIPPLE,
Chief Engr. Power and Equipment.

THE CONNECTICUT COMPANY

Engineering Department

SPECIFICATION No. 628-21621.
COVERING
DAILY OR CASUAL INSPECTION OF ROLLING EQUIPMENT

This specification is intended to cover daily or nightly inspection which should be given all equipment which is in service where possible and should consist of inspection of brake rigging, shoes and minor defects of cars and equipment reported by crews, such as broken glass, faulty door, bad trolley wheels, hot bearings, defective wiring, loose electrical contacts, faulty control operation, and on such of the older type motors as require it, oiling, etc.

This specification should also provide for the cars being swept out, dusted, and that their appearance and cleanliness are satisfactory for service.

Every car in service is to have this casual inspection made every day if possible, simply to determine if the car is in safe condition, clean, and satisfactory for operation. The general and thorough inspection should be made on a mileage basis, as covered by Specification No. 629-21621, dated Feb. 16, 1921, or such other specifications as may supersede them in the future.

[*Signed*] H. W. BEEBE,
Supervisor of Equipment.

Approved:
[*Signed*] P. W. RIPPLE,
Chief Engr. Power and Equipment.

Specifications for Mileage and for Daily Inspection

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also in more common use than its reciprocal, or a multiple of its reciprocal.

Other Records Are Kept

A great many of the records of the mechanical department are kept in the form of charts. Among them the following have proved especially convenient:

Cost of maintenance in dollars per 1,000 car-miles for each division.
Number of pull-ins per 1,000 car-miles for each division.
Number of defects per 1,000 car-miles for each division.
Number of hot hearings per month for each division.
Cost of lubrication for each division and each carhouse.
Cost of overhead maintenance (covering accounts Nos. 17, 18, 20 and 22) per month in dollars per mile of track operated.
Number of signal boxes installed and number of interruptions per signal box per month.
Kilowatt-hours output total and per car-mile, monthly, for each division.
Number of track switch interruptions per month and total number of track switches on the system.
Number of trolley wire breaks per month, per mile of single track.

The company also keeps in tabular form, among other data:

Number of armatures rewound per month, showing type of motor, number of miles made between rewindings, etc.
Average weekly wage of the shop men.
Number of shop and carhouse men per car operated, regular, extra, total.
Number of pole renewals per week for each of the different overhead divisions, together with the number of poles behind and the number of poles ahead of the renewal schedule, and the percentage that the division is up to date on its pole renewal schedule.

Veneer Construction Has Advantages

BESIDES permitting the use of cheaper material in the core or on unseen surfaces, veneer construction has several other advantages over solid wood. According to the Forest Products Laboratory, Madison, Wis., these should be borne in mind by the purchaser who thinks that veneering cheapens the product. A panel of this construction has the advantages that it is more nearly of the same strength in all directions and that as it absorbs or gives up moisture it shrinks and swells about as much one way as another. Splitting along the grain in one set of plies is made impossible by the cross grain of the alternate plies, and rapid shrinking across the grain in the face veneers is offset by slow shrinkage along the grain in the core.

Veneered panels do not change dimensions as much as solid wood. Warping is largely eliminated in thick panels by plywood construction. More care can be taken in the selection of surface wood in veneered products than can be taken in solid products. The manufacturer can dry veneer stock very quickly and cheaply, and he can utilize all of his wood to the best advantage.

Glued joints when correctly made are as strong as the wood under ordinary service conditions. Many failures in glued-up wood are caused by "starved" joints, or joints in which the film of glue between the wood surfaces is not continuous. Such joints are not necessarily the result of a lack of glue spread on the wood. Heavy spreads are as likely to produce them under ordinary commercial conditions as light spreads. They are caused rather by the application of pressure to the joint while the glue is too fluid. Starved joints are more likely to occur with glues of low viscosity, such as warm animal glue and most blood albumin glues, than with casein, vegetable and other thick glues.

Some woods are more susceptible to the production of starved joints than others. Birch, maple, red oak, and ash, which have open pores, absorb glue from the spread in such considerable amounts that they often leave the joints starved. Basswood and yellow poplar also take up a great deal of glue, but weak joints are not very noticeable in these woods because the woods themselves are weak. Other woods with smaller cells open to the gluing surface do not seem to be so subject to starved joints.

To avoid starved joints it is necessary to mix a glue solution thick or allow it to thicken on the wood from drying or chilling before pressure is applied. When it is necessary to glue under conditions which might produce starved joints, the use of light pressure is advantageous.

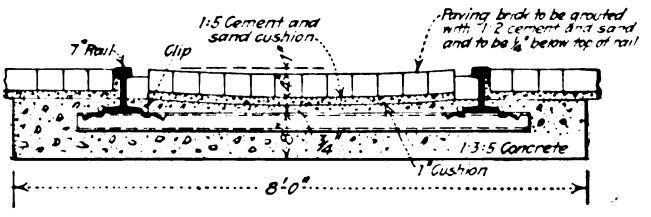
Results with Steel Tie Construction

City and Interurban Railway Produces Pictures and Figures to Show Condition of Track After Twelve Years of Service

By Louis A. Mitchell
Engineer Maintenance of Way, Union Traction Company

DURING the years that steel ties have been in use many articles have been written describing and illustrating the different construction methods and the difficulties encountered in building this type of track. But comparatively little information has been published to show how this type of track construction is standing up. Steel ties have now been in service long enough to make possible an appraisal of their work as part of the track foundation.

The Union Traction Company of Indiana purchased the second order of steel ties manufactured by the International Steel Tie Company in 1911. This type



Standard Track Construction of the Union Traction Company of Indiana

of tie has been used in reconstruction work ever since. The results obtained on our lines after these years of service leave little doubt as to the merits of steel tie construction.

The accompanying illustrations show examples of this type of construction in Anderson, Muncie, Indianapolis and Newcastle. The joints shown on Meridian Street and on Main Street, Anderson, were built in 1911, and are the oldest tracks that we have with steel ties. Both have been subjected to unusually heavy wear, as is shown by the number of wheel passes in the accompanying table.

An accurate record has been kept of the number and type of cars passing each of the points under consideration. From this it has been possible to calculate the number of wheel passes and the tonnage to which each joint has been subjected.

The other illustrations show joints built at various

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times between 1911 and the present date. Other track with steel ties has been built by the Union Traction Company during this period, but that shown is typical. Some has been built each year and the examples pictured are of various ages. None of the track shown, nor any of this type of construction on our property, has cost anything for maintenance since it was installed. These illustrations show what steel tie track will do, and that this type of construction requires a minimum of maintenance.

Users of the International steel tie are probably agreed that it gives the best results when placed in concrete. The track foundation then becomes a reinforced concrete beam in which the wheel loads are transmitted through the rail and the tie. There must be entire and perfect contact between the concrete and the steel reinforcing if the desired results are to be obtained. Where this principle has been closely adhered to there have been no joint failures attributable to the type of construction.

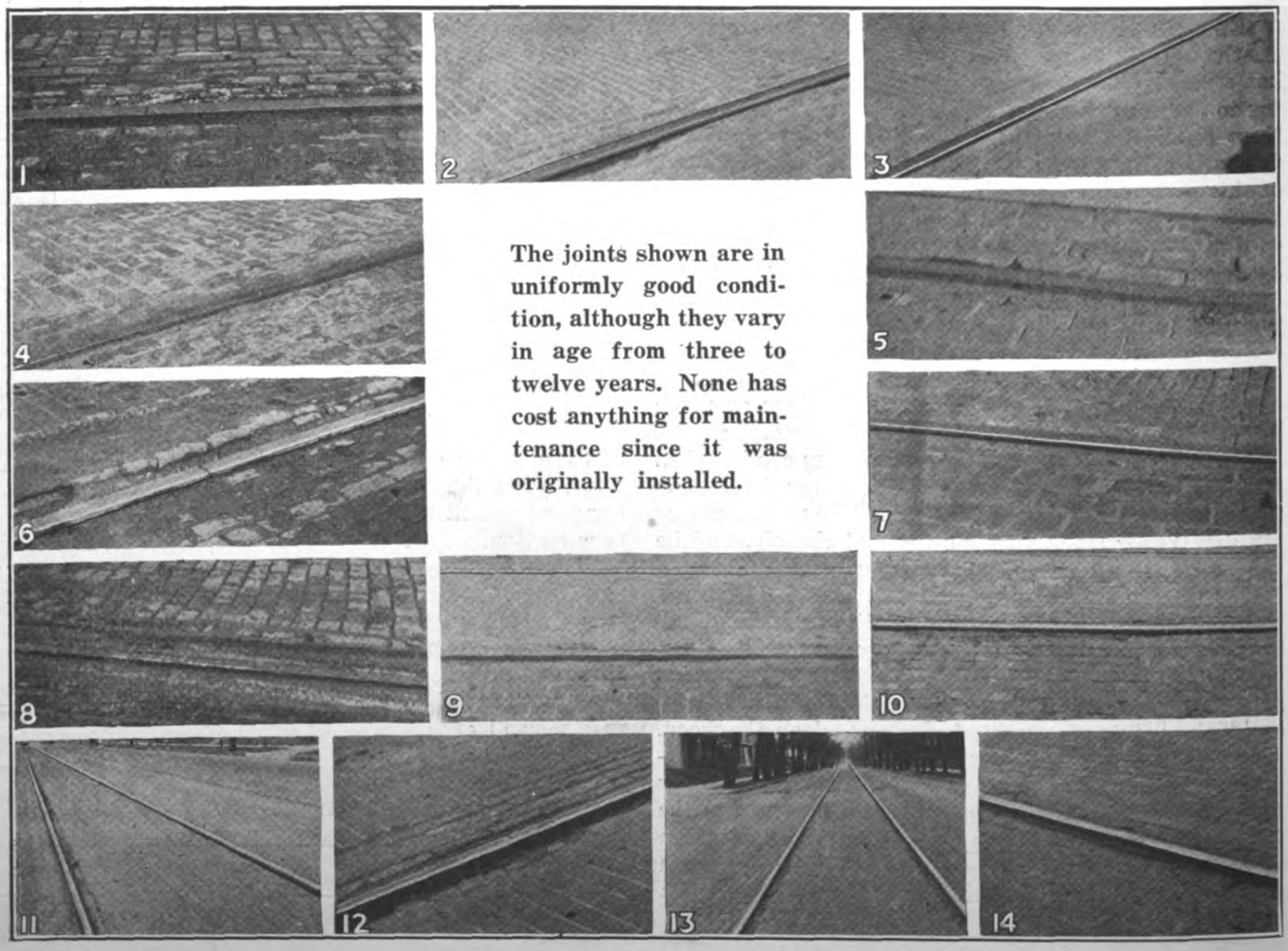
The standard all-steel track construction of this company is with 7-in. 91-lb. girder rail. A foundation of 8 in. of concrete is placed below the tie. Each joint has a steel tie under it, and plain joint bars bolted with six 1⅛-in. machine bolts, driving fit. Each pair of twin ties is placed 3 ft. from the adjacent pair, thus giving an even spacing of ties throughout.

An unusual feature of the construction is that the paving between the rails is slightly concave, insuring the collection of moisture in the hollow in the center of the track. The hollow is drained at intervals by connection to an underground pipe. This construction is useful in keeping water from entering between the rail and paving.

DATA OF CAR AND WHEEL PASSES PER JOINT

Illustration Number	Location	Year Built	No. Cars Passed: Interurban	No. Cars Passed: City	No. Wheels Passed per Joint	Total Weights in Tons: Average per Wheel	Total Weights in Tons: Per Joint
1	Meridian St., Anderson	1911	268,800	957,840	2,990,880	4.5	13,458,960
2	Main St., Anderson						
3	So. Meridian St., Anderson	1916	.....	434,350	868,700	4.25	3,691,975
4	Third St., Anderson	1917	.....	153,300	306,600	4.25	1,303,050
5	East Lynn St., Anderson	1918	.....	306,600	613,200	4.25	2,606,100
6	Howard St., Muncie	1911	144,540	621,960	1,822,080	4.5	8,199,360
7	So. Walnut St., Muncie	1912	104,390	546,040	1,509,640	4.5	6,793,380
8	So. Walnut St., Muncie	1913	94,900	.....	359,600	5.0	1,798,000
9	College Ave., Indianapolis	1912	251,910	134,320	1,544,920	4.2	6,488,664
10 & 11	College Ave., Indianapolis	1917	130,152	134,320	1,057,888	3.8	4,019,974
12 & 13	Twelfth St., Newcastle	1913	109,500	.....	438,000	5.0	2,190,000
14	College Ave., Indianapolis	1920	.....	.....	.....	....	.....

The material used for ballast and paving in the standard construction of this company, per linear foot of track, has been calculated as follows: 35.52 paving bricks; for the cement grout, 0.0105 cu.yd. of sand and 0.0355 bbl. of cement; for the sand cushions, 0.032 bbl. of cement and 0.0236 cu.yd. of sand; for the concrete ballast, 0.2536 bbl. of cement, 0.1155 cu.yd. of sand, and 0.1915 cu.yd. of gravel.



The joints shown are in uniformly good condition, although they vary in age from three to twelve years. None has cost anything for maintenance since it was originally installed.

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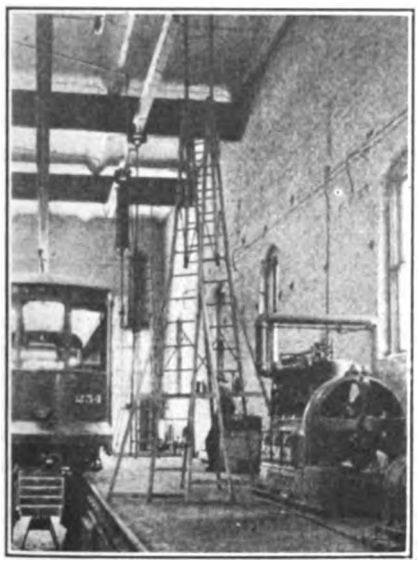
Equipment Maintenance Notes

A Safe High Ladder for the Shop

IN THE overhauling shop of the Chattanooga Railway & Light Company, Chattanooga, Tenn., an ingenious substitute for the ordinary extension ladder is used in connection with operations such as the oiling of hoist trolleys, etc., which require high climbing.

This is a collapsible structure made of two 16-ft. ladders 18 in. wide and one 10-ft. ladder 14 in. wide, put together as shown in the accompanying illustration.



Where Overhead Work Is to Be Done in the Shop a Ladder Like This Should Prove Useful

This picture, taken in the shop of the Chattanooga Railway & Light Company, shows in the foreground the motor-compressor which supplies air for shop uses.

The two large ladders are held together at the top by means of a strap hinge on each side, the ends being spaced sufficiently wide apart to permit the smaller ladder to slide between them. The width of the base of each large ladder is increased by means of a braced strut attached firmly on each side, widening the base to about 6 ft. A pair of steel folding braces attached to the sides of the ladders about one-third of the way up from the bottom permit the two ladders to be stretched apart about 8 ft. to form a stable footing.

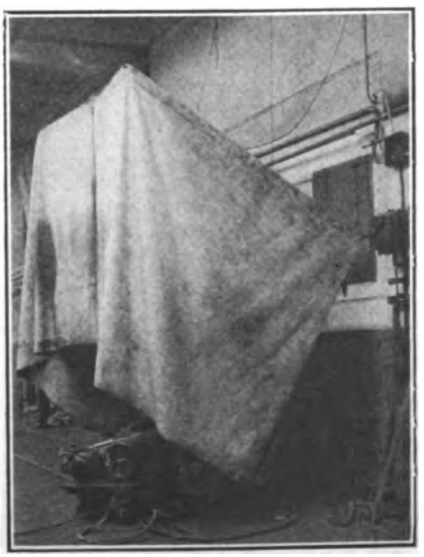
The smaller ladder hangs between the upper ends of the big ones on steel straps hooked under the bottom round of the small ladder and over a pair of rounds of the large ladders, depending upon the height of extension desired.

This self-supporting extension ladder is amply substantial, although light, and workmen use it with entire confidence from the standpoint of safety.

A Folding Welding Room

WELDING rooms should be so located that work can be handled conveniently and without the necessity for transporting the equipment to be welded over long distances. Sometimes little space is available in the most desirable location, but this difficulty has been overcome at the Fairview shops of the Lehigh Valley Transit Company, Allentown, Pa., by the plan shown in the accompanying illustration.

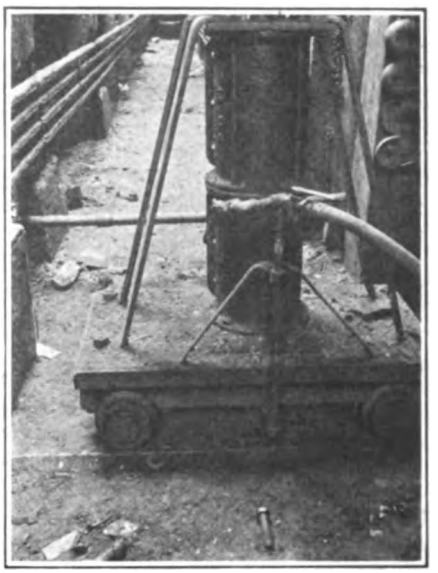
The space used for welding is surrounded by a canvas curtain mounted on a ½-in. pipe framework. This framework is hinged at the wall, and a rope attached to the center of the front side and passing over a pulley on the wall permits the raising and lowering of the framework with the canvas. By this method space occupied by a track is used for welding work, and whenever it is necessary to operate cars over the track the curtain is folded back to give clearance. Two rooms of this nature are provided at the Fairview shops, one for acetylene welding and the other for electric welding.



Folding Curtain for Screening Welding Operations

Pit Jack Made from Air Brake Cylinders

THE increasing use which is being made of air in the performing of mechanical operations around electric railway shops is indicated by the larger number of manufactured and locally built devices everywhere in evidence. A pit jack which was put together in the overhauling shop of the Terre Haute Traction & Light Company, Terre Haute, Ind., illustrates this tendency.



This Pit Jack and Transfer Truck Are Used in Connection with Compressor Maintenance in Terre Haute

It consists of two air-brake cylinders, mounted one above the other to give the desired lifting range. The lower one is bolted to the platform of a small truck. The upper cylinder is clamped down on the lower by means of long bolts which pass through a plate on top of the upper cylinder and down below the upper flange of the lower cylinder. The plate serves as a closed end for the upper cylinder and also as a bearing for the plunger or piston rod. On the top of the rod is a

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small table (not visible in the picture) on which compressors are lowered from a car body and transported to the overhauling bench.

The air cylinders are held firmly in place by means of four flat steel braces which are bolted to the truck floor as shown. The air pipe leading to the bottom of the lower cylinder is supported by a brace also fastened to the truck floor.

The truck rolls on a cross track, the car from which a compressor is to be removed or on which one is to be placed being "spotted" at the proper point over the jack.

An Almost Frictionless Air Hoist Rigging

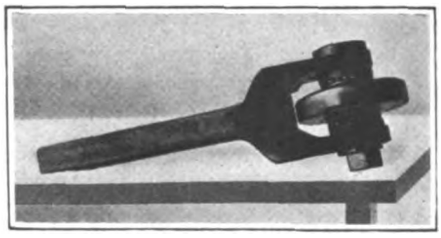
A SUCCESSFUL plan for supporting air hoists in such a manner that they can be moved freely in any direction is one in use in the overhauling shop of the Columbus Railway, Power & Light Company, Columbus, Ohio. It involves the use of two circular trolley tracks of I-section, mounted side by side under the roof trusses, the two together practically covering the shop width.

Two radius bars, also of I-section, travel around each circle, one end of each bar being carried on the circular track by means of a trolley, the other end being pivoted at the center of the circle. An air hoist is suspended from each radius bar on a trolley similar to the one previously mentioned.

At first a roller trolley of the type common in the electric railway shops was used on this hoist mounting, but was found to work stiffly on the circular track. The Chisholm-Moore roller bearing trolley shown in the illustration was recently substituted for it, and has proved well adapted to running on the curved track. The mounting is now practically frictionless.

Lathe Tool for Rolling Journals

LIKE many other electric railways, the Indianapolis Street Railway has found the rolling of axle and other journals to be a satisfactory procedure in the shops. The design



Any Good Toolmaker Can Reproduce This Convenient Device for Rolling Axle and Other Journals

of the rolling tool differs with the ideas of the master mechanics on different properties, but all will agree that the one illustrated above is a good design. At least it has been found so in Indianapolis.

The roller in this lathe tool is about 3 in. in diameter, and ½ in. wide across the face. It is made of tool steel, hardened and highly polished. The rolling surface is rounded at the edges, one side being given a sharper curvature than the other, so as to provide a variety of curvatures. On each end of the roller hub a circular raceway is turned as part of a ball bearing.

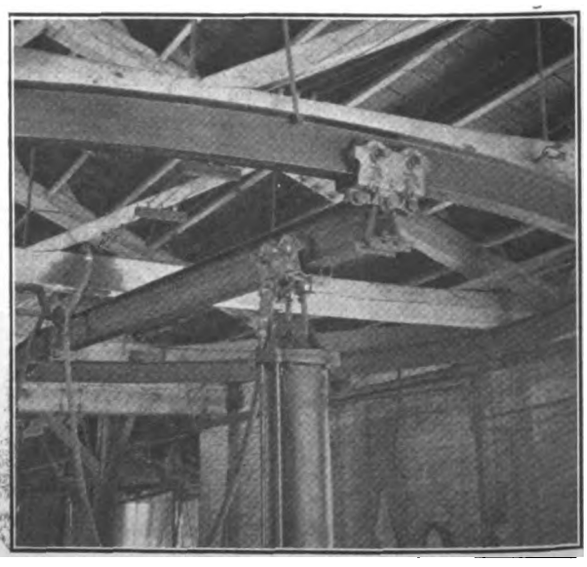
The roller is mounted in a steel holder of which one end is a shank to fit into the lathe toolpost and the other is forked to straddle the roller. A steel arbor passes through the tines of the fork and carries a pair of stationary ball-raceways. The balls which run in the raceways are about ⅛ in. in diameter.

The characteristics of this tool which commend it are its simplicity, the frictionless mounting of the roller and the ease of adjustment of the bearings. As to the rolling of journals as an everyday proposition, J. F. Elward, master mechanic of the Indianapolis Street Railway, is enthusiastic for it, claiming that it produces an excellent wearing surface on the journals. In his shop tool marks are not removed by means of emery cloth, but the rollers rolling on a well-oiled journal surface easily eliminate them.

"Gas Turning" Successful at Terre Haute

THE Terre Haute Traction & Light Company, Terre Haute, Ind., is getting very satisfactory mileage out of steel wheels. In interurban passenger service 34-in. wheels with rims 2½ in. thick and 3-in. treads are giving well over 350,000 miles on the average. Some 36-in. wheels have made more than 400,000 miles. The wheels used are of the three-wear type, but they are not lathe-turned. Instead a "thick flange" is cut down by means of an acetylene torch, while a thin flange is built up with the electric welder.

The operation of cutting down a thick flange with the torch might properly be termed "gas turning," because when the torch is held in



An Air Hoist Hung in This Way Can Be Moved Freely in Any Direction
At left—General view of hoist mounting. At right—Close-up view of trolleys.

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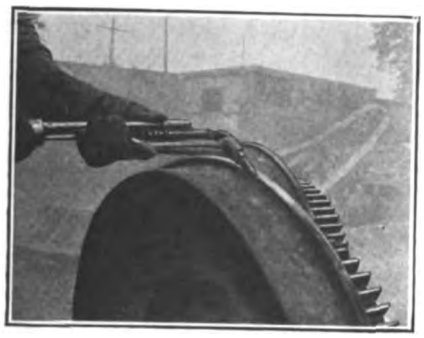


Rectifying Wheel Contour with the Aid of the Acetylene Torch

The torch is held like a lathe tool and the wheel is revolved slowly. Removal from the truck is not necessary.

the position shown in the accompanying illustration and the wheel is turned slowly the excess metal is taken off cleanly. In fact, the torch acts just like a cutting tool and it is remarkable what a smoot surface is left after the operation. The thin flanges are built up with "rail-ox" steel, which gives a fiine, hard flange surface.

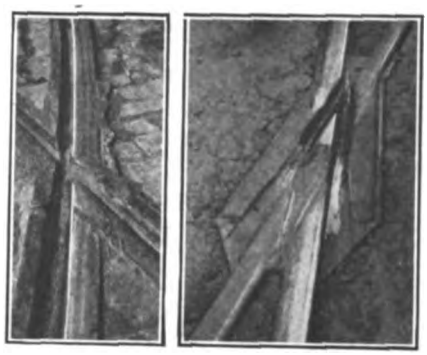
This is no experiment at Terre Haute, as it has been in use for many months and most of the steel wheels in interurban service as well as the smaller steel wheels used on the safety cars in the city have been treated by this process. The reason for the securing of such large mileage is that the metal ordinarily turned off to give a desired flange contour here is utilized in wheel service.

In general the action of the brakeshoes is sufficient to smooth out the contour of both cut-down and built-up flanges, but occasionally emery brakeshoes are used to facilitate this.

The cost of the gas torch operation and the building up of the flanges is between three and four dollars per wheel, including labor and materials and the removal of the truck and replacement under the car. The work is done on two wheels simultaneously without removal of the wheels from the trucks.

Cast Steel Used in Making Special Trackwork

THE accompanying illustrations show some frogs made in the shops of the Lehigh Valley Transit Company, Allentown, Pa., by use of cast steel from its electric furnace. In the construction of the frogs standard rail sections are used. These are cut to shape with the acetylene torch. The edges are then welded at spots, to hold them in position, and a steel plate is placed underneath. When thus assembled, the frogs are placed on a layer of sand on the foundry floor and a mold box is built around the various sections. Molten steel from the electric furnace is next poured in to make the section desired, and finally the grooves are ground out.



Good Service from Cast-Steel Frogs

The frog at the left, which is held together with cast steel, has been in service two and one-quarter years.

At the right is shown a cast-steel frog at Central Park, Allentown, Pa., in service one and one-half years.

One of the frogs illustrated has been in service two and one-quarter years at a point of heavy traffic at the corner of Seventeenth and Turner Streets, in Allentown. The frog in the second illustration has been in service about a year and a half. Sixteen frogs of this design are now in service in Allentown. The company finds that this method of building up frogs eliminates all loose centers, which are a frequent source of trouble.

Finding a Solution for the Pull-In Problem

General Manager, Dissatisfied with Record Made By Local Company, Puts Matter Squarely Up to Department Heads—Calls for Quick Results

WM. REDFIELD, general manager of the Jinxville Electric Railway, is of a cheerful disposition, but his face wore a forbidding frown last Monday morning as he studied the record of car pull-ins for the preceding week. "The place for a car is on the street, giving service," he muttered, "not in the barn, laid up for repairs. We've got to do something about this." Then calling Riter, his clerk, he said sharply, "Charlie, ask Gainway, the superintendent; Jones, the machine shop foreman, and Fairweather, the roadmaster, to come here for a short conference."

"What's wrong, chief," said Bill Jones, the first arrival as he caught the frown on Redfield's face. "Nobody sick at home, I hope."

"No, they're all well enough; but it's this pull-in record that bothers me. A pull-in last week for every 2,000 car-miles. No wonder the barn is full and we have trouble in maintaining our schedules."

"A lot of them don't mean anything, Chief; our motormen often pull in a car just because they don't like it. The inspector reports it 'O.K.' and it goes right out again. Here's Gainway, he can tell you about it."

"Talkin' about pull-ins? Well, there are too many of them, but they are mostly for trifles," replied Gainway. "A worn motor brush, loose controller finger or tight brakes. If you fellows in the shop did your work right they wouldn't happen."

All of the men whom he called having arrived, Mr. Redfield put up to them what they could do to improve the pull-in record. "Do you know," he said, "I heard the other day about a road that makes over 20,000 miles per pull-in, ten times as good a record as ours?"

"That's some record, Mr. Redfield," said Gainway, "it looks queer to me. Maybe they can do it; maybe they can't. And a big mileage per pull-in doesn't mean a correspondingly low maintenance cost, either. Of course, I'm not arguing that a good pull-in record isn't a good thing. It is, all right, but that's not the whole story."

"I agree with you, Bill," said the G. M., "but all the same I think we can do better."

"That reminds me, Mr. Redfield," said Jones, "that I heard of a car barn where they allow each inspector a bogie of a certain number of pull-ins per month for the part of the equipment he looks after. They post the record every month. The same road, I understand, sends out a repairman to fix little troubles on the road. Not a bad idea, I'll say."

"What you fellows say shows the need for all the departments to pull together instead of passing the buck all the time," said Redfield. "It's purely a co-operative proposition.

"Get your heads together, fellows, and see if you can't get control of this pull-in business. When I took charge here late last year you promised to help me get this property into a condition such that we could show a little profit for 1923. Here's one way you can help. Meet me here at the same time next Monday and show me some results. Do you get me?"

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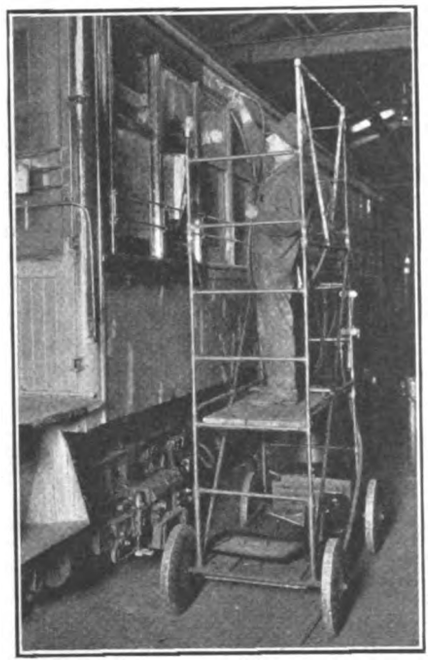
Movable Platform for Spray Painting

THE accompanying illustration shows a pipe-work platform mounted on wheels, which is used for spray painting at the Thirty-ninth Street shops of the New York Rapid Transit Corporation. This platform is built of ⅜-in. and ½-in. pipe and has a ladder construction at each end. Planking is arranged to fit in and can be supported at the various rungs of the end ladders. With the exception of two pipes forming an X and a cross-support, the front side is open so as not to interfere with the work of the painter. The entire scaffolding is mounted on four sheet-iron wheels. These are welded and give a very light construction. The tank for paint spraying and the necessary valves are mounted at the end of the pipe framework.



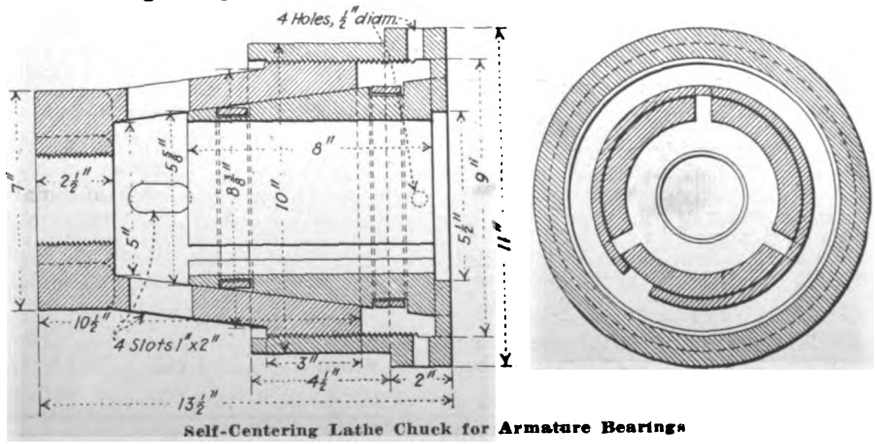
Convenient Pipe Scaffolding Mounted on Wheels for Spray Painting

In working the painter starts at one end of the car and pushes the scaffolding along as he progresses. It is thus unnecessary for him to get off the scaffolding until he has completed the strip of the side of the car that he is working on. At the shops of this New York company, the general practice is to paint the sides from the roof down to below the windows from one position of the scaffolding. The part of the car body below the windows is painted from the shop floor, and the roofs are painted by placing the boards on which the painter stands on a higher support of the pipe framework.

Handy Armature Bearing Chuck

A SELF-CENTERING chuck that is a time and labor saver is used in the shops of the International Railway, Buffalo, N. Y., for holding armature bearings while they are being machined. This chuck consists of a taper housing with collapsing split sleeve. The International Railway uses five sizes of these sleeves to accommodate the different sized bearings. These have inside dimensions varying by ½ in. from 3 in. to 5 in. The sleeve is split into three parts and is held together by two ¼-in. x 1-in. steel rings. By screwing the front portion of the chuck the split sleeve is forced inward against the taper of the housing and thus clamps the bearing and at the same time centers it.

The chuck is threaded at the back end, so as to screw on to the headstock of the lathe. Four slots 1 in. x 2 in. in size are provided for tightening the chucks, and these slots also serve as an outlet for the babbitt chips when the bearing is being machined. The tool post is fitted with three tools, one for turning large bearings, one for small bearings and a third for facing the ends of bearings.

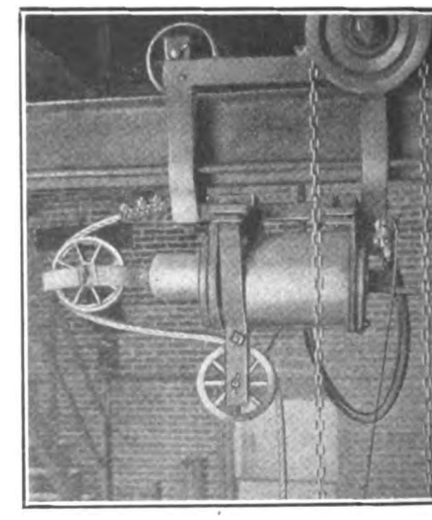


Self-Centering Lathe Chuck for Armature Bearings

Air Hoist Made from Air Brake Cylinder

AMONG the many types of hoists which are found in electric railway shops, one of the most interesting is a home-made affair built and used successfully in the machine shop of the Newport News & Hampton Railway, Gas & Electric Company, at Hampton, Va.

An air-brake cylinder is hung from a trolley which runs on the base of an inverted rail suspended possibly 15 ft. from the floor. The plunger carries a grooved sheave mounted in a bearing made of strap iron. Below the cylinder is a second sheave mounted on a strap-iron support as shown in the accompanying illustration.



This Simple Air Hoist Is Made Largely of Waste Material

A steel cable is attached to the trolley and passes around the two sheaves in such a way as to permit it to hang below the middle of the trolley. The method of connecting the cable over the two sheaves gives it a lifting range of twice the travel of the plunger.

The trolley is made of 3-in. strap iron, carrying 6-in. rollers. The frame is fabricated so as to permit the cylinder to be mounted under it as under a car. The air hose which feeds the cylinder drops from above in a long loop so as to permit considerable travel of the hoist along the rail. Movement along the rail is controlled from the floor by a chain passing over a sheave mounted on the end of one of the roller axles.

While the range of this device is not large, it serves its purpose as it is used principally for hoisting parts from the floor to a truck. It will raise a half ton a couple of feet without difficulty.

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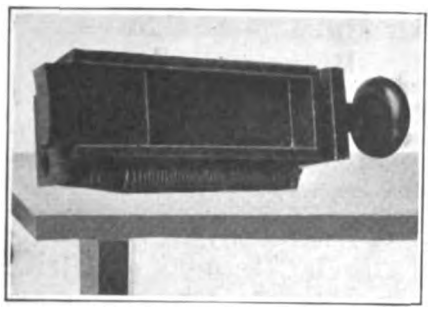
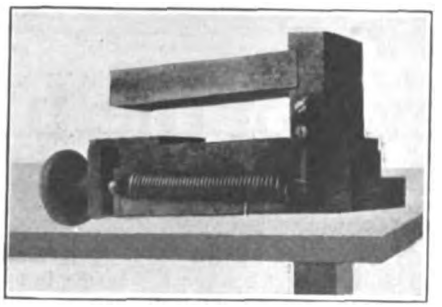




Lathe Tool Used for Grinding Commutators in Indianapolis Street Railway Machine Shop
At Left—Tool in position as used in lathe. At Right—Tool laid on its side to show details of spring connection and shank for mounting in lathe-carriage tool-post.

Grinding Tool for Lathe Insures Good Commutator Finish

IN GRINDING commutators one problem is to insure a uniform pressure of the grinding stone against the commutator surface. This problem has been solved in the shops of the Indianapolis Street Railway by the construction of a lathe tool in which the carborundum block is pressed against the commutator by a spring, in the fashion shown in the accompanying illustration.

The tool consists of two principal parts: One that may be termed the body, to which is attached a shank to fit in the tool post of the lathe, and the other the grinding block holder, a shell in which the grinding block is held by friction, being driven into place.

The block holder slides on the body, being held in proper relation thereto by means of a dovetail mortise and tenon. This arrangement, with the rubbing surfaces properly lubricated, permits the block holder to slide backward and forward, the block holder being pulled outward or toward the commutator by means of a steel spring. A circular handle permits the block to be pulled away from the commutator without disturbing the position of the tool carriage.

Commutators are polished with this tool after they have been undercut.

New Equipment Available

Electric Glue Pot for Railway Shop

THE maintenance of railway equipment includes a number of operations which require heated glue. Realizing that there are many cases where the heating of glue pots by gas or fire may present an extreme fire hazard, the Westinghouse Electric & Manufacturing Company has developed a line of electric glue pots. These may be used for heating materials with low melting point, such as paraffin and beeswax, as well as glue.

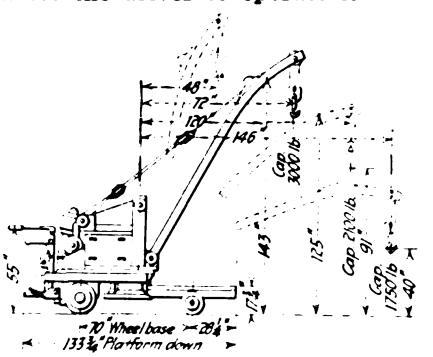
Some of the advantages claimed for the electrically heated pots are that the expense of operation is less than for other types and that they furnish a uniform and reliable heat.

The type of electric glue pot now being marketed can be fitted with rheostatic control to give a wide range of temperature. Through its use it is possible to regulate the heating of the glue so that it will be suitable for the particular type of work being undertaken. Electrically heated pots are portable and thus they can be ready for use wherever the work may be located, as the plug for the extension line can be shifted from one outlet into another.

The Glue Pot Is Portable and Keeps the Temperature Uniform

New Type Crane Truck

A NEW three-way crane truck has been developed by the Baker, R. and L. Company, Cleveland, Ohio, which is of particular interest due to the power swiveling attachment provided. This feature increases the utility of the machine, and enables the driver to operate it with ease. The type DYAQ crane has a capacity at 6-ft. radius of 3,000 lb. It weighs 7,000 lb. without battery and has a travel speed of 6 m.p.h. without load. The hoist is driven by a single totally-inclosed motor of 24-volt 60-amp. rating at 1,000 r.p.m. Power is applied to either drum by means of magnetically operated friction clutches. This makes the change from one drum to the other very smooth, and the construction is such that the drum which is not working is firmly held by a large-sized brake.



Dimensions and Lifting Height of New Three-Way Crane

The slewing unit is pillar mounted and turns on ball bearings. Power is transmitted from the slewing motor through a worm and spur gear. The slewing motor is compound wound, totally inclosed, and has a rating of 24 volts, 32 amp., and 1,700 r.p.m. Control of the slewing motor is by means of a drum-type reversing controller mounted on the dash. Limit switches are provided for automatically controlling the hoisting and reverse motions of the boom, the hoisting motion of the load hoist and slewing motion.

The boom is fabricated from structural steel and can be made to any length which is required within reasonable limits.

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The News of the Industry

Shore Line Revived

Line Opened Between New Haven and Guilford After Being Shut Down Four Years

Cars began operation on July 17 between New Haven and Guilford, Conn., on the New Haven & Shore Line Railway, a part of the former Shore Line Electric Railway. The new company, under the direction of William A. Sperry, consulting engineer, New Haven; the Blakeslee Brothers, and others, has purchased that part of the old Shore Line system between New Haven and Saybrook and has rehabilitated the line between New Haven and Guilford. Very little work was required as the original construction was good. The line between Guilford and Saybrook will gradually be opened.

Altogether the new company owns about 35 miles of track, laid with 70-lb. T-rail on ties 2-ft. centers and supplied with a catenary overhead line. A large part of the road is on its own right-of-way. Power for the present is being supplied by the Connecticut Company from station A in New Haven, and until its new cars arrive from the Wason Works the company will use cars leased from the Connecticut Company. The new cars will be double-truck, with a single operator. There is a substation at Guilford and a second one is being built near North Branford. The voltage will be 650.

On July 16 a special party of about 125 took three cars from New Haven as guests of the company. On their trip they found a good deal of rejoicing over the opening on the part of those along the way. At Guilford a collation was served in the carhouse, and speeches were made by Mr. Sperry, Mayor Fitzgerald of New Haven, L. S. Storrs and others. Mr. Sperry also introduced the new general manager, William Walker.

The F. E. Kingston Company, New Haven, is acting as banker in connection with the road. The bond issue is $500,000, of which $400,000 is to be sold, the stock issue being $400,000. New Haven business men and residents of the territory served are among the supporters of the project.

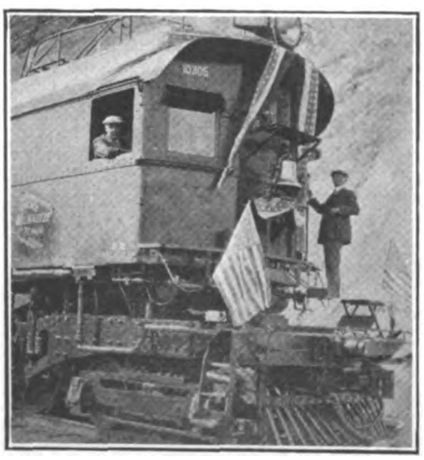
As indicated previously this 33-mile stretch of railway, providing connections from New Haven to Madison, Guilford and Saybrook, was formerly part of the Shore Line Electric Railway and, with lines running to Norwich, Stonington and Westerly, made up a system of 134 miles, part of which has been in disuse for several years.

The new company now operating the road is giving hourly service for the greater part of the day, with more frequent service when the traffic is especially heavy, as during week-ends and holidays. The growing summer resort interests along the route call for such a service, and stone quarries are expected to yield a paying freight business.

Wage Testimony All Presented in Chicago

Presentation of testimony in connection with the arbitration of the wage dispute between the union employees on one side and the Chicago Elevated Railroads and Chicago Surface Lines on the other was completed during the week ended July 14. It was stated that a decision would probably be announced on July 21. The wage scale to be decided by the arbitration board will be for two years, dating back to June 1, the date on which the former wage agreement expired. The arbitration board began hearing testimony on July 9 and daily sessions have been held. The cost of living has been the chief subject of discussion and testimony of witnesses. The men now receive 70 cents an hour. They are demanding an increase of 10 cents an hour.

President Rides in St. Paul Cab



President Harding had the unusual experience of riding in the cab of an electric locomotive of the Chicago, Milwaukee & St. Paul Railway in his recent Western trip. He had as his guide H. B. Earling, Western vice-president of the Chicago, Milwaukee & St. Paul Railway, shown on the pilot of the locomotive in the accompanying engraving. In commenting on his experience the President said that the electrification was the most stupendous undertaking of the kind he had ever seen.

Official Reports on Strike

Industrial Commissioner Who Inquired Into Schenectady Strike Wants Greater Voice for People

Sweeping changes in the present method of managing public utilities in New York State, a direct outgrowth of the strike on the Schenectady Railway, and a reflection as well, of the prolonged Albany strike, are recommended in the report just submitted to Governor Smith by Bernard L. Shientag, State Industrial Commissioner, reviewing the Schenectady situation. Mr. Shientag urges three radical departures from the existing system of managing street railways:

1. Representation of the people of the localities concerned on the directorates of street railways.
2. Legislation that will give the people, who are the most vitally interested, a greater voice in the control and regulation of public utilities.
3. Legislation that will delay strikes until an impartial tribunal has made a public investigation and endeavored to settle controversies between the employees and the companies.

Commissioner Shientag places full responsibility for the Schenectady strike deadlock on the fact that no member of the board of directors of the Schenectady Railway is a resident of Schenectady and that the directors themselves are split fifty-fifty on the proposition of recognition of the union.

The situation on the board of directors, the announcement by Commissioner Shientag said, has driven him to the conclusion that the only remedy against a recurrence of the Schenectady situation is to open a way for a voice of the public in avoiding similar troubles in the future.

From the inquiry conducted in the Schenectady strike situation it developed that the Schenectady Railway was owned jointly by the Delaware & Hudson Railroad and the New York Central Railroad, each of the companies having six representatives on the board of directors. Commissioner Shientag said the New York Central group of directors favored recognition of the union, while the Delaware & Hudson directors refused to recognize the union and would deal with the striking employees only as individuals.

Commissioner Shientag said:

The attitude of the Delaware & Hudson interests in the Schenectady Railway strike is complete denial of the right of collective bargaining. As the situation has developed it is no longer a question of entering into contract with the union, but the question that is presented to us is whether or not the union shall be destroyed.

The present attitude of the management of the company is that there is no strike—that the strike is over. Anyone in the streets of Schenectady will testify to the contrary.

The New York Central Railroad, through its directors represented on the board of

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the Schenectady Railway, has taken a progressive stand on some of the questions involved in this strike. Declarations alone, however, will bring no results to a suffering public. The New York Central, being the one-half owner of this property, cannot escape the responsibility which such ownership carries with it. The fact that there is a conflict of views among the directors of the Schenectady Railway can afford but little satisfaction to the people of Schenectady.

The function of the State Department of Labor with reference to a strike or industrial controversy, says Mr. Shientag, is threefold:

1. To attempt to avert the strike before it takes place.
2. To use its endeavors to bring about a settlement of the strike after it does occur.
3. To investigate the causes of the strike and to bring the facts to the attention of the public to the end that the force of enlightened public opinion may succeeed in bringing the parties together where other means have failed.

He then went on to explain that neither the labor department nor any other state agency has any power of compulsion in an industrial dispute, and continued with a brief discussion of the economic effects of a strike.

In making his recommendations to minimize the danger of future strikes, Commissioner Shientag declared that in little more than two years trolley strikes in Albany, Troy, Schenectady and Buffalo have cost the traction companies more than $10,000,000 and caused tremendous losses to the traveling public and to business interests.

The significance of the state's efforts to settle the Schenectady dispute spread beyond the confines of the area affected when Commissioner Shientag called William K. Vanderbilt, director of the New York Central, and Alfred H. Smith and Albert Harris, president and vice-president of the New York Central, and directors of the Schenectady Railway to testify. Their testimony, bearing principally on recognition of the union, attracted wide attention.

In the course of his observations the commissioner said:

To one who has closely observed the progress of events leading to these strikes, and their aftermath, the conviction is inescapable that the citizens of a community should have a greater voice in the control and regulation of their public utilities.

After all, the public attitude determines to a large extent the success or failure of public service corporations, like street railways. If recognition is to be given to the oft-expressed declaration that in a situation of this kind the public interest is paramount, public service corporations may well consider the advisability of having on their boards of directors one or more disinterested persons to represent the people of the community, to reflect their views, to keep the board informed of local conditions and to be in position to foster that spirit of equity and fair dealing between the company and its employees without which neither can prosper.

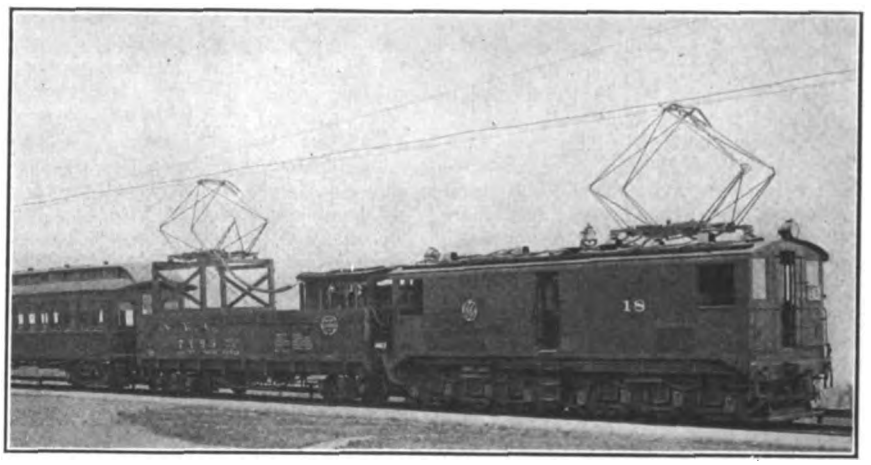
In the future, such public representation on the directorate may well be written into contracts entered into between public service corporations and local communities involving the use of the public highways. Public representatives on such boards may be in a position to give expression to the public needs and public welfare, frequently lost sight of by both parties in these controversies.

There may well be considered also the advisability of enacting legislation providing that in the event of a declaration of a strike on a public utility it shall not become operative until a short fixed period intervenes, during which time an impartial tribunal shall make a public investigation of the facts and endeavor by mediation to bring about an adjustment of the difficulties.

New Overhead Tested

Large Values of Electric Current Can Be Successfully Collected for Heaviest Traffic Possible

A new type of overhead trolley construction has been developed by the General Electric Company for use on heavy traction electric railways. A demonstration was made on the tracks of the General Electric Company, at Erie, Pa., on July 16, 17 and 18, before a group of railway executives, engineers and operating men. These public trials were for the purpose of showing that the new type of overhead construction can be used successfully for collecting current, either direct or alternating, for handling the heaviest railway traffic that can be anticipated in the future. A new record for current collection of more than 5,000 amp. was set up. This is considerably more than twice the amount of current now collected for normal requirements. It was done at speeds up to nearly 60 m.p.h., the current and speed apparently being limited only by the ability of the power supply.



Test Train Taking Current from New Type of Overhead Construction

The test train was composed of a 110-ton passenger type gearless locomotive, drawing a gondola car and a coach. Two pantographs were used, being of the type which have been employed successfully on the Chicago, Milwaukee & St. Paul electrification. The pressure of the pantograph against the wire was between 30 and 35 lb. The load was supplied by means of grid resistors mounted in the gondola car and controlled through remote-control switches located in the locomotive. By this means any load in addition to that taken by the locomotive could be imposed on the station up to the capacity of the station apparatus.

The length of the track on which the test was made is about 2¾ miles, the greater portion of it being used for high-speed running. The overhead construction is supported by steel bridges for a portion of the way, lattice poles for another section, and poles of I-beam sections remainder of the way. The pole spacings are approximately 300 ft.

The overhead construction is of the compound catenary type. A messenger cable of steel strand is hung from insulators on the supporting bridges or pole brackets. From the messenger cable is suspended a copper feeder messenger cable by means of hangers. Two contact wires are used, for the major portion of the distance being No. 0000 grooved copper trolley wire, the remainder being No. 000000 grooved copper trolley.

The special feature is the method by which the trolley wire is suspended from the feeder messengers. This is accomplished by means of a lacing of copper cable, along the direction of the line, and fastened with clips alternately to the feeder and to one or the other trolley wire. The spacings between clips on one wire vary from 15 to 20 ft., making the clips on the feeder messenger 7½ to 10 ft. apart. By this means great flexibility is obtained.

A number of observation towers were erected at a height approximately that of the top of the pantograph, so that those witnessing the tests could see the action of the pantograph moving along the wire. In the entire series of tests practically no arcing was observed, regardless of the speed or load. A complete description of the installation and the tests made will be published in a future issue.

Men Accept Five per Cent Advance

Employees of the Interborough Rapid Transit Company, New York, N. Y., recently accepted by a majority vote of 1,200 the 5 per cent wage increase offered by the company. The vote was either to accept the 5 per cent increase or else to refer the matter to arbitration. The wages range from $3.50 to $9 and $10 a day for skilled mechanics. The increase will be retroactive to July 1 and will remain in effect for one year.

The men had demanded an increase of 10 per cent. Frank Hedley, president, replied to the demands of the men by offering a 5 per cent increase. He said that even the 5 per cent rise would place an additional burden of $1,250,000 a year on the company.

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Predicts 29,000,000 Population in New York in Year 2000

What traffic regulations and methods of transportation will be in force in the year 2000 might well be subjects for conjecture as well as apprehension in view of a recent prediction of the Committee on Plan of New York and Its Environs that in the year 2000 the population of New York would be nearly 29,000,000.

It believes that the negro population will be triple the present quota and that there will be a substantial decrease in the percentage registered in the foreign-born element. This conclusion was reached after a statistical study of the population undertaken by Professors Pearl and Reed of the School of Hygiene and Public Health of Johns Hopkins University.

The area under scrutiny was called the "New York Region" and comprised a territory of more than 5,500 square miles in New York, New Jersey and Connecticut. The present population in that area is roughly estimated at 9,000,000.

The forecast for the area in round figures is as follows:

1930	11,500,000
1940	14,100,000
1950	16,800,000
1960	19,600,000
1970	22,300,000
1980	24,800,000
1990	27,000,000
2000	28,800,000

The scientists in a booklet giving their prediction disclosed in detail the complicated mathematical processes by which they arrived at their results.

F. P. Keppel, secretary of the Committee on Plans of New York and Its Environs, says that it is interesting and significant to note that the forecasts by Professors Pearl and Reed for a considerable period into the future, up to 1970 at least, a limit which provides ample latitude for the present regional planning project, are in quite close agreement with those worked out by Nelson P. Lewis as a part of his physical survey of the region for the committee, as well as those made by at least one important public service corporation.

No Increase in Philadelphia This Year

According to a plan recently advanced by Thomas E. Mitten, chairman of the executive committee of the Philadelphia Rapid Transit Company, any excess wages to employees over the present 64-cent scale are to be diverted to the co-operative wage fund. The present wage of the Philadelphia Rapid Transit Company is based on the average of three cities, namely, Chicago, Detroit and Cleveland. Negotiations are pending in Chicago and Detroit looking toward an advance in wages and it is the intention of the Philadelphia company to keep the cash payment to its men constant by the new plan. Following the announcement by President Mitten, a resolution was adopted by the co-operative committee authorizing the company to pay any additional wages to which the men may become entitled this year into the co-operative dividend fund. It was Mr. Mitten's contention that the company could not meet another advance this year and continue the 10 per cent co-operative wage dividend.

$78,000,000 Transit Program

United Recommendations Are Made in Philadelphia for Carrying Out Work in Business Area

The engineers for the city of Philadelphia, the Philadelphia Rapid Transit Company and the business interests in the center of the retail shopping district united on July 10 upon a recommendation to the Council's Transit Commission. The recommendation as explained in the official statement and as commented upon in the *Ledger* was in two parts: First, a broad and comprehensive plan for high-speed transit development based on present needs and upon those that will undoubtedly be created by the completion of the Delaware River bridge and the possible changes in the terminal of the Pennsylvania Railroad Company, and, second, the first step for construction.

Broad Street Plan Unchanged

Taking up the latter, "step No. 1," as of immediate importance, the engineers propose the building of the Broad Street subway substantially as planned in the program of 1914-1916, between Olney Avenue on the north and Spruce Street on the south, but with Director Twining's proposal for a subway beginning at Broad Street and Ridge Avenue, extending under the Ridge and Eighth Street to Walnut, and thence westward to a connection with an elevated line on Woodland Avenue to Darby.

"Step No. 1" forms the heart of the program, but the comprehensive plan shows also—for ultimate construction—a surface-subway under Chestnut Street, connecting on the east with the ferries and with the bridge, and on the west gathering in the surface lines now operated on Spruce Street and on Baltimore and Chester Avenues; a subway under Arch Street, with a possible future connection by tunnel with Camden and connecting with an elevated line on Lancaster Avenue to Overbrook, and a subway under Filbert Street connecting with the bridge, at the east, and with the Parkway-Roxborough line at the west.

The engineers in their report estimate the cost for construction and equipment under "step No. 1" at $78,000,000, of which sum about $31,000,000 is or can be made immediately available out of the loans already authorized. It is understood that the city's unused debt limit will permit the borrowing of the additional amounts needed to carry through this initial unit.

Canadian Pacific Electrification Rumored Again

Plans for the electrification of the Canadian Pacific Railway's main line through the Rocky Mountains, or, at least, those sections where the existing grades are heavy, are expected to materialize in the very near future. Officials of the railway are discussing these plans at present, and from information given out it is confidently expected that work on the electrification will be started next year.

D. C. Coleman, vice-president of the Western lines, stated a few days ago that surveys on the water power available on the Columbia River in the vicinity of the main line are now being carried out by the company. At present there are observers determining the water power at Surprise Rapids on the Columbia River, about 32 miles south of Beavermouth. Mr. Coleman stated that for the time being the surveys were being confined to the water of the Columbia River. Mr. Coleman said traffic demands, the financial situation and other conditions would of course determine largely when a start would be made.

Safety Committee Dines and Hears About Safety Progress

Fried chicken was served to 100 employees on safety committees of the Union Traction Company of Indiana at the semi-annual dinner held recently at Anderson. A feature of the dinner was the announcement by Ross Luellen, safety engineer of the company, of the company's record for four years, during which time its cars hauled 66,800,000 persons and its interurban and city trains have traveled a total distance of 31,500,000 miles with no passengers killed.

Steam railroad crossings at grades were safely passed 11,000,000 times and there were 1,250,000 safe "meets" in sidings in interurban operation. Two billion pounds of freight and express were transported on the company's lines in these four years.

"Safety First" in Anderson has made real progress through the efforts of Mr. Luellen, who keeps before the people the subject of safety through the "Sayings of Safety Sam" and through his various addresses before the Rotarians, Kiwanians, school children, etc. He believes that each person's safety, whether physical, moral or financial, depends first and most of all on the precautions which he himself takes.

Brooklyn Elevated Case Adjourned

The hearing of Edwin Parcells, Brooklyn motorman of the Fifth Avenue Elevated train which fell from the elevated structure at Flatbush and Atlantic Avenues on June 25, was adjourned on July 17 in the Flatbush Court until July 31, to await the result of the various investigations now pending.

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New York City Creates a Transit Bureau of Its Own

A permanent Transit Bureau with an appropriation of $101,700 was created by the Board of Estimate of New York City at its meeting on July 13 on motion of Mayor Hylan. All special committees acting for the board in transit matters will be discharged as soon as they report and their place will be taken by the new body, which consists of John H. Delaney, Dock Commissioner; George P. Nicholson, Corporation Counsel, and Arthur S. Tuttle, chief engineer of the board.

Mr. Delaney, as chairman of the special committee negotiating on new subways with the Transit Commission, presented a report recommending that the board approve and adopt the major portion of the commission's route for the proposed Brooklyn-Queens crosstown subway. The report also asked for sixty days extension of time for the committee's consideration of the rest of the crosstown subway and of the proposed west side subway in Manhattan. Mr. Delaney indicated that the negotiations with the commission were proceeding amicably and toward a solution of the present deadlock. The board did not act on any of the report, but extended the time of the committee for sixty days.

The new Transit Bureau received jurisdiction over all transit affairs. Among the matters which it is empowered to handle are negotiations with the Transit Commission, discussion of new routes, appropriations for the state body, and preparation of the local city administration's plans for providing new subways.

The new Transit Bureau received its first assignment when the board referred to it the problem of continuing the operation of the trolley lines of the Manhattan & Queens Traction Corporation, whose contract was declared forfeited, because of alleged failure to furnish the stipulated service. Pending the taking over and operation of the lines by Grover A. Whalen, Commissioner of Plant and Structures, the transit committee will see that there is no interruption of service. Counsel for the receiver of the line protested against the board's action, and threatened to take the matter into the courts.

Specialists to Report on New York Elevated Equipment

Frank Hedley, president of the Interborough Rapid Transit Company, and W. S. Menden, president of the Brooklyn-Manhattan Transit Corporation, have informed the Transit Commission that they have arranged with the General Electric Company and Westinghouse Electric & Manufacturing Company to carry out a suggestion of the commission to have engineers of those companies make a thorough survey of the subway and elevated equipment and of its maintenance. Letters from the companies to this effect were made public by Commissioner Harkness on July 12. He said:

> These letters from Mr. Hedley and Mr. Menden carry out suggestions made by the Transit Commission several weeks ago. They were made before the recent Fifth Avenue (Brooklyn) accident. The purpose of the survey is to supplement inspection of the commission's regular staff through an examination by engineers of the two companies. Their report will give us most exact and authoritative information as to present condition of the equipment used in subways and on elevated lines.

Cicero Has Peculiar Problem

Seeming Lack of Responsibility for Paving Reacts Against Railway and the Public

The Cicero Avenue line of the Chicago Surface Lines operates between Irving Park Boulevard and Twenty-fifth Street. The major portion of the line is within the city limits of Chicago, but a stretch of double track 1½ miles long, between Twelfth Street and the southern end of the route, lies in the town of Cicero. This section has received no attention other than the ordinary maintenance necessary to operate cars for a number of years. The street on each side has recently been paved by the town, but the section of roadway maintained by the railway has remained unpaved. It is at a grade 5 in. lower than the new pavement.

No one lays claim to this particular piece of property and yet it furnishes transportation to a major portion of the 20,000 employees of the Western Electric Company and during the rush hour is one of the heaviest cross-town lines in the city.

A number of years ago an ordinance was passed by the city of Chicago and the town of Cicero authorizing the Chicago Railways, which originally built the track, to enter into an operating agreement with the Chicago & West Towns Railway whereby it would be possible for the Surface Lines to operate its cars over the 1½-mile stretch in the town of Cicero, the only requirement being that the Chicago Railways should maintain the track in good order.

The ordinance, however, stipulated that the company could not pay for rehabilitation work, the only allowable expenditure being that necessary to keep the track in operating condition. A 30-day cancellation clause was included in the operating agreement between the two railways.

No trouble was encountered during the ensuing years until one year ago, when the town of Cicero let the contract for paving this street on each side of the right-of-way, and raised the grade 5 in. above that of the track. The town of Cicero called upon the Chicago Railways to raise the track to grade and pave the property. It was pointed out to the town officials that by the ordinance the railway was prohibited from making any expenditure of this nature. The West Towns Railway declined to do anything, stating it was not using the track and had no objections to its being torn up. The Illinois Commerce Commission was asked to force the Chicago Railways to pave the street, but after reviewing the ordinances and the operating agreement, the commission declined to issue an order.

No further action has been taken by the town of Cicero and the condition prevailing now as to clearances permits only certain types of cars to be run over this stretch of track. Although operation may be continued during the summer and the open months of the year, it is doubtful if it can be continued during the coming winter when this sunken area will become filled with water and snow and may freeze over.

View Showing Condition of Street on Either Side of Tracks

Discontinuance of the service at Twelfth Street, the city limits, will mean discommoding a large part of the employees of the Western Electric Company, which is located 1 mile farther south, who use the Cicero Avenue line as a means of getting to and from work. The adjoining pavement is already being affected by the different grade due to the heavy trucks turning in and out and breaking down the concrete.

It certainly appears as though the town of Cicero has been very short-sighted in paving before a disposition was made in regard to the paving of the tracks. With the thirty-day cancellation clause written into the agreement and the ordinances as previously stated, the railway company is not allowed under these conditions to write into its capital account an expenditure for this paving.

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Deadlock in Jersey

Public Service Railway Flatly Refuses Demands for Higher Wages and Shorter Hours

After six weeks of silence, the Public Service Railway, Newark, has answered the demands presented by the men on June 1. In a statement made on July 17 to the general conference board representing the employees, Thomas N. McCarter, president of the company, said that the financial condition of the railway made it absolutely impossible to grant any increase in the wage scale at this time. He offered to throw open the books of the company for examination by the employees. Schedules, overtime payment and other similar matters were said to be as favorable to the employees as it is possible to make them.

The reply presented by the railway to the trainmen contained a complete and careful analysis of the entire situation. It was pointed out that the wage scale demanded, which is 30 per cent higher than the present one, and the other changes suggested would involve an annual charge upon the company of approximately $4,000,000. In presenting the new contract to replace the agreement which ends Aug. 1 no reason was given why these enormous increases should be made. The company showed that the present wage scale is 100 per cent higher than that which prevailed in 1913, whereas according to statistics of the United States Bureau of Labor the cost of living in New York City is now only about 75 per cent higher than it was at that time. The rate asked for, 65 cents an hour, would amount to an increase of 160 per cent over 1913. From these facts the company argues that the demands cannot possibly be justified by the cost of living.

RAILWAY OPERATING AT DEFICIT

In contrast to the steadily increasing disbursements for wages, it is shown that the owners of the property have received no dividends since 1917, but have been burdened with a deficit, which at the end of the year 1922 amounted to $1,252,288. Successful operation of the railway cannot continue, the president said, unless the capital invested is accorded a fair treatment and a return paid thereon.

In regard to working conditions, the demand is that 50 per cent of the runs shall be nine hours straight, an additional 20 per cent shall be finished within ten hours, 20 per cent more shall be finished within eleven hours and the remaining 10 per cent shall be finished in as short a time thereafter as may be possible. The company forcibly points out in its reply that any increase in the number of straight runs or the shortening of swing runs will inevitably result in an increase in tripper service. This would be expensive and annoying to the company and detrimental to the employees.

As a counter proposal the company suggests the continuation of the present agreement for another five years. In completing his statement the president mentioned the pleasant relations which have existed between the members and the management, said he hoped they would continue and expressed willingness to discuss matters further at any future date.

Meetings to act upon the offer of the president have already been held by the trainmen in the various cities served by the Public Service Railway. All of these meetings have emphatically refused to accept his proposal. The employees declare that their wages of 50 cents an hour are the lowest in the country for any similar property.

Illinois Motor Vehicle Law Revised

The motor vehicle law of Illinois has been revised in these essentials:

Reduces the maximum weight permitted on the road surface on any two wheels from 16,000 to 13,000 lb; the gross weight of a self-propelled vehicle from 24,000 to 20,000 lb., and the gross weight of a vehicle and trailer from 32,000 to 26,000 lb. Provides that tractors may be operated on improved highways if the cleats are attached in such a way as to be continuously in contact with the road surface and the weight per inch of width of such cleats does not exceed 800 lb; that freight carriers operating on the state highways pay an additional annual license fee of $1 for each 100 lb., gross weight, if over fixed routes, $3; that passenger carriers operating over fixed routes pay $3 for each 100 lb. gross weight, computed at 125 lb. per passenger; that mirrors be attached to all trucks so that the driver can see the road behind. Increases the speed limit from 30 to 35 miles an hour. Requires operators of passenger or freight carriers on the public highways to file bonds of $5,000 for each vehicle.

Puget Sound Suit Dismissed

The "specific performance" suit of the Puget Sound Power & Light Company against the city of Seattle was formally closed when the United States District Court received the mandate of the Circuit Court of Appeals ordering Federal Judge E. E. Cushman to enter a decree reversing his original decision. The suit was a fight of the Seattle taxpayers to prevent forever invasion by the city of the general fund by taxation for payment of the interest and principal of the purchase price of the railway system. The Corporation Counsel will draft a form of decree to be signed by Judge E. E. Cushman, dismissing the company's suit, which sought to compel the city to complete the contract for purchase of the railway lines. The city's defense to the suit was that it already was living up to the contract.

Under Judge Cushman's decision, the city would have been obligated to resort to taxation if necessary to support the municipal railway and pay interest and bond redemption to the Stone & Webster interests. Judge Cushman, however, was reversed by the Circuit Court of Appeals, whose ruling was affirmed by the United States Supreme Court. The decision of the Circuit Court of Appeals was entered Dec. 4, 1922, and the ruling of the United States Supreme Court denying the power company's petition for a writ of certiorari was entered April 16, 1923.

News Notes

Men Accept Compromise Wage.—Employees of the Ithaca Traction Corporation have accepted a compromise wage of 46 cents an hour. They had demanded 50 cents, and when this scale was refused by the company the men walked out. The strike lasted less than a week. Conferences brought the demand down to 46 cents, which the men accepted.

Traffic Surveys for Wichita and Topeka.—John A. Beeler will conduct traffic surveys at Wichita and Topeka similar to the one made recently in Peoria, reported in the ELECTRIC RAILWAY JOURNAL for July 7, page 29. All of these properties are now included in the system of the Illinois Power & Light Company, the successor to the Illinois Traction Company.

Wages Advanced.—Trainmen on the New York & Long Island Traction Company have received an increase in wages effective July 1. The new scale in cents per hour is from 49 cents for the first year to 57 cents inclusive for the five-year men. The former scale was 41 cents to 53 cents for the men who had been in the company's service ten years or more. The New York & Long Island Traction Company operates about 40 miles of line over the central, western and southern sections of Nassau County in Long Island.

Men Accept Wage Award.—As the result of an award fixed by the arbitration board and accepted by the trainmen of the Youngstown & Ohio River Railroad, operating an interurban passenger line and freight service between East Liverpool and Salem, wages will be increased 6 cents an hour. The new scale is retroactive to May 1. The maximum hourly wage has, therefore, been increased from 50 to 56 cents. Overtime will be paid for at the rate of time and a half. The new agreement will terminate on May 1, 1924.

New Franchise in Preparation.—It is understood that the officers of the Columbus Railway, Power & Light Company, Columbus, Ohio, are preparing a new franchise for presentation to the present Council. Under the City Charter provisions, renewal of the franchise cannot come up prior to two years before its expiration except by a vote of five members of Council. As the present franchise does not expire until two years from next February, the company cannot have its proposed renewal considered by the present Council unless five members are willing. Any time after next February the company could have the proposed new franchise introduced for consideration without the approval of five members, but by that time the personnel of Council will have changed, as four members are to be elected in November.

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Foreign News

Substitution of Trackless Trolley for Tramway

Quite a stir was caused at first in English tramway circles by an announcement that the Town Council of Keighley, in Yorkshire, England, had decided to abolish its entire tramway system and substitute trackless trolley cars. The importance of this move is, however, somewhat reduced when it is ascertained that the municipality in question possesses only 3 or 4 miles of tramway route.

The local officials are well acquainted with the running of railless trolley cars, as they were among the earliest tramway authorities in England to adopt the railless car. For a number of years trackless cars, with the old Austrian over-running trolley, have been in use to a limited extent as an auxiliary to the tramways, and a few petrol buses have also been employed on still other routes. It does not appear that any of the three systems has been a great financial success, though of course the total population to be worked upon is comparatively limited.

The Town Council is not dissatisfied with tramway traction. Indeed, the chairman of the Tramways Committee said at the meeting of the Council that tramcars were the most satisfactory vehicles all round, and that if the Council could get some relief for the maintenance of the roads he would advise that the tramways be continued. As such relief could not be obtained the town could not afford at the expense of the tramway department to renew the tracks and maintain the roadway. It appears that nearly £130,000 would be required for track renewals, and that capital charges on this and the cost of repairs would be about £6,150 per annum. The cost of removing the rails would be offset by the sale of them, while the work of repaving, etc., to put the roads in condition so that the Council would take them over and maintain them as main roads was estimated at about £12,000.

It will be observed accordingly that a fundamental feature is that the cost of highway maintenance on the present tramway routes is to be transferred from the tramway undertaking, with an ultimate fall back on the borough rate payers to the county rate payers. This should be quite an agreeable financial arrangement for the borough, though what the county will say about it remains to be heard. Doubtless the objection from this source will develop when the Town Council proceeds to apply for an order to authorize the substitution of the trackless cars for the tramways. On the other hand, the Town Council will probably be called on to contribute to the cost of maintaining the roads in question.

It is proposed to purchase six double-deck trolley vehicles, to convert five single-deck vehicles now in use, and to purchase three single-deck vehicles. The cost of these, along with £3,640 for conversion of the overhead equipment, is put at £27,850, or rather less than the cost of renewing 2½ miles of tramway track. According to estimates, the annual revenue from the combined new and old trackless trolley system will be about £25,660, while capital charges and working expenses will be about £22,690. The surplus of £2,970 would cover the capital charges on the superseded tramways.

The British Tramway Association

The annual congress of the Tramways & Light Railways Association was held at Swansea, Wales, on June 21 and 22. Papers were submitted on some of today's problems and on tramway rolling stock.

British Electric Traction Company Sees Better Times Ahead

At the annual meeting of the British Electric Traction Company, held in London on June 15, J. S. Austen, the chairman, said that during the past year the company had done a little better than in the previous year. The directors were able to recommend the payment of a dividend of 5 per cent, the first distribution at that rate for some years. During the year £60,000 of debenture stock was redeemed, and the discount on that, amounting to £11,000, was applied to reducing the value of the securities. In addition, about £70,000 profit had been realized from sales of securities. This sum was also applied to the reduction of stock.

In the tramway and omnibus undertakings the receipts in 1922 had been adversely affected by the general trade depression, unfavorable weather, reduced railway fares, the engineers' lock-out, competition, and some reduction in fares. Against all these factors the company had done its best to contend and had achieved a reduction in the expenses. Profits, however, were about 20 per cent below those of the previous year. On the whole Mr. Austen was quite satisfied with that result.

With regard to the electricity supply undertakings, the trade depression in the early months of the year had caused a diminished demand for electricity, but the demand had increased during the latter part of the year, so that in the result more units were sold than in 1921, but at a lower average price.

Taking the federated companies—those which the British Electric Traction managed—as a whole, there was at the moment no visible reason why the present year should not show an improvement over the past. With regard to the tramway and omnibus companies, during the first three months of the year the results, compared with those of the corresponding period of 1922, show a substantial increase, indicating better results ahead this year.

Some London Tramway Aspects

In the House of Commons on May 31 some discussion took place on the London County Council (money) bill—a bill of the sort being required every year to meet the financial requirements of the Council. Viscount Curzon inquired where the London tramway system was worked with due regard to economy. He said that the Council declared that if it was permitted to connect its lines here and there the organizations could be made to pay. But these connecting lines would mean the introduction of tramways on busy arteries already badly congested with traffic. The Council should give more attention to street widenings. G. Hume, replying for the Council, explained that the most important matter in the bill in regard to new borrowing powers was for housing purposes. The tramway items were for clearing up purposes, not a single tramway extension being contemplated. The London traffic problem would shortly again force itself on the attention of the House. Before the summer was over 1,000 more omnibuses would be on the streets, and by next spring the position would have become intolerable. The tramways had never come on the local rates until the difficult years after the war. In 1919 there was a deficiency of £100,000; in 1920 £590,000, and in 1921, £80,000. But this year there would be a surplus of £100,000. The Council was now asking authority to raise £150,000 to remotor the cars in order to speed them up for the convenience of the public. The bill was given a second reading.

[The omnibuses referred to are run by companies in competition with the County Council's tramways.]

An Ancient Electric Locomotive

The first electric locomotive operated on the first "tube" railway in the world made its last journey on April 25. This locomotive, No. 1, was designed and constructed by Mather & Platt, and it began to run daily service on the City & South London Railway in 1890. The last journey was from Stockwell depot to the science museum at South Kensington, where it takes its place with the "Rocket," "Puffing Billy," "Sans Pareil" and other samples of the earliest steam locomotives in Britain. The City & South London Railway is the only London "tube" line on which electric locomotives are still in use, and they will all disappear when the reconstructed line reopens some nine months hence. Multiple-unit trains will then be used.

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Financial and Corporate

"L" Roads in Chicago to Consolidate

The four elevated railways in Chicago are to be consolidated into one corporation. The proposal to carry out a plan of this kind has been under consideration for some time, but on July 17 announcement of the details of the plan for the reorganization of the finances of the railroads was made by the protective committee representing the noteholders.

The proposed reorganization and readjustment of the financial structure of the elevated railroads and the consolidation of the lines into one corporation will reduce the funded debt and capitalization of the roads to an amount approximately the same as the valuation of the property fixed by the Illinois Public Utilities Commission in 1919.

Although the roads have been operated for several years as a unified system under the direction of Samuel Insull, they have maintained their individual corporate existence. The Illinois Commerce Commission has already approved the merger of the Metropolitan, Northwestern and South Side lines and the purchase of the Oak Park line by the Chicago Elevated Railways Collateral Trust when the court orders its sale. The Oak Park line has been in the hands of a receiver for several years.

The plan about to be put into effect calls for a drastic scaling down of capitalization. The present outstanding debt and securities of the four companies is about $121,895,000. In the new corporation it is proposed to reduce this total to $87,196,500. The property value of the companies as fixed by the state commission for rate-making purposes is $89,514,932.

The proposed reduction in capitalization of about $34,700,000 will be accomplished chiefly by the wiping out of the Chicago Elevated Railways preferred and common shares, which at par value amount to about $40,999,000. The new corporation will have $20,329,500 of common stock, but this will go to holders of other securities of the old companies. In the proposed reorganization the underlying mortgage bonds and equipment notes of the operating companies, which total $46,704,000, will remain undisturbed.

Purchase Ordinance Prepared for Introduction in Milwaukee

Sixty-five million dollars must be spent by the city of Milwaukee to acquire all the holdings of the Milwaukee Electric Railway & Light Company. By acquiring only the property in the metropolitan area Milwaukee must expend $50,728,000.

This information was revealed after two years of study by the special committee of the Common Council on acquisition of public utilities. This valuation is included in the final draft of the ordinance for municipal ownership of the company which the committee hopes to present to the Common Council at its next meeting.

The ordinance provides that the city acquire merely the holdings in the metropolitan area. In brief, this means all the property of the company in Milwaukee County, excluding the electric interurban lines which run to Kenosha, Racine and other points outside the metropolitan area. Thus, it will be seen that the company will retain ownership of $15,000,000 in property outside this zone should the Common Council approve the ordinance.

The ordinance provides that the city has the option to take over the company by direct purchase or on the piecemeal system.

Authority to Issue New Securities Sought by Illinois Power & Light Corporation

Improvements estimated to cost $1,880,000, to be made on the Illinois Traction System, will be paid for out of the proceeds of an issue of $2,059,600 of 7 per cent preferred stock. Authority to sell such an issue is being sought by the Illinois Power & Light Corporation from the Illinois Commerce Commission. The company also plans to issue $1,905,000 of first and refunding mortgage bonds with which to reimburse it for money already spent for new power houses, boiler plants and railway and other improvements. The principal items included in the program of improvements are $1,200,000 for a new power house at Venice, Ill., and $98,862 for a new turbine.

The Illinois Power & Light Corporation has entered into a contract with the Missouri Utilities Company, Mexico, Mo., whereby it will acquire control of the common stock of that company. The stock was purchased from E. R. Locke and Willy F. Corl, Mexico. The purchase price was not revealed.

Creditable Progress Made in Detroit

Research Bureau Reports that Revenue of Municipal Railway for Eleven and One-Half Months Is in Excess of All Charges Made for Operation and Maintenance, Except Depreciation, and Interest and Sinking Fund Requirements

REFERENCE was made in ELECTRIC RAILWAY JOURNAL, July 7, page 34, to a report on the finances of the Department of Street Railways of Detroit, presented by the Detroit Bureau of Governmental Research, Inc. This report has now been published in full in *Public Business*, issued frequently by the bureau "to circulate facts concerning city, county and state governments for citizens of Detroit."

As was indicated previously the bureau holds that the contract between the city and the Detroit United Railway, from which the present municipal properties were purchased, constitutes an unusually heavy financial burden. It is suggested that consideration be given to its refinancing. The conclusions of the bureau, based upon the facts set forth by the records of the Department of Street Railways and subject to final verification by independent audit, are as follows:

That under the circumstances, creditable progress has been made toward solving the financial problems of the Department of Street Railways.

That general city taxes have not borne any charge for interest and sinking fund payments.

That the revenues of the Department of Street Railways during the past eleven and one-half months are in excess of all charges made for operation and maintenance (except depreciation), and interest and sinking fund requirements.

That sufficient reserves are being set aside in a sinking fund to provide for the payments of interest and to retire all outstanding bonds issued on behalf of the Department of Street Railways.

That sufficient reserves are being set aside to meet the nineteen semi-annual payments of $500,000 each on the purchase contract with the Detroit United Railway and to make the final payment of $7,580,000, due in 1931.

That reserves based upon general and local experience are being set aside from earnings to meet claims from injuries and damages, taxes, and insurance.

That partial rehabilitation of the property acquired from the Detroit United Railway, to the extent described in this report, some of which might fairly be chargeable to capital, has been effected and paid for out of earnings. To finance from earnings the extensive program of rehabilitation necessary to needed service will require several years if uninterrupted by business depression. To complete such program promptly will necessitate either an issue of bonds or an increase in rate of fare.

That if earnings under existing conditions are applied toward rehabilitation, extensions to furnish satisfactory service must be provided by the issue of bonds or by an increase in rate of fare.

That the purchase contract for the acquisition of the Detroit United Railway lines, although expedient under the then existing debt limitations, constitutes an unduly heavy financial burden, and it is suggested that consideration be given to its refinancing.

That a depreciation reserve, as such, has not been established, but it is understood that the Board of Street Railway Commissioners agrees such reserve is highly desirable as a means of determining actual property values, operating costs, and proper rate of fare, and contemplates the establishment of a depreciation account in the near future.

It will be recalled that the purchase contract was approved by the vote of the people on April 17, 1922, and became effective on May 15, 1922. The amount of the contract was $19,850,000, with an initial down payment of $2,770,000 and semi-annual payments of $500,000, each for a ten-year period, the balance, $7,580,000, becoming due on Dec. 31, 1931. The initial payment of $2,770,000 was provided out of the bond issue of $4,000,000 authorized at the time the purchase agreement was approved. The balance of the bond issue, $1,330,000, is available as author-

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ized for the payment of supplies received from the D. U. R., the purchase price of which is in process of arbitration.

The bureau explains that the date April 30, 1923, was taken for the compilation of the report because it was the latest date for which complete financial and operating statistics were available at the time of the study. This therefore accounts for the period of eleven months and a half covered by the report as presented. The bureau says, however, that the accuracy of the figures and of the conclusions drawn from them must depend upon the integrity with which the financial records have been maintained. It feels assured by test that revenues have been reported and that the expenditures as between current operation and capital outlay have been carefully distinguished in the documents of original entry and fully and correctly reported, but that the final accuracy of the financial statements must depend upon the report of the next audit, which probably will be made as of June 30, 1923. The statement of revenues and expenses for the eleven and one-half months as contained in the report is shown in the accompanying table.

Detroit Municipal Railway Earnings for the period May 15, 1922, through April 30, 1923.

Passenger revenue	$17,917,395
Parlor, sleeping and special car revenue	1,470
Miscellaneous transportation revenue	1
Station and car privileges	112,925
Rent of track and facilities	943,599
Miscellaneous income	25,625
Rent and other income from physical property	14,152
Income from unfunded securities (bank balances, notes, etc.)	47,373
Income from sinking fund and other reserves	5,092
Total revenues	$19,067,631

For the same period, expenses were as follows:

Maintenance of way and structures	$1,763,755
Maintenance of equipment	1,225,367
Power	1,884,726
Conducting transportation	7,085,257
Traffic expenses	1,367
General and miscellaneous expense	1,408,324
Total operating expenses	$13,368,796
Taxes	625,748
Miscellaneous rents	7,075
Interest on purchase bonds ($4,000,000)	147,994
Interest on construction bonds ($15,000,000)	695,516
Interest on purchase contract	951,980
Sinking fund on purchase bonds	99,665
Sinking fund on construction bonds	471,849
Sinking fund on purchase contract (19 payments at $500,000; final payment, $7,580,000)	1,666,556
Amortization expense on funded debt	1,816
Total expenses	$18,036,995

The figures of earnings are inclusive not only of transportation but of all other operations, which arise through furnishing the transportation service of the city.

The net excess of income over operating expenses, taxes, interest, and sinking fund requirements (but not including depreciation), for eleven and a half months ended April 30, 1923, was therefore, $1,030,635, before the net loss of $1,843 from bus service is deducted. The report says that were the Department of Street Railways owned and operated by a private company, its statement of net earnings before depreciation (not a statement of the excess of income over operating expenses, taxes, interest and sinking fund requirements, as shown above), for the eleven and one-half months, would be $5,066,009, as follows:

Operating revenues		$19,067,631
Operating expenses		13,368,796
Net revenues		$5,698,834
Taxes	$625,748	
Miscellaneous rents	7,075	
		632,824
Net operating earnings before depreciation		$5,066,009
Interest		1,795,487
Net earnings available for depreciation, sinking fund for indebtedness, extensions, etc.		$3,270,522

It is explained by the bureau that in the expenditures above stated for operating expenses there are included expenditures charged to maintenance which are properly chargeable to capital. On the matter of depreciation the bureau says:

The Department of Street Railways, with the experience of substantially a year's operation, is now in a position to classify the entire properties and set up an adequate depreciation account. The bureau understands that this will be done. This charge, when ascertained, will be made against the net earnings before depreciation of $5,066,009 above shown.

On this same matter it says elsewhere in the report:

At present no depreciation reserve, as such, is established, although expenditures properly chargeable to capital have been charged as maintenance, and indebtedness in excess of an estimated amount of depreciation for the period has been retired from earnings. The Department of Street Railways has provided and to date is maintaining:

(a) A sinking fund out of earnings for the retirement of its bonded indebtedness at maturity.

(b) A sinking fund out of earnings to pay the purchase price under the D. U. R. contract.

In this respect, the D. S. R. differs from a privately owned street railway corporation in that it is mandatory upon the municipal utility to retire its indebtedness from earnings.

The total of the city's equity in the railway properties is placed at $3,633,758. The excess of assets over liabilities, or the surplus, as of April 30, 1923, was $1,311,687. The assets as of April 30 are given as $40,898,038. The total liabilities at the same date are given as $37,264,280, exclusive of the city's equity of $3,633,758. The bureau says that the present fare—5 cents with 1 cent additional for transfer—amounts to an average fare of nearly 5½ cents.

The direction of the Bureau of Governmental Research rests with a board of nine trustees and the personnel includes leaders in their several walks of life, among them merchants, bankers and professional men. The bureau is organized to increase the affectiveness of local government through co-operation with officials and by keeping citizens informed about the city's business. The bureau is absolutely non-partisan, and takes no part in the election or appointment of persons to office. The cost of the bureau is financed and controlled by the Detroit Community Fund, but only such contributions are used as are specifically designated to the bureau by the donors.

Ohio Interurban Being Dismantled

The power plant of the Springfield, Troy & Piqua Traction Company at Springfield, Ohio, is being dismantled. This marks the final step in the junking of the road by the Schoenthal Company, Columbus, which purchased the properties at receiver's sale. The tracks, etc., have already been scrapped, except for 2 miles of the right-of-way, which has not been touched. A car is being operated over the portion between Springfield and Maitland by the Springfield & Suburban Railway, owned by the Schoenthal Company. This line provides transportation for employees of the Victor Rubber Company, and also serves as a transfer between the Erie passenger station at Maitland and Springfield, as well as for the transfer of freight in Springfield. An attempt was made by persons residing along the line to form a company to take over the property, but the deal fell through. The Schoenthal Company did not begin the work of scrapping the line until it became apparent that the effort had failed which was being made by the residents to finance a new company to operate the line.

Saginaw Sale Aug. 18—Reorganization Terms Announced

The sale of the local property of the Saginaw-Bay City Railway will take place on Aug. 18. This is the date which has been fixed by the referee in bankruptcy, acting on the petition filed in the United States Court by Trustee Otto Schupp. Under the court order the sale will be free and clear of all mortgages. Mr. Schupp, as grantee under the franchise recently voted by the people, has formally accepted the contract, and will assign it to a new operating company as soon as it is organized. The property will, of course, be financed as agreed between the grantee and the City Council.

In this connection joint committees of bondholders of the Saginaw-Bay City Railway and the Saginaw Valley Traction Company have submitted a reorganization plan to the security holders along the lines laid down by the new franchise ordinance.

The plan calls for the incorporation of a new company, probably to be known as the Saginaw Transportation Company, which will issue 20,000 shares of non-par common stock, 14,790 shares of 5 per cent preferred, par $100, cumulative after Jan. 1, 1924, and approximately $1,000,000 of twenty-five year 5 per cent bonds under an open mortgage, maturing on Jan. 1, 1949. The bonds will constitute a first lien on all the property and will be redeemable at 102 and interest.

It is intended to exchange the old $584,000 Saginaw Valley Traction bonds

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for an equal face amount of new company bonds, with a bonus of one share of new common stock for each $500 face amount of the old bonds; the $1,479,000 Saginaw-Bay City first and refunding 5s are to be exchanged for an equal amount in par value of the new preferred stock and the right to subscribe, pro rata, to $400,000 additional bonds at not less than 85 and 18,832 shares of the new common stock at a price to be determined later. The proceeds from the sale of the $400,000 bonds are to be used in carrying out terms of the franchise in respect to betterments and payment of prior claims.

By this plan interest charges will be cut from about $117,000 annually to $50,000.

The franchise terms give the new company the right to charge a 10-cent cash fare instead of the present 6-cent fare. The provisions of the grant were reviewed at length in the ELECTRIC RAILWAY JOURNAL for July 14, page 70.

Wisconsin-Minnesota Property Bought by Byllesby

H. M. Byllesby & Company, Chicago, have purchased control of the Wisconsin-Minnesota Light & Power Company from the American Public Utilities Company.

The former officers of the Wisconsin-Minnesota Company have resigned and the following board of directors has been elected: H. M. Byllesby, president; R. F. Pack, vice-president; Halford Erickson, vice-president; A. S. Huey, J. J. O'Brien, R. J. Graf, F. W. Stehr, F. C. Shenehon, J. H. Briggs, H. W. Fuller and John H. Roemer.

The Wisconsin-Minnesota Company owns and controls 71,800 hp. of developed water power and 700 miles of transmission lines in western Wisconsin, supplying electricity to seventy-three cities and towns. The territory served by it is contiguous to part of that supplied by the Northern States Power Company. Both companies include in their holdings electric railway properties, the most important one being the line from Chippewa Falls to Eau Claire.

Auction Sales in New York.—At the public auction rooms in New York there were no sales of electric railway securities this week.

New Jersey Subsidiary to Issue Stock.—The State Board of Public Utility Commissioners of New Jersey has approved the issuance of $12,750,000 capital stock of the Public Service Electric Company, a subsidiary of the Public Service Corporation of New Jersey.

Dividend Declared.—The directors of the Madison Railways, Madison, Wis., at a meeting held on July 9 declared a semi-annual dividend at the rate of 7 per cent on the preferred stock of the company issued subsequent to March 1, 1922. The dividend is payable on Aug. 1 to stockholders of record on July 20. A bonus at the rate of 1 per cent per annum will also be paid under the same condition.

Certificates Offered. — Putnam & Company, Hartford, recently offered at 100 and accrued interest $487,500 of the 6 per cent equipment trust certificates of the Connecticut Company known as series F. The certificates are dated July 2, 1923, and are due serially in semi-annual installments Jan. 1, 1924, to July 1, 1928, inclusive. The certificates were issued in part payment for standard railway equipment consisting of fifty new double-truck cars, described in the ELECTRIC RAILWAY JOURNAL, issue of June 16.

Commission to Hear Valuation Appeal.—The Missouri Public Service Commission set July 19 as the date for hearing the motions filed by the United Railways and the city of St. Louis, Mo., for a rehearing in the valuation case of the United Railways. The company contends that the valuation of $51,700,000, placed by the commission on the company's property was too low. The city says it is too large. The decision of the commission fixing the valuation was reviewed at length in the ELECTRIC RAILWAY JOURNAL for June 9, page 980.

Purchase Negotiations Being Resumed.—Negotiations have been resumed for the purchase of the private right-of-way of the New York & North Shore line by the city of New York. Watson Robinson, attorney for the bondholders of the defunct company, said recently that he had made an offer to sell the private right-of-way and the tracks and wires of the entire line to the city for $50,000. Of the $50,000, should the offer be accepted, the bondholders would receive $40,000. The proposition is now being considered by A. J. Rinn, real estate appraiser of the controller's office.

Abandonment Authorized. — The Board of Public Utility Commissioners of New Jersey has granted permission to the Jersey Central Traction Company to abandon its lines in Middlesex County, New Jersey. Notwithstanding numerous experiments with regard to the rate of fare charged in order to increase riding the company has not been able to earn operating expenses, much less additional moneys required to pay interest on bonds. The plea of the company to the board to abandon service was reviewed at length in the ELECTRIC RAILWAY JOURNAL for July 7, page 33. Operation will be discontinued at midnight on July 28.

Utilities at Jamaica Under Stone & Webster—Stone & Webster, Inc., Boston, Mass., have been appointed general managers of a new company which has been organized by Montreal banking interests to carry on the electric light and power and electric railway business in Kingston, Jamaica, British West Indies. The financing has been done by a syndicate headed by Greenshields & Company, and including Aemilius Jarvis & Company, and Mackenzie & Kingman. The new company has acquired by purchase the West India Electric Company, Ltd., and the Jamaica Electric Light & Power Company, Ltd., which have been combined into the Jamaica Public Service Company, Ltd. It will do the entire electric light and power and tramway business in Kingston and the adjoining parishes of St. Andrew and St. Katherine.

Old Nassau Lines Taken Over by B.-M. T.—At midnight on July 13 the Brooklyn-Manhattan Transit Corporation took over the operation of the lines of the Nassau Electric Railroad, which has been in the hands of receivers since Dec. 31, 1921. This is in accordance with an order signed by Judge Julius M. Mayer in the Federal court for the Southern District, who appointed Lindley M. Garrison receiver for the Nassau lines. This is the first of the surface lines to be returned to the successor company to the Brooklyn Rapid Transit Company.

Line in Bad Condition.—Appraisal of the tangible properties of the Tacoma Municipal Railway line and an examination of the accounts of the system in City Comptroller John Roberts' office did not lend much comfort to any hope of the Emergency Fleet Corporation that the line will be worth fighting for to collect $232,000 loaned to the city during war times for enlarged service, according to city officials. The rolling stock is wearing out, the engineers found, and despite an admitted economical operation of the line, a monthly deficit was found. During May the deficit was $2,198, an increase over that of April. The appraisal and book examination were made as a part of the preliminaries of the negotiations which are expected to be made between the city and government for a settlement of the loan, which the city maintains should be entirely written off as a war expense.

Reduction in Valuation Sought in Tax Case.—J. F. Evans, tax attorney for the United Railways, St. Louis, on July 14 appeared before the Missouri State Tax Commission and requested that the road be permitted to reduce its tax return $8,300,000. He stated the road made a return listing its properties at approximately $60,000,000, and that the Missouri Public Service Commission later fixed the railway's valuation for rate-making purposes at $51,700,000. He asked that the tax return be cut that amount, and also that only 80 per cent, or $41,360,000, be subject to taxation. Mr. Evans said that the $70,000,000 valuation which the company sought to have placed on its property in the recent valuation case before the Missouri Public Service Commission included about $9,000,000 of "non-essentials" for tax-making purposes and also $1,500,000 of depreciation. He was granted a week in which to prepare a brief supporting his oral arguments before the tax board. A decision is expected to be made in September.

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Traffic and Transportation

Separate Service for Commuters

Engineer for New York Commission Sees Need for City Service Independent of Present Subways

Daniel L. Turner, consulting engineer for the New York Transit Commission, after a preliminary survey of suburban traffic, has recommended the construction of a new rapid transit system in Manhattan, independent of present subways, designed for the sole purpose of handling commuting traffic. Mr. Turner came out strongly in favor of this rather than the alternative of building a union suburban terminal in the heart of the city. He said this would only make for greater congestion on existing lines.

Co-operation of all the railroads entering this city has been secured by the Transit Commission in searching for a permanent remedy for the commuting problem. Engineers of the State board and the companies have had a series of consultations on this subject and more are under way.

In the report by Mr. Turner the problem is discussed as follows:

1. Ten years hence it will be impossible to accommodate the 600,000,000 or more suburban passengers per year with the facilities that now exist.
2. It will be impossible to take care of this traffic on the transit lines designed for the use of city traffic. It will be as much as the city can do to obtain facilities enough to accommodate the city traffic originating within its own limits.
3. It will be impossible to interject the steam railroad suburban traffic that will have developed ten years hence into the city transit lines now terminating at points near the outer boundaries of the city.
4. In order to accommodate the suburban business originating on the steam railroad lines it will be necessary to do one of two things, either:

(a) Provide additional terminals for the accommodation of this rapidly increasing suburban traffic which will relieve the existing terminals, or,

(b) Shunt all of the suburban traffic past the existing terminals and provide a separate and independent collecting and distributing transit system traversing central Manhattan for the exclusive use of suburbanites now served by existing steam railroad lines.

In other words, the solution of the problem means building new suburban terminals or distributing the traffic through central Manhattan just as the rapid transit lines now distribute the traffic originating along the outlying branches of such lines.

It is Mr. Turner's opinion that it would be a mistake to follow the first of these alternatives—that is, to build new terminals for the use of suburban traffic. As he sees it, this would only mean concentrating the suburban business at separate points and creating congestion worse than now exists. From these congested points the traffic would have to be delivered to its destination over the city transit facilities, thereby throttling these facilities and prohibiting them from properly serving the area within the limits of the city. It would be just as reasonable to dump all of the rapid transit traffic originating on the city transit lines at two or three points in central Manhattan and expect it to find its way to its destination over some other lines of transit as it would be to provide for the future handling of suburban traffic from terminals in such a manner. In conclusion Mr. Turner said:

In my judgment the only way that this problem can be properly solved is to develop an independent transit system traversing central Manhattan for the exclusive use of the suburban passengers of the future; in other words, the only adequate solution of the problem will be the development of a metropolitan transit plan to be independent of, and to be superimposed over, the transit plan designed to serve the city exclusively. Just how this can best be done will depend on the conclusion of our studies.

United Traction Takes Action Against Jitneys

A loss of from $500 to $1,000 a day is claimed by the United Traction Company, Albany, N. Y., through illegal operation of jitneys. This claim was made in its contempt of court action brought July 14 against sixteen Troy jitney drivers charged by the company with violation of the Hinman injunction order of Sept. 10, 1921, which restrains jitney operators from competing with the trolley company.

The United Traction Company is preparing to serve papers on more than 100 additional jitney operators in Albany and Troy, according to Ernest Murphy, superintendent of the company.

J. Stanley Carter, attorney for the traction company, said that the alleged violations have been occurring since May and that the jitney men have been operating on several lines of the company. In spite of the Hinman injunction order, jitney service between Albany and Troy has not ceased altogether since the United Traction trolley strike of two years ago.

Mayor Praises Traction Management

Mayor W. A. Magee of Pittsburgh, Pa., predicted better railway service and lower fares in a talk to members of the Pittsburgh Advertising Club on June 26. Among other things he said:

It is not unlikely that in the next few months the genius of the Philadelphia Company, A. W. Thompson, who is working hard to regenerate the insolvent Pittsburgh Railways, will have brought success out of failure and that with new equipment and new leaders the street car system will improve its service in every way and that with this improvement in service there will come a lowering of carfares.

The Mayor is a Republican, but the Pittsburgh *Post*, a Democratic paper, took the Mayor's speech as a text for its leading editorial in the issue of June 28. In concluding its comment that paper said:

If Mayor Magee were to deliver such an address every week, keeping the attention of the public focused on these important subjects, he would find the effect most encouraging.

Commission Reserves Decision in Rate Case Involving Reductions

Hearings were concluded recently in the Nashville Railway & Light Company case under an order of the State Railroad & Public Utilities Commission to show cause why rates should not be reduced on light, power and car fare. Experts who made the investigation for the commission find that the company has lacked $169,000 of paying the stipulated return of 6½ per cent on its investment.

The testimony presented at the final hearing touched directly upon the assumed contracts existing between the Nashville Railway & Light Company and two supervising companies, by which the local concern must pay to one of these supervisors 2 per cent and to the other 6 per cent, or a total of $140,000 annually. The commission sought to ascertain whether the contracts were really valuable to the company or its consumers.

At the concluding session the company introduced Halford Erickson of Chicago, vice-president of the H. M. Byllesby Management Corporation. He said about 75 or 80 per cent of utility companies are under supervising companies, and they derive great benefit from these large corporations in the financing of their properties, and in the availability of expert service. He said this also makes it possible for small communities to get service that they could not otherwise afford.

Following the conclusion of the testimony, Attorney W. E. Norvell, representing the company, asked that the commission issue an order permitting the Nashville Railway & Light Company to use a part or all of its depreciation reserve in extensions and additions to its plant, and agreeing that it will be returned to the reserve fund with 4 per cent interest over a period of years to be determined upon.

The commission announced at the conclusion of the hearing that it would issue, through its chairman, Harvey H. Hannah, a formal order in the case at an early date. The case has been pending before the commission since last May.

Arrangements Under Way for Acquisition of Bus Line

Final negotiations are now under way for the transfer of the Woburn-Reading Bus Line, Inc., to the Eastern Massachusetts Street Railway. The railway will take over the bus business in Woburn, North Woburn, Wakefield, Reading, Stoneham and from Wakefield Square to Wakefield Park, from Wakefield Square to North Saugus and from Wakefield to Reading by way of Lakeside.

The Eastern Massachusetts will substitute its own buses for those operated by the Woburn-Reading line. The fare will be 5 cents from the center of any community to the town line and 10 cents from points on one side of the

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center of a town to a point on the opposite side. Street car fares in the same community will not be affected and will remain at 10 cents per zone, except that the fourteen-ride tickets for $1, good between Wakefield Square and the Greenwood district of Wakefield, will remain in force.

County Judge Vacates Jitney Restraining Order in Schenectady

An unusual situation has developed in the city of Schenectady in connection with its trolley strike. On July 16 County Judge McMullen, claiming concurrent jurisdiction with the Supreme Court on orders issued out of court, issued an order vacating the jitney restraining order of Supreme Court Justice Angell of Glens Falls. While there seems to be a well-established legal ground for concurrent jurisdiction, the action of a county judge in setting aside an injunction order of a justice of the Supreme Court is, so far as can be determined, absolutely without precedent in this state.

The logical course of action will be for the Schenectady Railway to appeal to the Appellate Division of the Supreme Court, from which source it may hope to obtain a permanent injunction restraining jitney operations. The action of Justice McMullen has created a furor in judicial circles.

In the meantime, pending an appeal to the higher court, attorneys for the Schenectady Railway are proceeding on the assumption that the order lifting the injunction is illegal and are getting ready to summon a number of jitney operators into court for contempt of the Angell order. The order of Justice McMullen restored jitney service in Schenectady.

Harry B. Weatherwax, president of the Schenectady Railway, issued a statement in which he said that the crusade against jitneys would be vigorously waged and the Angell injunction enforced.

Railway Plans to Do Trucking Business in Michigan

The Detroit United Railway has applied to the Michigan Public Utilities Commission for permission to do a general freight hauling business with motor trucks and trailers. The application stated the Detroit United Railways Trucking Company would be immediately organized with a capital of $500,000.

It is planned not only to do straight highway hauling where necessary for package and carload lots, but to combine this with the trolley freight service of the Detroit United Railway. There will be pick-up work as well as piece distribution.

In connection with the application, President E. G. Stevenson said:

> The Detroit United has an investment of $35,000,000 in the territory it serves. It proposes to add to that investment whatever amount is necessary fully to serve the territory and at the same time guard the investment already made.

Buses Operating Under City Supervision Restrained in New York

The whole matter of the operation of buses in New York City under direction of the local city administration has been opened up again. For some time now the buses installed under city supervision have continued to run because of a stay of execution obtained by the Corporation Counsel. This stay was nullified on July 14 when the Court of Appeals refused to entertain an appeal from the ruling of the Appellate Division of the Supreme Court, which a month ago upheld Judge Mullan's injunction in a case brought by a taxpayer to prevent the appropriation of further funds for bus supervision by the city.

There are twenty-seven bus lines in operation and last year they carried more than 100,000,000 passengers. The prediction was made that they would cease service at once, but up to Thursday the court had issued no formal order and there was some speculation as to whether he would issue a stay for another thirty days.

An easy way out of the matter was suggested by the Transit Commission, which stands ready to legalize bus permits for temporary or other service, but this proposal Mayor Hylan has rejected. Instead he called a special meeting of the Board of Estimate for the purpose of adopting a resolution to appeal to the Governor to call a special session of the Legislature. On Wednesday the Governor came to the city to inquire into the situation.

In a tirade against the so-called traction interests, which he sees behind the recent court moves, Mayor Hylan said:

> The faithless flouting by the traction corporations of their franchise agreements made the installation of emergency bus routes an absolute necessity. In no other way could the comfort, convenience and welfare of the traveling public, discommoded by the deprivation of needful transit facilities, have been promptly and effectively served.

The bus owners themselves have suggested that a $3,000,000 corporation be formed to own all the buses now being run under municipal supervision and that this company apply to the Board of Estimate for a franchise revocable on ninety days' notice and containing a clause which would permit the city actually to acquire title to the bus equipment.

Weekly Pass Enters Bradford, England, Successfully

The expression "Carrying coals to Newcastle" can now be matched by the phrase "Passing the pass to Bradford," inasmuch as British tramways have long been familiar with the unlimited-ride season ticket. The differences in adoption of the weekly pass, however, are the shortening of the validity period to a calendar week (Monday to Sunday inclusive), the introduction of transferability and the sounder system of pricing. Because of the variety of fares already in use on the system, R. H. Wilkinson, the manager, recommended that the trial installation of two months be made on but one route. This is known as the Lidget Green section. It is only 1.5 miles long, so that the ordinary fare of 1.5d. (3 cents) serves the entire run. Up to 9 a.m., however, there is also available a workmen's fare of 1d. (2 cents). The pass has been priced at 2 shillings (48 cents at full exchange), equivalent to sixteen ordinary fares.

It is hoped that the pass will have the effect of giving a lower fare to those regular patrons who add non-rush rides to their rush-hour rides without causing the reduction in revenue that would have followed a cut to 1d. (2 cents) for all classes of riders.

The restriction to one route makes the pass less attractive, but this may be offset by the Britisher's zone-fare training in taking short rides and in going home for lunch.

The first two weeks are reported as satisfactory. After allowing for the diversion of traffic from a neighboring route, it was found that passengers compared with the corresponding weeks of May increased 4.3 per cent and 3.4 per cent respectively and revenue increased 2.5 per cent and 2.3 per cent respectively. In the first week (June 18) 102 084 passengers were carried, of whom 21,122 used passes; in the following week the total was 103,089, of whom 22,125 used passes. The average number of rides per pass per diem was 3.3 in both weeks.

Wants One-Man Operation Stopped

Mayor Frank X. Schwab has served notice upon Herbert G. Tulley, president of the International Railway, to cease operating one-man cars on the local lines of the company in Buffalo. He said that unless this is done at once he will bring proceedings to compel the company to do so. Mayor Schwab told the International that one-man cars are a menace to public safety. One-man cars are being operated by the company on short lines and in sections of the city where the passenger travel is exceptionally light. Since the introduction of one-man cars on these lines the frequency of the service has been almost doubled. Commenting on the demand made by Mayor Frank X. Schwab, the *Express* says: "One-man cars do not inconvenience the public, though they may be an eyesore to the union and men out of jobs."

Bus Line in Medford.—The Boston Elevated has begun operation of a motor bus line in Medford, Mass., which supplies crosstown service for the people of old Medford and Medford Hillside.

Buses Supplement Railway Service.—Bus service was started by the Eastern Wisconsin Electric Company on July 3 in Fond du Lac, Oshkosh, Van Dyne, North Fond du Lac and Neenah. This service is designed to supplement the interurban rail service of the company.

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Personal Items

Iowa Association Honors Mr. Chambers

President of Des Moines City Railway Made Head of Iowa Electric Railway Association

F. C. Chambers, president and general manager of the Des Moines City Railway, has been elected president of the Iowa Electric Railway Association. Mr. Chambers joined the company as electrical and mechanical engineer in 1913. In April, 1918, he took charge of power generation and distribution for both the city and the interurban lines. Later he was placed in charge of rolling stock. In April, 1920, however, the mantle of management fell upon him with his assumption of the post of vice-president and general manager. Still later he was operating receiver for the company.

F. C. Chambers

The periods of negotiating the franchise agreement, approved by the electors in November, 1915, and of carrying out the rehabilitation of the physical property had been passed through when Mr. Chambers assumed the rôle of manager, but the trials and tribulations incident to them were as nothing compared with the events that were to come later. Like many other cities, Des Moines had been drifting away from its railway. It had been trying to get something for nothing. The bus bug, or more properly the jitney bug, had bit it. As Elbert Hubbard once said: "You cannot fool calves by giving them whitewash instead of milk." Des Moines tried to force whitewash on its street railway calf and the calf nearly died before Des Moines discovered that something for nothing leaves nothing.

Thus it came about that the company withdrew service in July, 1921. It was not a vindictive move—the decision to stop service in Des Moines. Not all the angles to it can be reviewed here. There is no need for that. They have been told before in these pages. The withdrawal of service was purely a business matter. Des Moines starved its railway. And the railway had to shut down. On Mr. Chambers, however, fell the onus of this move. He didn't just explain. He went on and proved that the population of any city of any considerable size can be carried expeditiously and comfortably only by a responsible operating agent organized for service at the same time it is striving for profit.

It is a striking commentary on the changed state of public opinion there that the very company which such a short time ago was forced to the drastic action of shutting down service has been able to go before its own people and sell locally an issue of preferred stock to investors.

To Mr. Chambers, an engineer by profession, the events incident to the suspension of service were problems to be solved even though they did in this case mean working largely with men instead of materials. In the rehabilitation of the physical property of the company following the granting of the 1915 franchise, his efforts played an important part. It was the reputation that he made here and in his later work that led to his advancement to the post of operating head in 1922. Mr. Chambers has ever been alert to keep abreast of the latest engineering practices. He was one of the very first, for instance, to see the possibilities of the automatic substation. It was largely the early record of performance of the Des Moines installation that helped the quick spread of the automatic substation idea.

Mr. Chambers entered the traction field in 1896, in power house work for the Adrian Light, Heat & Power Company, Adrian, Mich. In 1901 he went to Rome, N. Y., as chief engineer for the Rome Gas & Electric Company. He left Rome in 1905 to become electrical engineer for the East St. Louis & Suburban Railway. From 1908 to 1911 his position was superintendent of power for the Springfield (Ill.) Consolidated Railway. In 1911 Mr. Chambers went to Chicago, where he became superintendent for the County Traction Company, now known as the Chicago & West Towns Railway. He remained with the company until 1913, when he went to Des Moines.

L. C. Bewsey, whose appointment to Cuba was announced in the ELECTRIC RAILWAY JOURNAL for June 30, has been made manager of the Cia Cubana de Electricidad at Santa Clara, Cuba. He will report to E. C. Deal, general manager of the Cuban properties. As for the Electric Bond & Share Company, to which reference was made previously in the ELECTRIC RAILWAY JOURNAL, in connection with this matter, it is not represented in Cuba at all. Mr. Bewsey was formerly superintendent of the Michigan United Railways at Kalamazoo.

C. Melvin Sharpe in Washington

Executive Assistant to President Ham Is a New Figure in Electric Railway Circles

C. Melvin Sharpe, who has recently been appointed as executive assistant to William F. Ham, president of the Washington Railway & Electric Company and the Potomac Electric Power Company, Washington, D. C., has been a resident of the nation's capital for the past twenty years.

Mr. Sharpe was born in Philadelphia in 1881, a son of George Heppard Sharpe of that city. He was educated by private tutors and later at the Philadelphia School of Industrial Art and graduated as a Fellow in Art of the Pennsylvania Academy of the Fine Arts with post-graduate work abroad.

C. M. Sharpe

His organizing and directive abilities were recognized during the late war and the designing, engraving and manufacture of the issues of the liberty bonds and other paper securities of the government engaged his earnest and constant attention until Secretary McAdoo made him secretary of the Liberty Loan Committee of the District of Columbia. His management of various campaigns of civic and national proportions has earned for him a reputation for acutely sensing the pulse of the public and has brought him in close contact and association with men and women prominent in civic, national and international relations.

The present civil service retirement act, whereby civil employees of the government are retired after a certain term of service, was in large part due to the efforts of Mr. Sharpe, while his direction of the Interchurch World Movement Campaign in the district was a conspicuous success. His latter

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work with the Chamber of Commerce of the United States and the recent brilliant work with LaSalle Extension University would seem to augur his success in his new association with the Washington Railway & Electric Company in its public relations work in Washington and the surrounding country. While he is a newcomer in electric railway work, Mr. Sharpe is a student of economics, banking and transportation matters. In his new position he will apply himself to perfecting plans looking to improvement in service.

Four New Vice-Presidents for U.G.I.

Four new vice-presidents have been elected by the board of directors of the United Gas Improvement Company, Philadelphia, Pa. This action increases the number of vice-presidents from five to seven.

Randal Morgan, who has been associated with the company for forty years, retires as vice-president and becomes chairman of the executive and finance committee.

Walter Clark, who has served the company for thirty-five years, retires as vice-president and becomes consulting engineer.

Lewis Lillie, vice-president, will in addition assume the duties of general manager.

The new vice-presidents are:

James T. Hutchings, who retires as general manager and becomes vice-president in charge of operation and of plants.

G. W. Curran, who retains the title of secretary, vice-president in charge of accounting.

J. A. Pearson, promoted from purchasing agent, who will be in charge of purchases.

F. J. Rutledge, promoted from manager of the new-business department, who will be in charge of sales of gas, electricity and appliances for using the same.

The other vice-presidents are Paul Thompson and Philip H. Gadsden. William W. Bodine becomes assistant secretary and assistant treasurer. In addition to his duties as assistant to Vice-President Lillie Mr. Bodine was also appointed secretary of the executive and finance committee. The positions of general superintendent and assistant general superintendent were abolished. Rollin Norris was appointed gas engineer, Paul Spencer electrical engineer and John B. Klumpp inspecting and valuation engineer.

Mr. Nichols in Jamaica

Alfred S. Nichols has been appointed manager of the new company which has taken over the electric light and power and the electric railway business in Kingston, Jamaica. Mr. Nichols is of English birth. He has had a wide business experience in British mercantile work and during the past twenty years in the United States in newspaper work and in the operation of public utilities. He has been with the Stone & Webster organization for thirteen years and for the past six years has been manager of the light, power, gas and street railway at Paducah, Ky., a company under Stone & Webster management. The properties at Jamaica have recently come under the direction of Stone & Webster as managers.

J. M. Penick Installed Railless Trolley in Petersburg

J. M. Penick, connected with the Virginia Railway & Power Company, Richmond, Va., since 1910, supervised the installation of the new trackless trolley service put into operation recently by that company in Petersburg. There has hardly been sufficient time under operation by this system to form a basis for accurate judgment as to its real future possibilities, but the results so far achieved with the new service promise a wider use of railless transportation in the future in Petersburg and in the other cities served by the company.

J. M. Penick

The installation of the new line was carried out under Mr. Penick in his capacity as general superintendent of railways of the Richmond and Petersburg divisions as well as the Richmond-Petersburg interurban division. He has served in these capacities since January, 1923. As indicated previously, Mr. Penick joined the company in October, 1910. His first work was assistant engineer in charge of the construction of reinforced concrete carhouses, this being the first big construction work under the company's program for rehabilitating the property after its reorganization in July, 1909.

In February, 1911, Mr. Penick was promoted to assistant chief engineer of railways, having charge of the construction and reconstruction of track, and in January, 1917, he was made engineer of maintenance of way and structures in charge of maintenance and construction of tracks, bridges and buildings. In March, 1922, as chief engineer of railways of the company, he was also placed in charge of equipment.

Obituary

G. R. Scrugham

George R. Scrugham died at his home in Cincinnati, Ohio, on July 12. Mr. Scrugham promoted the organization of the three interurban electric railways from Cincinnati to Batavia, New Richmond and Mason in 1896, and for a time was connected with the management of the Cincinnati & Eastern Electric Railway as president and general manager. Later he came into the public eye by organizing the policyholders of large life insurance companies in New York to effect reorganization of the companies. Before entering the electric railway field as an operator Mr. Scrugham had long been identified with street railway interests, principally as an officer of the Creaghead Engineering Company, Cincinnati, contractor for the construction of both city and interurban railways.

Since 1916 Mr. Scrugham had been connected with Pennsylvania coal companies, which he was reorganizing following their bankruptcy. When the campaign of Charles Evan Hughes for the Presidency was organized in 1916, Mr. Scrugham was made one of the managers, with offices in Washington. Mr. Scrugham was fifty-eight years old. He was born at Danville, Ky., but had lived in Cincinnati with his family for more than twenty-five years.

F. E. Connors

F. E. Connors, vice-president and general manager of the Spokane & Eastern Railway & Power Company and the Inland Empire Railroad of Spokane since February, 1920, died recently. He had steadily climbed the ladder of success since he first became identified with the Chicago & Alton Railroad, when he was only sixteen years old. After serving in the Chicago office for five years he went to the Santa Fé Railroad at Topeka. As was noted in the ELECTRIC RAILWAY JOURNAL of Oct. 14, 1922, Mr. Connors rose from a clerk in the stationery department when he started at Topeka to an assistant to the vice-president when he left in 1919. Following his resignation from the Santa Fé company he was appointed receiver of the Spokane & Eastern Railway & Power Company and the Inland Empire Railroad. A year later he was made vice-president and general manager, which position he held until his death.

When changes were made in the staff of the companies last fall Mr. Connors, along with Messrs. Gannaway and Paine, was chosen to continue as a captain. These three men were largely responsible for the operation of the traction lines during and after the receivership.

Since the death of Mr. Connors the offices of operating vice-president and traffic vice-president have been combined and the duties of both are being performed by Waldo G. Paine with the title of vice-president and headquarters at Spokane.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Mixing Manufacturing with Maintenance

By Henry S. Day
Westinghouse Electric & Manufacturing Company

From the time when electric railroads made their first appearance it has been generally regarded by operating officials as good practice to include in the shops a department for manufacturing renewal parts. Whether this belief ever had any justification is open to doubt, but today a close scrutiny of manufacturing methods and maintenance methods should convince any unbiased person that the two will not mix.

Just why a railway shop should be regarded as a manufacturing plant, capable of making anything from a filing cabinet to a wrist pin for an air compressor, is not very clear. The reason for the existence of a railway shop is not a manufacturing one. It is for maintenance and nothing else. True enough, in order properly to maintain equipment, it is necessary to have machinists and lathes, wood shop and carpenters. Beyond that, however, the parallel ends abruptly. Men and machines do not constitute a manufacturing plant without the other elements that go with them.

Manufacturers of electric railway apparatus have difficult problems to meet in making products destined for use under severe service conditions. The maintenance and upkeep of these same products develop many difficult problems, but of such a widely different nature that the manufacturer and the operator do not think in the same terms.

Today manufacturing consists of specializing, quantity buying and quantity production. Engineering, research, development, etc., all have a necessary and important place before production is started. The railway repair shop is seldom prepared to carry on such work. It is not equipped for manufacturing purposes, but is equipped only with tools and facilities for repairing. Where the manufacturer may have ten high-priced special machine tools built for speed and accuracy the average repair shop has one general utility tool, purchased with the idea of covering as wide a range of jobs as possible. Moreover, there is little doubt that the skill of workmen in manufacturing plants averages higher than it does in railway shops.

Manufacturing in a repair shop must of necessity be in small quantities, because few roads have sufficient equipment of one type to permit quantity production. The basic economies that can be effected in the future in electric railway operations will not result from the operators becoming manufacturers. They will come from closer inspection, systematic overhaul and reclamation. Carhouses and shops have today about the same appearance as they had years ago, and methods of overhauling and inspecting equipment are a good deal the same. The movement of cars, trucks and motors, however, should be worked out to obtain smooth progression. Manual labor and slow devices should be replaced by quick-moving machinery, and the repair shop should be placed on a basis similar to that of a manufacturing plant.

To summarize, the idea is that the savings sought by the operator are not to be found in manufacturing his own replacement parts, but in bringing his methods and facilities for repairing to a highly specialized and efficient point, reducing waste and developing reclamation.

Synthetic Lumber Has Possibilities

Considerable work is being done at the present time by lumber interests with a view to utilizing more fully the product of the forests. Satisfactory methods have already been developed for the manufacture of composition lumber through the utilization of sawdust in combination with a glue binder. Although this work is as yet very much in the experimental stage, it seems possible, according to the Forest Products Laboratory, that developments within the next few years will make possible the marketing of composition lumber suitable for many purposes where ordinary lumber is now used.

G. E. Officials Given College Honors

Four General Electric Company officials have recently been given honorary degrees at four important American universities.

Gerard Swope, president of the company, was awarded the honorary degree of doctor of science at Rutgers College on June 12. Owen D. Young, chairman of the board of directors, was given the degree of doctor of literature at St. Lawrence University, of which he is an alumnus, on June 12, while Dr. Irving Langmuir, assistant director of the research laboratory, received the honorary degree of doctor of science from Union College, Schenectady. David B. Rushmore, consulting engineer, was given the D.S. degree from his alma mater, Swarthmore College.

Round Trolley Wire Still in Demand

An impression prevails in some quarters that round trolley wire is decreasing in popularity, while the demand for grooved wire is increasing. According to the Bridgeport Brass Company there is no basis for such an idea. Its figures show that the proportion of grooved wire made in 1922 was no larger than the proportion made in 1916, 1917 or 1918. The total production of grooved wire is very much greater now than it was a few years ago. Inasmuch as this company is today making a great deal more trolley wire than formerly, the proportion between the grooved wire and the round wire therefore remains approximately the same.

Charles W. McKay Directs Valuation Work

Charles W. McKay, well known appraisal and valuation engineer, has been appointed manager of the division of valuation and appraisement of the Roberts-Pettijohn-Wood Corporation, consulting engineers, Chicago.

Mr. McKay was formerly president and general manager of McKay & Sherman, valuation engineers, and when Mr. Sherman retired from the firm, the name was changed to Charles W. McKay & Associates. Recently the interests of the latter have been merged with those of the Roberts-Pettijohn-Wood Corporation and Mr. McKay received his present appointment.

Since his graduation from Sibley College of Mechanical Engineering, Cornell University, in 1906 he has been engaged in engineering and appraisal work with what is now the New York Telephone Company, the McCall & Clark Company, efficiency experts of New York City; McMeen & Miller of Chicago, where he spent the major portion of his time on problems involving the appraisement of public utility properties; Central Union Telephone Company, the Cooley & Marvin Company and with L. V. Estes, Inc., of Chicago.

Mr. McKay is valuation consultant for the Industrial Extension Institute and has contributed numerous articles to the technical press.

Metal, Coal and Material Prices

Metals—New York	July 17
Copper, electrolytic, cents per lb	14.687
Copper wire base, cents per lb	17.50
Lead, cents per lb	6.05
Zinc, cents per lb	6.47
Tin, Straits, cents per lb	37.875
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$3.375
Somerset mine run, Boston, net tons	2.625
Pittsburgh mine run, Pittsburgh, net tons	1.95
Franklin, Ill., screenings, Chicago, net tons	1.675
Central, Ill., screenings, Chicago, net tons	1.55
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$7.05
Weatherproof wire base, N. Y., cents per lb	18.75
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal	$1.05
White lead, in oil (100-lb. keg), N. Y., cents per lb	11.85
Turpentine, (bbl. lots), N.Y., per gal	$0.93

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Rolling Stock

Jackson Railway & Light Company, Jackson, Tenn., has recently purchased three double-end Birney cars, Westinghouse equipment, from the American Car Company of St. Louis.

Dayton & Troy Electric Railway Dayton, Ohio, recently placed an order with the American Car & Foundry Company for ten box cars. The capacity of the cars will be 80,000 lb. Delivery is expected in September.

Louisville Railway has arranged to place orders with the Kuhlman Car Company, Cleveland, for forty pieces of additional equipment, which will include fifteen motorized cars and twenty-five trailers, total cost being around $350,000. Frank Miller, vice-president, stated that the motor cars would be equipped with 35-hp. General Electric 247-I motors and Westinghouse air brakes. Purchase of the additional equipment was recently approved by the board of directors, and company representatives have been conferring with the municipal utility authorities as to type. The cars will be of what is known as the "Peter Witt" type cars. The motor cars will have a two-door entrance at the front and another in the center. During dull hours they can be used as one-man cars. During rush hours they can be manned by two operatives. An order was recently placed by the company for ten motor cars and thirty trailers. This equipment was referred to in the ELECTRIC RAILWAY JOURNAL, issue of June 16.

Track and Roadway

Atlantic Shore Railway, Sanford, Me., will extend its line 2½ miles.

Durham Public Service Company, Durham, N. C., expects to reconstruct 2,000 ft. of track with 80-lb. T-rail and steel ties.

Capital Traction Company, Washington, D. C., plans to spend during the present summer and coming fall about $546,500. The biggest job will be the replacement of the track on Seventh Street, N. W., from Pennsylvania Avenue to the Seventh Street carhouse. This work will cost about $274,000.

Dallas Railway is now laying heavy channel steel on Beverly Drive as part of its improvement program in Highland Park. Mayor H. R. Davis said the improvements by the traction company are being made in return for the privilege of collecting an 8-cent fare recently granted by the city.

Southern Public Utilities Company, Charlotte, N. C., will begin work on Aug. 1 on the extension of the line from its present termination on Glade Street to the new high school building.

Los Angeles Railway has started construction of double track on West Seventh Street between Hoover and Vermont Avenues. Seven-inch, 116-lb. Trilby rail is being used. This involves construction of half a mile of double track and will provide a new route for Western Avenue cars. Track now used on Hoover, Wilshire and Commonwealth Boulevards will be removed.

Union Traction Company, Coffeyville, Kan., through its stockholders has ratified the proposal to extend the interurban line 22 miles farther south into Oklahoma, reaching the towns of Talala and Oolagah. The extension of the Coffeyville-Nowata line to Oolagah, Okla., would place it within 45 miles of Tulsa. When the line is built into Oolagah, it is expected that an extension will then be undertaken to Collinsville, the largest town between Tulsa and Nowata.

Power Houses, Shops and Buildings

Northern Texas Traction Company, Fort Worth, Tex., is building a $34,000 reinforced-concrete paint shop at Pacific Avenue and Pine Street.

Northern Indiana Power Company, Kokomo, Ind., has purchased two 750-hp. boilers with stokers and auxiliary equipment.

Union Traction Company, Anderson, Ind., expects to build a large terminal station in Anderson, and has filed deeds with the Madison County recorder for all the real estate in the first half block south of Fifth Street, between Main Street and Meridian Street. The property cost $35,000. It is said that work on the new building will be started next year.

Pacific Electric Railway, Los Angeles, Calif., in connection with its Alhambra-San Gabriel line extension, will install a new power substation to take care of the increased power demands, also to improve the power conditions on the Alhambra-San Gabriel and Pasadena, Sierra Madre and Glendora lines. The new terminus on the line extension will be located at Golden West and San Gabriel Avenue, where a joint freight and passenger station will be constructed.

Trade Notes

Boiler Equipment Service Company, Atlanta, is now selling diamond soot blowers in the states of Georgia and Florida, having been appointed district representative by the Diamond Power Specialty Corporation of Detroit.

A. S. Moody, assistant northwest manager of the General Electric Company, has been appointed local manager of the Los Angeles office of the same company, to succeed R. L. Cash, who has been transferred to Schenectady. Mr. Moody is well known in the electrical industry on the Pacific Coast, having been identified with the General Electric Company in that section for the past sixteen years.

Union Switch & Signal Company, Swissvale Pa., has the contract from the Long Island Railroad for installing a complete system of automatic signaling on the four-track electric line between Hillside and Floral Park. This includes two electro-pneumatic interlockings, one at Queens, comprising ten switches and fourteen signals, and one at Floral Park, comprising nineteen switches and nineteen signals, as well as the remodeling of an existing mechanical interlocking at Hollis and the installation of twenty-seven automatic block signals between the interlockings. The automatic signals will be Style "B" 110 volts, 25 cycle, located on signal bridges spanning the four tracks. As an emergency power supply feature, a frequency changer will be installed at each interlocking to convert the 110 volts, 60-cycle city supply to 110 volts, 25-cycle.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., received a contract from the Cleveland Railway for $400,000 of substation equipment. The apparatus in the order includes eight 1,500-kw., 514-r.p.m., six-phase, 60-cycle, 600-volt, d.c. converters, twenty-four 550-kva., single-phase, 60-cycle, 11,000-volt transformers and automatic switching equipment for the control of four two-unit, 3,000-kw. substations. Each substation consists of two 1,500-kw. converters and all are to be equipped with supervisory control apparatus so that they can be remotely controlled from the dispatcher's office. Each substation will be equipped with nine feeders of the short-circuit detector type. In addition to this apparatus the order also included seven 550 kva. transformers, six of which are to be used in place of air-blast transformers included in a previous order for four 3,000-kw., two-unit substations and the other to be used as a spare. The plan of the Cleveland Railway calls for the erection of nine automatic substations in various parts of the city and the dismantling of the company's generating plant. The project was referred to in the ELECTRIC RAILWAY JOURNAL, issue of May 19.

New Advertising Literature

Chausse Oil Burner Company, Detroit, Mich., has issued a new circular describing its railway torches.

Blacker Engineering Company, Grand Central Terminal, New York, has just issued a leaflet describing its Blacker "B" blacksmithing hammer for hand forging.

Okonite Company, Passaic, N. J., has published a booklet entitled "Splices and Tapes." The last page of this eight-page pamphlet gives instructions for making a perfect splice or joint.

Dossert & Company, New York, announce they have ready for distribution new price sheets covering all types and sizes of Dossert connectors. These sheets are Electrical Supply Jobbers' Association standard size.

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New York, Saturday, July 28, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 4

The Cedar Point Convention of the C.E.R.A.

THE climax of the Cedar Point convention of the Central Electric Railway Association last week came in the final session on Friday morning when E. F. Wickwire made his address. His subject was "Co-operation of Manufacturers," but his address was far more comprehensive, for he outlined a plan of united action for the entire electric railway industry, both railways and manufacturers, that is not only practical, but whose consummation would soon have a profound effect in establishing a sympathetic understanding on the part of the public. Such a combination of all the electric railway interests, national, state and community, is not impossible, and in united effort it would represent a force of public opinion that must be reckoned with.

Another valuable suggestion in Mr. Wickwire's address, which is printed on page 138, is his scheme for changing the popular conception of the man who represents the electric railway, by picturing broadcast a pleasant-faced man in overalls. In these days of regulation, if not before, this is a true characterization of "Mr. Electric Railway"—a workingman, giving an honest day's service for a fair living wage. That is all he gets.

While of the usual high order of value and interest, this C.E.R.A. convention was disappointing in one feature. The reports made by the Engineering Council did not show the accomplishment that it seemed fair to expect. The three principal committee reports, published on page 146, were expected to crystallize out of the various round-table discussions of the sectional groups, some very definite recommendations as to best practices and as to standardization. However, very little progress in these directions is discernible, and much of the matter contained in the reports is common knowledge. Of course, the functioning of the Engineering Council is still in the experimental stage, but the results thus far show clearly the need for more definiteness of procedure.

It is unquestionably a fine thing for the track, line, power and equipment men to meet and have these round-table exchanges of experience. But if these meetings are not going to get anywhere, the value of the discussions and the interest will rapidly disappear. Thus far there has been a notable tendency to cover the same old ground in the discussions without bringing out of it some definite conclusion or consensus of opinion.

Perhaps the remedy lies in having some executive, who is an engineer by training and experience, sit in the sectional meetings and act as sponsor, with the duty of bringing the discussions down to definite conclusions. In other words, this would be a plan similar to that now followed with each committee of the national railway associations, which is sponsored by a member of the executive committee of the association. The opportunity to do a most valuable piece of work in standardizing practices and equipment among the many interconnecting interurban systems of the C.E.R.A. territory is so great that it is to be hoped that the matter will be given the study it merits, looking toward a plan that will bring accomplishment.

The Air Brake Is a Vital Auxiliary

THE discussion which has gone on for years regarding the relative merits of different methods of emergency braking led the Central Electric Railway Association to undertake a series of tests, the results of which are described in this week's issue. The committee concludes that while there is no one best way to stop a car in an emergency, it may be said that the best practice for a car equipped with air brakes is to apply emergency air and sand, simultaneously throwing the controller to the off position. While this result is not unexpected by those who have made a serious study of the problem, it serves to refute the statements frequently made that reversal of the motors or dynamic braking is preferable in an emergency, or that a motorman did not do all in his power to stop the car if he did not use electrical braking.

The greatest braking force that can be used on a car is that which will just fail to lock the wheels. With excellent track conditions this results in a retardation somewhere in the neighborhood of 4.5 to 5 m.p.h. per second. In the tests, especially those on the Birney car, this figure was very closely approached.

It is significant that in general the average rate of retardation secured was greater with emergency application of air than with the electrical methods. Probably a considerable amount of this was due to the psychological factor, the men being trained so that almost by instinct power is thrown off and the emergency air applied when danger occurs.

One of the great difficulties with the electrical method of braking is that if sufficient force is used to make a rapid stop there is danger of a closely set circuit breaker blowing out, which of course removes all the braking force and allows the car to move without restriction. Both this and dynamic braking, in which the motors are used as generators, place severe strains on the electrical equipment, and sometimes results in burned out windings or connections serving to remove the braking effort. In the test, as is to be expected, these methods, were found more erratic than air.

The real value of electrical methods of braking is in case anything happens to the air brakes so that they are inoperative. It is, of course, comforting to know that an auxiliary brake exists which can be called on in such cases, even though it is not as efficient as the regular air brake. For this reason it is well not to be-

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little this form of braking, though the air should be relied on as long as it is in working condition.

Since these tests were made very largely for use in court cases, in which the distance to stop a car is called into question, particular attention should be paid to the fact that the rail conditions under which they were made were better than those frequently obtained on busy streets. The rails were either clean and dry or else thoroughly wet, both of which conditions make for a shorter stopping distance than when a thin film of moisture or vegetation or a light fall of snow is on the rail head. For this reason the results of the tests should be regarded as minimum distances, rather than the average or maximum, in which a car can be stopped. Under commonly met conditions the distance a car will travel after the brakes are applied is considerably more than those recorded in the tests.

Zoning Laws Aid Transit Operation

ONE of the most serious problems in our large cities today is that of traffic congestion. Electric railways are hampered not only by the vehicular congestion in the streets but also by extreme concentration of traffic on their own lines in certain localities. Usually such troubles are the result of imperfections in the original layout of the city. After congestion has developed it is too late to make over the street plan. Zoning laws, however, are being recognized as an extremely useful method of localizing the evils of imperfect planning and preventing their recurrence in new places.

Zoning laws should have the hearty indorsement of the electric railway industry. They make possible a reasonable forecast concerning the future development of various sections of the community. They permit the railway to plan today to meet to-morrow's needs. They prevent sudden and unexpected changes in the character of service demanded by a particular locality.

If zoning is done in time the various streets are used in the way for which they were laid out. By establishing permanently the character of different sections of the city, narrow streets designed for light traffic are prevented from being choked with the greater volume of traffic which might accompany the change from a residential to a commercial neighborhood.

Changes Needed in Rules for Formulating Standards

THE efforts of the American Electric Railway Engineering Association are constantly directed toward standardization. The work is assuming larger proportions through the activities of the association in connection with its status as a member body of the American Engineering Standards Committee. There must soon be a distinct change in the work of the association in regard to its methods of creating standards because the A.E.S.C. rules of procedure must now be followed if national standardization is desired.

The A.E.S.C. has decided that no subject matter may be presented for standardization after Jan. 1, 1924, under Rule 4, which permits the submission of matter already adopted by the member bodies or in process up to Jan. 1, 1920. After Jan 1, 1924, it will be necessary to request the formation of sectional committees in the A.E.S.C. to secure the broad degree of standardization which A.E.S.C. approval gives.

To the Engineering Association this means that any standard which involves manufacturers and other associations and interests as possible users can no longer be assigned to some standing committee for sole preparation. Standing committees henceforth will probably assume the nature of advisory committees which will function by collecting data and conferring with the association representatives on the several A.E.S.C. sectional committees.

Just how to co-ordinate this work on the new lines will require careful study, in order that initiative may not be stifled, that accuracy may be maintained and that the required actions may be speeded up. The present routine of assignment of subjects by the executive committee to standing committees; study and final report of the standing committees; reference to and study by the committee on standards; reports to convention by both standing and standards committees; and convention debate and action, altogether requires from one to three or more years. It is clearly impracticable to hold to all of this procedure if ever the subjects in hand are to get to and through the A.E.S.C. sectional committee grist mill.

Other member bodies of the A.E.S.C. are, no doubt, facing the same problem. An inquiry as to how they are trying to meet it might serve to guide in the formulation of new rules of procedure within the Engineering Association.

Politics Versus Efficiency

THE summary dismissal of a prominent and experienced engineer from his position as head of the United States Reclamation Service and the appointment in his stead of a combination grocer, banker and politician is an occurrence which technical men view with dismay and indignation. To turn out of office, after thirty years of faithful government service, such a man as Arthur P. Davis, a past-president of the American Society of Civil Engineers, would be regrettable enough at best, but the manner in which it was accomplished and the strange qualifications possessed by his successor throw an even darker cloud over the whole affair.

The position of director of the Reclamation Service was protected by the civil service law. In order to effect this change it was necessary to abolish the position which Mr. Davis held and to create an entirely new position. This in itself was a gross violation of the spirit of the law, if not of its letter.

The arguments presented in favor of a business man, rather than an engineer, for the head of this service are wholly specious. Efficient direction is what is needed in the government service, rather than salesmanship or a shrewd ability to juggle profits and losses. For such work an administrator is wanted more than a so-called business man. The engineer who possesses the happy faculty of handling men as well as broad technical knowledge makes an ideal administrator. Proof of this may be found in the increasing number of engineers selected to fill administrative positions.

In no other field is this more true than in the railway industry. Railway men will surely sympathize therefore with the efforts of the American Society of Civil Engineers and the Federated American Engineering Societies to have the whole situation thoroughly investigated. Every detail of this unpleasant affair should be brought out into full daylight.

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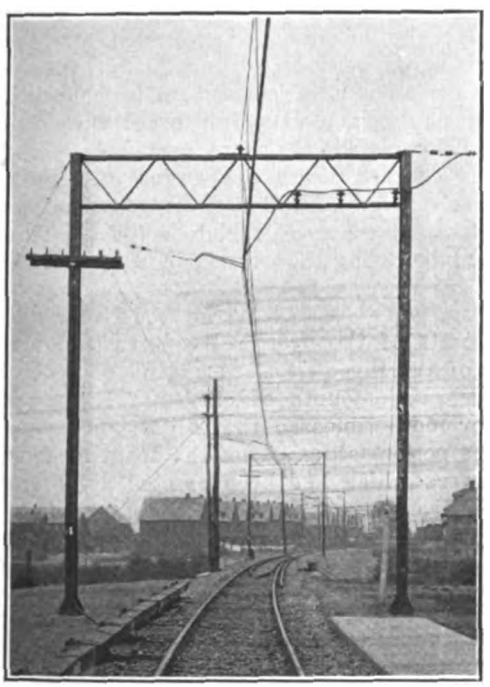
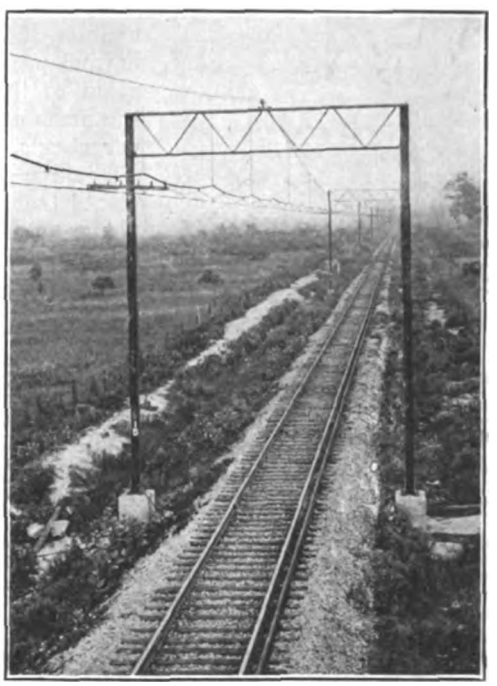
Collecting 5,400 Amp. at 58 M.P.H.

In Recent Tests at Erie a New Form of Overhead Trolley Suspension Is Tried—With a Pantograph Collector Large Amounts of Current Are Drawn Without Difficulty—New Type Is a Modification of the Usual Catenary Construction

TO SECURE information as to the amount of current that can be collected successfully from an overhead trolley wire, the General Electric Company has been carrying on an elaborate series of tests on its experimental track at Erie, Pa. The construction work involved the erection and test of various types of contact wires and suspension, culminating in the selection of the compound catenary with a so-called laced suspension of the contact wire. A public demonstration and test of this latter type was held July 16, 17 and 18, as described in this paper in the issue of July 21. The present article describes in more detail the engineering features of the installation.





Left, Curve Construction, Supported from Lattice Column Bridges. Center, Tangent Construction Supported from Solid Column Bridges. Right, Latticed Side Bracket Construction on Tangent

For the successful collection of current from an overhead wire it is essential that the contact or contacts between the working conductor and the collector be maintained at all times. Any irregularity in the contact that may cause visible arcing must be avoided. Arcing is a much greater factor in the deterioration of the contact wire than is mechanical wear due to the sliding friction. The aim in designing the overhead construction has been to comply with this essential, and the demonstration has shown the possibility of collecting sufficient current to handle the heaviest trains, even at moderate contact-line voltages.

TEST TRACK DESIGNED FOR HIGH SPEED

For testing locomotives the General Electric Company makes use of the eastern division of the East Erie Commercial Railroad, a subsidiary. That portion of the track which is used for testing purposes is at present 2¾ miles in length, while an extension now under construction will give a total length of 4¼ miles. The portion used for high-speed running is about 2½ miles long, the remainder being required for slowing down the train. Included in the high-speed section is about 1 mile of level tangent track, beyond which there is a slightly ascending grade with curves of from 1 to 1½ deg. The rails weigh 100 lb. per yard, being laid on wood ties with 24 in. spacing and placed in broken stone or slag ballast. The track was carefully aligned and tamped preparatory to the series of tests and gave extremely smooth riding conditions.

The supporting structures are of various types to illustrate different methods of construction. Beginning about 600 ft. west of the substation near the west end of the test track, and from which the line is supplied, the first thirteen bridges are of the latticed column type, while bridges 14 to 18 are Bethlehem column bridges. The structures from No. 19 to No. 23 are latticed channel bracket poles; No. 24 to No. 28, 10-in. Bethlehem bracket poles; No. 29 to No. 33, 9-in. Bethlehem bracket poles. The last structure, No. 34, is a latticed column bridge used for an anchor. The spacing of the supports is 300 ft. throughout. Several types of structure are shown in the illustrations. All of the steel structural work was supplied by the Archbold-Brady Company.

The overhead construction is of the compound catenary type, having a steel messenger from which are hung a feeder messenger and the contact wires. For the entire length of the test section the steel messenger is a ⅝-in., seven-strand high-strength steel cable. The feeder cable is suspended from it by vertical hangers

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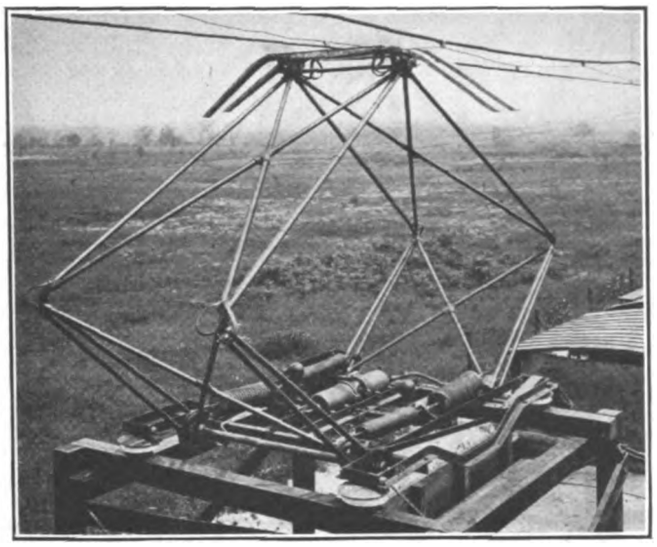
of proper lengths to keep the points of support of the feeder in a horizontal plane. The form of hangers to be used has not been finally determined at yet. For the greater portion of the line the suspension was made with plain wire hangers, twisted about the messenger and the feeder. A short section was fitted with hangers made of copper tubing, flattened at the ends and bent over the cables, being held in position with bolts.

The feeder messenger for the first 4,500 ft. from the substation is a 1,000,000-circ.mil stranded copper cable and for the remainder of the line a 750,000-circ.mil copper cable.

The contact conductors are located 22 ft. above the rail. Except for a short section, between bridges 16



View of Pantograph and Method of Suspension of Contact Line

and 20, the contact line consists of two No. 0000 grooved hard-drawn copper trolley wires hanging side by side. The short section has two No. 000000 copper wires, being the same in all other respects. The two wires are allowed to hang freely, and touch at all points.

The two contact wires are hung from the feeder messenger by means of a stranded copper cable, size 0, which is laced back and forth between the feeder and alternate trolley wires. The construction is shown in the illustrations, although the proximity of the two contact wires makes it somewhat difficult to distinguish between them. The lacing cable is fastened by a clip to the feeder messenger, then at a point 5 ft. away to one of the contact wires, then 5 ft. farther along to the feeder, 5 ft. beyond that to the other contact wire, and so on. This makes a 20-ft. spacing between clips on each wire. The lacing cable is given such a tension that the contact wires are approximately 6 in. below the feeder messenger. This requires an over-run of but 5 ft. of lacing for each 1,000 ft. of line.

By means of this form of suspension each clip on a contact wire is opposite the center of the free span for the other contact wire, which is slightly below, due to the sag. It is this arrangement that has eliminated hard spots in the contact line.

In order to test the effect of spacing of the clips, some of the sections of the contact line are supported at 15-ft. points instead of 20 ft. The difference in operation has not been found noticeable.

The accompanying table gives the calculated weights and resistances for several sizes of feeder messenger.

For the current-collection tests a train was made up with a 110-ton gearless locomotive arranged for operation on 750 or 1,500 volts. The locomotive is equipped with four bipolar gearless motors and is capable of speeds up to 90 m.p.h. Behind this was a gondola in which were installed sufficient grid resistors to draw the current for the tests. By remote-controlled contactors, sections of these resistors could be inserted or removed to adjust the current to the value called for in each particular test. The gondola was followed by a coach, in which were fitted instruments for indicating the speed and the current being drawn from the trolley wire.

Normally current is taken through one pantograph of the General Electric Company's type 501. For the tests it was desired to use two pantographs, and on account of the short length of the locomotive cab, the second one was mounted on the gondola car to simulate operating conditions.

The pantographs are practically the same as those used on the Chicago, Milwaukee & St. Paul electrification, being of the sliding type. The slider pan is held against the wires by means of compressed air, the normal pressure being between 30 and 35 lb. On account of the large amount of current to be collected, the arms of the pantograph were reinforced with copper straps, and flexible shunts were provided around all joints. The contact pieces are strips of copper, placed transversely to the direction of travel. The two strips are separated by a space which is filled with a solid grease for lubricating the wire.

Conduct of the Tests

A series of tests of the overhead construction was made on each of the three days, consisting of several different speeds and amounts of current. Each was repeated one or more times so that all the observers could watch the action, either from the train or from observation towers which had been erected at several points along the route.

The first test was made to collect 4,000 amp. from a 1,500-volt circuit at speeds of 50 to 60 m.p.h. The train was accelerated as rapidly as possible to the maximum speed, which was from 56 to 58 m.p.h., and the load applied through the grids. The second test was similar, except that the voltage was reduced to about 850. The purpose of this was to show that the difference in the contact line potential had no effect on the current collection.

The third and fourth tests were made at 5,000 amp. at 30 m.p.h and 60 m.p.h. respectively, with two pantographs. Owing to the limited capacity of the power plant and substation these high-current tests were confined to 850 volts.

Following the completion of these four tests, a fifth one was run to collect 5,000 amp. with one pantograph at speeds up to 60 m.p.h. The current actually varied

CALCULATED DATA ON THE SEVERAL SIZES OF LACED SUSPENSION

WEIGHT AND RESISTANCE PER 1,000 FT. WITH TWO NO. 0000 COPPER CONTACT WIRES AND NO. 0 LACING*

Area in Circ. mils			Resistance in Ohms at 50 deg. C. (122 deg. F.)
Feeder Messenger	Total	Weight	
1,000,000	1,528,735	4,706 lb.	0.00752
750,000	1,278,735	3,931 lb.	0.00899
300,000	828,735	2,532 lb.	0.0139
4/0	740,335	2,259 lb.	0.0155

WEIGHT AND RESISTANCE PER 1,000 FT. WITH TWO NO. 000000 COPPER CONTACT WIRES AND NO. 0 LACING*

1,000,000	1,964,735	5,426 lb.	0.00587

* 5-ft. over-run of lacing per 1,000 ft.

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between 5,200 and 5,400, the maximum speed recorded being 58 m.p.h.

In all the tests the feature remarked on was the ease of collection and absence of any sparking or flashing at the contact. In the entire series but two or three small arcs were observed. The general appearance seemed to be that the pressure of the pantograph was sufficient to lift the contact wires from their normal position some 3 in., the wires appearing to move up and down in a wave as the contact passed beneath. This was made possible by the flexibility of the lacing cable. In this way there was no opportunity for the pantograph to leave the wire. It seemed to make practically no difference whether the power was supplied at 850 or 1,500 volts, and the collection was about equally good at all speeds.

According to statements made by the engineers, 1,500 amp. at 3,000 volts is representative of a 7,000-ton freight train at 40 m.p.h. on level track. The current with such a train would range between 1,500 and 3,000, depending on the grade and the acceleration. The Chicago, Milwaukee & St. Paul freight locomotives are rated at 840 amp. continuously, and the current at the maximum tractive effort with 25 per cent adhesion is 1,200 amp. At its continuous rating this locomotive would haul 12,000 tons on the level at 15 m.p.h.

A 1,500-ton passenger train at 70 m.p.h. would take representative currents of 1,200 amp., increasing possibly to 4,000 amp. with the locomotive starting at 25 per cent tractive coefficient. It is believed by the company's engineers, as the result of the tests, that one pantograph is adequate for service where the maximum current requirement per locomotive is not in excess of 4,000 amp., and that two pantographs will take care of a maximum requirement up to 6,000 amp. The reason for the lower relative rating with two pantographs is that it seldom is possible to divide the current evenly between two collectors.

It was stated that the new suspension should apply equally well for alternating current as it did in the tests with direct current. This would remove any limitation as to contact line voltage, since if the arcing is eliminated the one great cause of trolley wire wear is absent.

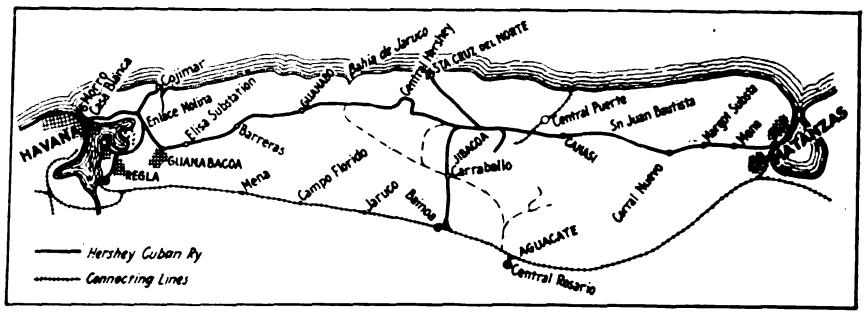
The tests were made under the general supervision of W. B. Potter, traction engineer. J. J. Linebaugh was in charge of the construction and the actual conduct of the tests.

Electric Railway Construction and Operation in Cuba—I

How and Why the Hershey-Cuban Electric Railway Was Built—Some of the Electrical Difficulties Caused by the Moist, Warm Tropical Climate and How They Were Overcome

By L. Geenens
Chief Electrical Engineer Hershey Cuban Railway

As a large user of sugar for the manufacture of chocolate, the Hershey Chocolate Corporation of Hershey, Pa., decided some years ago to build its own sugar mill in Cuba. A site, later known as Central Hershey, was selected on the north coast, half way between the ports of Havana and Matanzas, some 60 miles apart.



Map of Hershey-Cuban Railway

Successful sugar mill operation requires an appropriate network of railroad lines to convey the sugar cane from the fields to the mill and move the finished sugar to the waterfront. These lines are usually owned and operated by the sugar mill and are not in public service. They are operated during the six months of crop only. The Hershey railroad system, however, was developed on the principle that it should be a self-supporting enterprise instead of being merely an accessory to the sugar manufacture. By extending the line to Havana and Matanzas an all-year passenger and freight service could be established in addition to the sugar mill service.

A part of the road was built first to transport the construction materials for the sugar mill, which was completed in 1918. The remainder of the line was laid immediately afterward. The line passes through a hilly country, necessitating a considerable number of grades. This circumstance, together with the possibility of establishing a high-speed interurban service, led to the electrification of the line. This work was carried on together with the track laying and ballasting. The line was officially opened and electrically operated between Havana and Matanzas on Oct. 5, 1922.

A map of the road, which is known as the Hershey Cuban Railway, is published on this page. The length of main line from Casa Blanca, across the bay from Havana, to Matanzas is 56 miles (90 km.). There are also four branches with an aggregate length of 21 miles (54 km.). The center of operation is at Central Hershey, where is located the sugar mill of the Hershey corporation, the power plant, railway shops, offices, etc.

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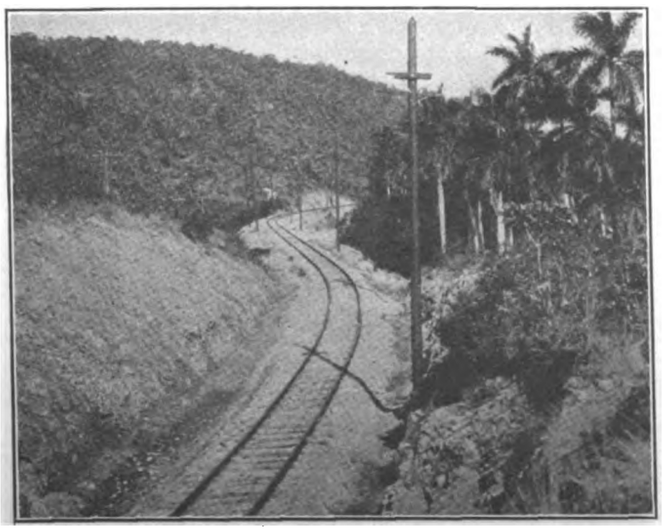
This Line Is Equipped with a 1,200-Volt Catenary, and Though Built Primarily to Haul Sugar Cane to the Mill to Be Crushed and Then to Haul Sugar to the Waterfront, It Is Doing an Increasing Business in Passengers and General Freight

The power plant was built in 1920 and started service in February, 1921. It is located alongside the sugar mill, and the new buildings were given the same architectural treatment. The boiler house is in a separate building from the turbine house. Both are steel structures with red cement tile roofing and plastered walls. On account of the tropical location special attention was paid to the ventilation of the buildings. Both have monitor roofs with continuous sash, top hung, extending the whole length of the monitors. The engine room has five rows of top hung sash windows extending all around the building. The boiler room is open on all sides.

The turbine building is 116 ft. x 40 ft. and the boiler house is 14 ft. x 70 ft. The 200-ft. brick chimney is located between the two buildings. At the present time Mexican crude oil is being burned, but the boiler room has been designed to provide for changing to coal should this be desired.

The plant has at present a generating capacity of 6,000 kw. at 0.8 power factor, 2,300 volts, three phase, 60 cycles in three General Electric turbo-alternators of 2,000 kw. each. Steam is generated at 250 lb. with from 150 to 200 deg. F. superheat in four oil-fired water-tube boilers of 500 hp. each. The air for the generators is taken from inside the turbine room and is washed before it enters the generators. The hot air is discharged outside through an underground tunnel.



In Many Places the Road Passes Through a Tropical Forest

The auxiliaries of the turbines are electrically driven, each unit being provided with a motor-driven circulation water pump, hot well pump and air washer spray pump. The power for these auxiliaries is obtained from the main busbar through step-down transformers at 440 volts, three phase. These transformers also supply power for the house pump, crane, etc. The circulation water for the condensers is cooled in a spray cooling pond.

The 2,300-volt, three-phase bus voltage is stepped up to 33,000 volts for transmission by means of two banks of outdoor transformers of 3,000 kva. each. These transformers are single phase, oil cooled and are provided with radiators. The high-tension bus and oil switches controlling the two outgoing transmission lines are located in a separate room back of the main switchboard on the turbine floor.

An electrical connection of 300 kw. exists between the railway power plant and the power plant of the sugar mill. This current is used outside of the grinding season to operate the cranes, elevators, etc., and also, during the season, on non-grinding days.

The average kilowatt-hours generated per gallon of fuel oil over a period of two years has been 5.2 kw.-hr. as registered on the meters at the busbars. As the load increases, the kilowatt-hours per gallon also increase, and the daily average reaches as high as 5.6 and 5.8 kw.-hr. per gallon with heavy loads. There is a noted difference in the quality of oil between one tank and another and in an exceptional case 6.2 kw.-hr. per gallon was obtained.

The main railway substation is located at one end of the turbine floor, and includes duplicate sets of two 600-volt, 500-kw. rotary converters connected in series for 1,200 volts. The corresponding switchboard with the air circuit breakers is installed in line with the main switchboard. One switchboard operator takes care of both the main board and the substation. The transformers for the rotaries are located below the rotaries on the ground floor inside concrete compartments separated from the plant by means of steel rolling doors. From each compartment a chimney extends to the top of the building for ventilation. There are two full automatic substations of 1,000 kw. each.

The contact wire consists of a No. 0000 grooved copper trolley wire suspended from a ten-point catenary on 150-ft. spans. The messenger is a $\frac{7}{16}$-in. Siemens-Martin seven-wire strand double-galvanized cable.

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There are no splices in the trolley wire, the ends being dead ended at the mast arms. The galvanized T-iron mast arms are supported from 45-ft. creosoted poles which also carry the feeders and transmission lines.

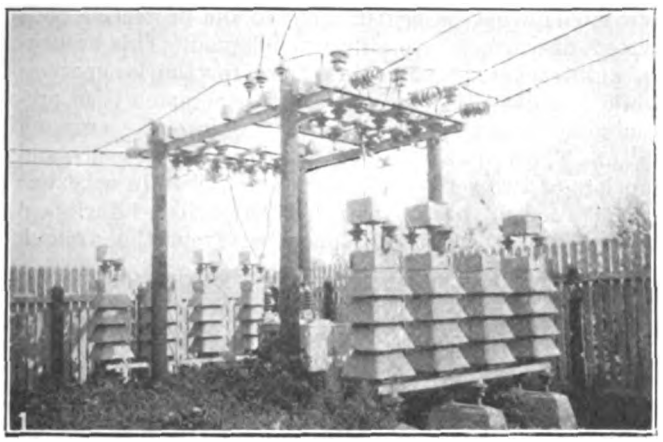
The overhead covers a total of 100 miles (160 km.) of track with 56 miles (90 km.) of main line.

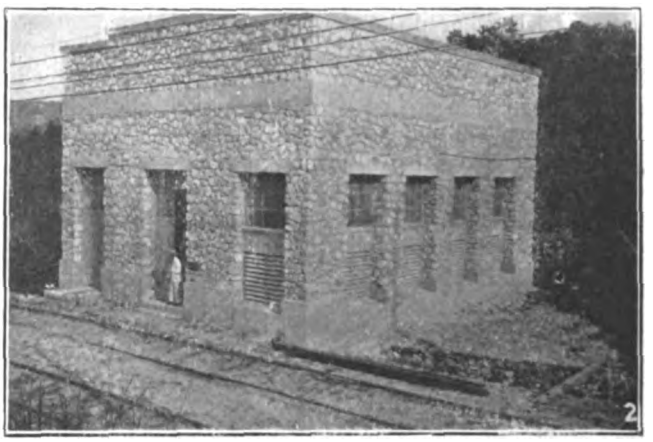
An all-aluminum stranded feeder of 795,000 circ.mils extends the whole length of the line with an additional feeder of the same section extending for 8 miles each way from the main substation, this section containing heavy grades and being the concentration point of all sugar cane trains. The feeders and trolleys are cut at the main substation and enter the 1,200-volt bus through air circuit breakers. Feeders and trolleys are continuous between the main substation and each end of the line, there being no section switches. The automatic substations are tied in the system through current-limiting resistances.

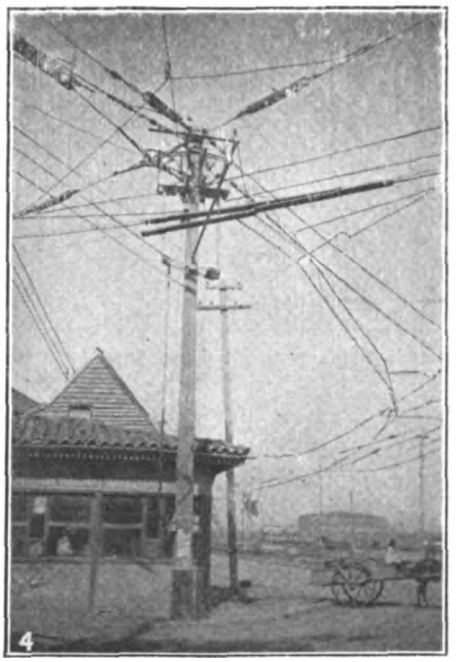
The poles were set at 10 ft. from the center of track to the center of pole, at a depth of 9 ft. below the top of the rail and with a rake of 6 in. in 24 ft.

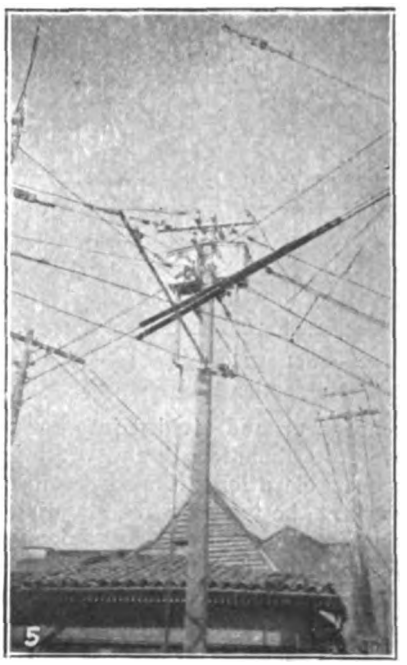
The digging of holes and also the setting of poles was given out on contracts. A first contract for digging holes was paid at the rate of $4.50 for holes in rock and $2.50 in dirt. Holes with part dirt and part rock were paid for on a percentage of these figures, corresponding to the ratio between the heights occupied in the holes by the respective materials. As the nature of the soil was not well known, this rate of pay protected both parties. Later, however, a uniform price of $3 was established as constituting an average figure resulting from the experience obtained with the first scheme. The company supplied digging tools and tents but no explosives.

The contract for setting poles was let at the rate of $5.65 for 45-ft. poles and $4.90 for 40-ft. poles. In these figures were included the removal of loose dirt in the holes, the setting of poles, installing ground cable every fifth pole, installing three crossarms with braces and pins at each pole but without tightening the bolts nor installing the lag screws of the braces at the pole. The latter adjustments were done later by the company's line crew. The contractor and his crew, all of whom were colored of British origin, were left free to follow the method of erection which suited them best and they received all possible assistance from the railway representatives. A light-weight wooden A-frame was used with an extension on the top and properly









Power for the Hershey Cuban Railway Is Supplied to the Trolley at 1,200 Volts

No. 1—33,000-volt outdoor metering station with short-circuiting switches to disconnect the meter without interrupting the service.

No. 2—Automatic substation at Margot, with a capacity of 1,000 kw.

No. 3—A typical narrow street in Casa Blanca.

Nos. 4 and 5—The switching device at Matanzas, where the 1,200-volt line crosses two tracks of a street railway equipped with 600 volts.

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guyed with ropes. A 1-in. rope double blocked was hitched to a team of bulls and these were made to lift the poles. A crew of ten men would erect from six to eight poles per day. This work was carried on in 1919 and 1920, a time during which a severe labor shortage was experienced. It was completed during 1922, when conditions were more favorable, and a contract price of $5.50 was obtained covering both the digging of the hole and the setting of the pole.

The erection of the overhead lines was done by the company itself, as no competent contractor could be found for this kind of work. It was soon apparent that British colored labor from Jamaica and other British possessions was best suited for this work. They are steady workers, are good climbers, like good food and thus are physically fit to render such heavy work under a tropical climate. Some of these men had acquired knowledge of line work at the Panama Canal, others were trained by the superintendent in charge of lines. A crew of nineteen men including a cook was lodged in sugar cane cars which had been properly boarded up and divided into rooms. A floor was built over the whole length and width of each car and at the proper elevation from the rails to allow linemen to work at the trolley while standing on this floor. These platforms were very convenient for all trolley work. When installing the hangers of the catenary, the whole camp was pulled out and constituted a continuous platform extending over more than one span. The crew was distributed along this platform at 15 ft. apart, and the ten hangers of the span were installed at the same time and with only one stop of the locomotive.

A reel car for eleven reels was made in the shops and used to pay out all the conductors. The No. 0 aluminum transmission cable and the 750,000-circ.mil aluminum feeders were paid out on the ground along the track and lifted on the poles at the same time that the insulators were installed and the bolts of the crossarms tightened, all this constituting one operation for small gangs composed of two linemen and one ground man.

During rainy days the crew was kept in the camp and made to prepare trolley dead-ends, cement messenger insulators and in general prepare line fixtures.

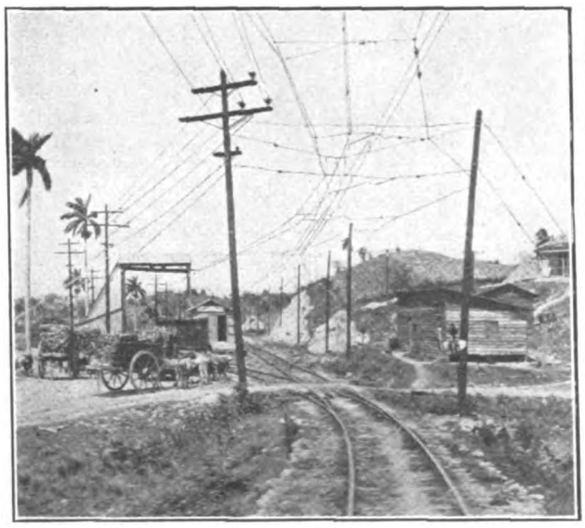
The guy anchors were made up of concrete blocks, 19 in. x 19 in. square, 6 in. thick in the center and 3 in. on the sides. A 1:3:5 mixture was used with ¾-in. stone. Twenty-five concrete poles of 38 ft. and 45 ft. heights were built and installed where city regulations prohibit the use of wooden poles.

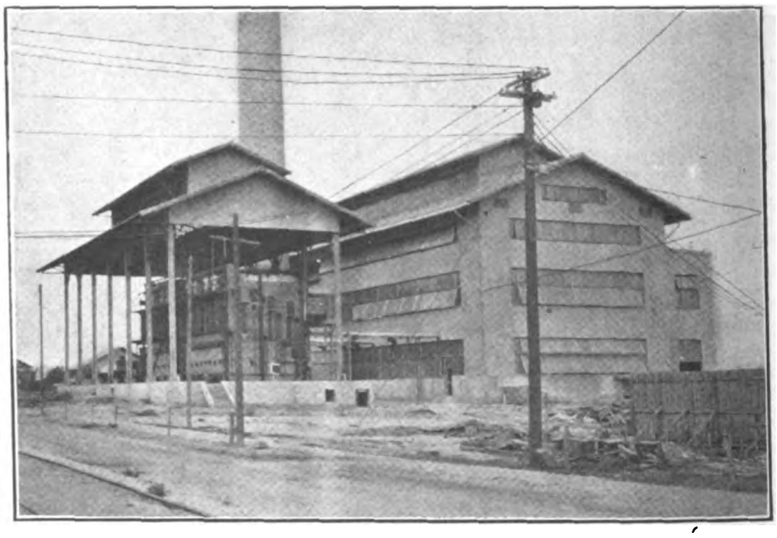
Overhead Crossings with 600-Volt Lines

Two crossings occur between the 1,200-volt catenary of the railway and the 600-volt direct-suspension trolleys of local street railway companies. One is in the city of Matanzas and the other at Regla, a suburb of Havana. In the first case two street railway tracks at 60 ft. apart cross the railway's track in a sharp curve and grade. As heavy freight trains pass here, coasting across could not be relied upon, so the protective zone system of overhead crossing was adopted. This assures an uninterrupted live contact wire for the locomotives while passing the crossings and at the same time prevents the street cars from coasting into the crossing train. The switching outfit was made up locally and consists of two sets of double-pole switches in asbestos-lined wooden boxes and mechanically interlocked through a rocker bracket operated from the ground. The switches are normally set for 600-volt operation over the crossing and are locked in this position by means of a railway switch lock. Train crews throw the switches over to 1,200-volt operation when they approach the crossing. No signals are needed as it is physically impossible to coast through the dead zones because of the existence of sharp curves and grades.

The second crossing between the 1,200-volt catenary and a 600-volt direct suspension was more complicated because of the existence of both a positive and negative trolley wire at 18 in. one from the other. Three such crossings existed at distances of some 150 ft. apart through city blocks and in an unusually narrow street. A switching system with protective zones would not have given the results expected as the street cars were able to coast into the crossing from a long distance back, due to a combination of grades in the streets. As an experiment, a system of overhead crossing pieces was developed locally whereby the two wheel trolleys of the street car pass with an uninterrupted live contact wire while the pantographs slide through the crossing without coming in contact with the 600-volt wire. The 1,200-volt catenary is killed for a distance of 5 ft. each side of the crossing.

The device consists essentially of two wooden troughs containing the wheel trolley wires and a system of





Left—Typical Siding and Cane Loader. Right—Owing to the Tropical Conditions, the Turbine Room Is Provided with More than the Usual Amount of Ventilation, and the Boiler Room Has a Roof with No Sides

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hinged wooden flappers which are pushed across the troughs by the pantographs and thus prevent the latter from rising so as to touch the 600-volt wires. The device was made of Cuban hardwood, which resists the climate better than iron and needs no painting.

The 33,000-volt outdoor metering stations, for metering current sold to distributing companies, of which one is shown on page 129, were built on the principle that as little iron as possible should be used and where employed it should be so located that it can be painted without having to kill the station. It should be explained that paint is used because galvanized fixtures show rust within a year and some even get rusty while in transit. Iron exposed to the weather and the salt mists in Cuba has to be painted twice a year.

The meters and lightning arresters were set on the ground on concrete bases. The disconnecting switches and choke coils were installed on timbers which, in turn, are supported from I-beams bolted to four creosoted poles. These timbers are of native Cuban wood called "caoba" and will resist the weather better than the iron and need no painting.

Bonding

Acetylene-welded bonds of No. 0000 B.&S. copper strand were installed on both rails of the main line, while on sidings only one rail was bonded. A competent contractor undertook this work at 95 cents per bond, the railroad supplying him with a powerful motor car for moving his equipment along the track. All expenses of gasoline, acetylene gas, etc., were paid by the contractor. This welding was done during the night, as the extreme heat of the day was a handicap for the welders.

Mexican crude oil was splashed on the bonds while hot for the purpose of discouraging stealing. Only a part of the bonds were so treated, however, as it increased the labor cost materially. Thus far, there has been no stealing of either the treated or untreated bonds. Both rails are grounded at each stream crossed by the railroad in order to eliminate any possibility of potential on these rails.

Overcoming Flashovers on the Transmission Lines

The railway does some commercial light and power business in the localities served by the railway. The power is sold wholesale at 33,000 volts, three-phase, to local distributing companies through high-voltage outdoor meters. The most important of these companies is the Matanzas Public Service Company, operating in the city of Matanzas, at the eastern terminal of the railway.

The transmission lines are carried on the trolley poles and consist of No. 0 aluminum steel-reinforced cable on 150-ft. spans, supported on pin-type insulators with steel pins, wooden crossarms and angle-iron braces. Insulators of 45,000-volt rating were installed.

The experience of other power companies operating high-voltage lines in Cuba had shown that some trouble was to be expected from the presence, during the winter months, of mists entraining a very appreciable amount of salt from the sea. The first line was put under tension in March, 1921, between the power plant and Matanzas. Trouble did not develop, however, until the following fall. On certain nights, insulators located on steel towers near the plant and at the end of the line along the seashore flashed over, tripping the line. On such nights, all the insulators of the line show a corona light between petticoats. When the sun rises, the moisture on the insulators dries and the phenomenon disappears.

An examination of the insulators showed that those located on the steel towers which carry the lines through city streets were heavily coated with dust raised from the street, while the insulators along the right-of-way were fairly clean. An analysis of this coating showed 8 per cent salt by weight. Rain would wash the insulators, but as there is no rain for months at a time, the combination of dust, salt and moisture soon develops into a hard coating which gradually becomes more conductive.

To remove this coating the insulators were first washed at intervals with a solution of caustic soda. This washing was done between 4 and 6 a.m., as this was the only time available. It developed, however, that unless the insulators were wiped dry, flashes would take place as soon as the voltage was re-established. Experience showed that a dry wiping with paper while the insulators were moist was more effective in removing the salt.

This phenomenon disappears in the spring, toward March, and is never noticed during the summer or fall.

To overcome these troubles the insulators were set on wooden crossarms in turn bolted to the steel towers. This was an improvement, but toward the end of the following winter the insulators flashed over again when enough dust and salt had accumulated. The crossarms had also a tendency to burn.

It was then decided to introduce a higher insulation on all steel structures. Hewlett strings of four 15,000-volt disks were installed, and, wherever needed, 60,000-volt pin-type insulators were used. This plan proved entirely successful in eliminating flashovers.

It will be interesting to note that the same 45,000-volt insulators on wooden poles are not flashing over, although some are exposed to the same dust and atmospheric conditions. An extension of the line was built last fall and was carried on steel poles along the bay of Matanzas and thus directly exposed to the salt mists. Strings of four disks with metal caps proved entirely unsatisfactory. All sorts of insulators on hand were tried. Disk insulators without metal caps stood up better than those with such caps, and pin types with many small petticoats proved more satisfactory than when a few large petticoats were used. Where string insulators were maintained, six disks were introduced.

It should be noted that this phenomenon was also felt on the steel towers and outdoor bus structures at the power plant, located 3 miles from shore, showing that this condition is not localized near the sea but penetrates inland for quite a distance. On such nights the air is usually calm. On windy nights it would not take place.

Although the dust accumulating on the petticoats acts as a support for the salt and thus encourages the flashovers, certain cases show that even with a clean insulator a breakdown will take place under severe atmospheric conditions. On several occasions wooden crossarms on steel towers caught fire through leakage over 60,000-volt pin-type insulators, where 1 ft. of crossarm separated the steel pin of the insulator from the tower proper. These insulators were found to be as clean as could be expected anywhere.

During these cases, the other insulators on the tow-

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ers show sparks between the lower petticoats and crossarms and sometimes along the crossarms all the way to the towers.

These conditions last for one hour or so in the early evening. During that time a cold mist has been noticed which is carried over from the sea.

The lightning period lasts from April until October and corresponds to the "rainy season" of tropical climates. During this period, there is a lightning storm practically every day around 2 p.m. Certain localities are more exposed to these storms than others. It was observed that some 90 per cent of the storms would occur east of Central Hershey, while very few would occur on the west. There would be more direct strokes on the Bainoa branch and near the Margot substation than on any other part of the line. The hills around the substation may account for this particular exposure.

The transmission lines are protected by means of oxide film arresters and, in addition, there is a ¼-in. steel ground cable over the lines east of Central Hershey, while on the west the ground cable has been omitted. The substations are protected on the trolley side by means of aluminum cell arresters and the electric cars are also protected with arresters of this type.

During the two years of operation, the voltage was never off the transmission line because of lightning troubles, although a considerable number of strain insulators were shattered on the trolley lines located below the transmission. Insulators of pantographs also were blown up, and direct strokes entered the substations and did considerable damage to apparatus. In general, experience has shown that the lightning discharges in this district are violent and very destructive and that the best lightning protection should be applied.

Rolling stock and transportation methods will be treated in the second and final installment of this article.

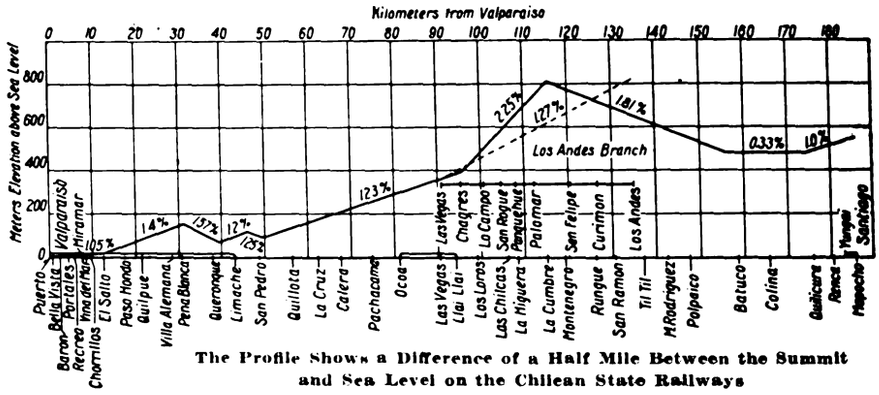
Chile Inaugurates Electric Operation

The President of the Republic, Acting as Engineer, Operates First Train—Report on Status of This Project Brought Up to Date—Details Briefly Reviewed

PRESIDENT ALESSANDRI of Chile occupied the engineer's cab on the first electric train to run from Santiago to Til Til, thus inaugurating electric operation on the Chilean State Railways. The large number of guests who attended the inauguration of electric operation included the Secretaries of the Interior, State and Industry, Railroads, War and Justice, the United States Ambassador, Hon. W. M. Collier; the Colombian Minister, Señor Carlos Uribe; the Director of Railroads, Señor Jaramillo, and other high officials of the railroads, and the engineers from the firms of Errazuriz, Simpson & Company and the Westinghouse Electric & Manufacturing Company.

It will be remembered that this electrification contract, awarded to the Westinghouse Electric & Manufacturing Company, amounted to $7,000,000, and involved the electrification of 144 route-miles, 116 from Valparaiso to Santiago, and 28 in a branch from the main line to Los Andes. Already 90 per cent of the concrete posts are in place, and the majority of the feeder lines and catenary trolley wire is up. About 6,500 posts and 1,200 tons of copper, aluminum and steel cables are required.

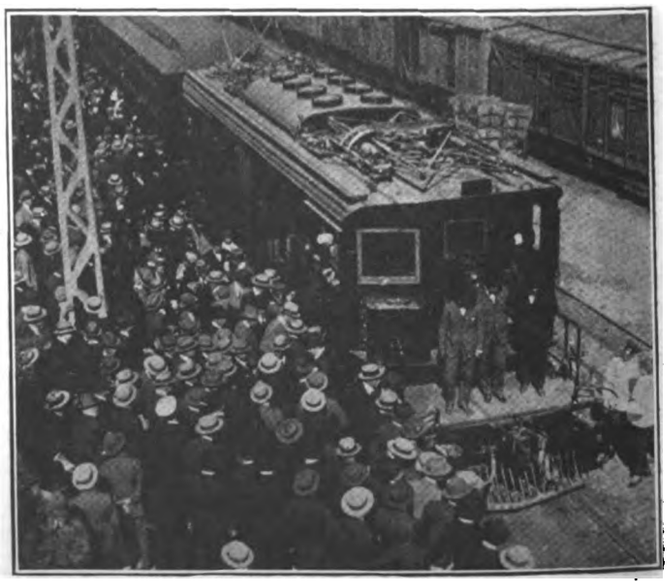
There are five substations involved which transform



The Profile Shows a Difference of a Half Mile Between the Summit and Sea Level on the Chilean State Railways

the high-tension, three-phase current from the hydroelectric power plants to 3,000 volts d.c. as used on the locomotives. The two power plants, Maitenes and Florida, are owned by the Compania de Electricidad, Ltd., and are located on the Maipo River. The substations are located at Quilicura, Rungue, Llai Llai, San Pedro, and Vina del Mar. The first and last of these receive 12,000-volt current and the three others 44,000-volt current. Each substation has two 2,000-kw. motor-generator units and is divided into two compartments, one for the transformers and one for the motor-generator sets.

The buildings are entirely of steel and concrete and are completed. The installation of all electrical equipment has been completed at the Quilicura substation, and is rapidly nearing completion in the four others. The line material, transformers and electrical equipment for the substations filled sixty-five railroad cars when shipped from the Westinghouse works and required two steamers to transport from Philadelphia to Valparaiso.



Greeting the First Electric Train on the Chilean State Railway at Til Til

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The contract included thirty-nine electric locomotives which will replace more than 100 steam locomotives. There are six express passenger locomotives of 2,250 hp. and weighing approximately 130 tons. They will carry first and second-class cars between Santiago and Valparaiso at a maximum speed of 62.5 m.p.h. These have six motors, are of the 2-6-0+0-6-2 classification and are designed for regenerative braking, which not only provides greater safety on the down grades and saves wear of brakeshoes and wheels, but actually returns energy to the lines. These locomotives have all been delivered and are assembled.

There are fifteen road freight locomotives of 1,680 hp., weighing 115 tons each and developing a speed of 40 m.p.h. These locomotives have six motors and are of the 0-6-0+0-6-0 classification. These locomotives have also been delivered.

There are eleven local passenger locomotives of 1,500 hp. and weighing 80 tons. These will be used in local service with frequent stops and carrying first, second and third-class cars at a maximum speed of 56 m.p.h. These locomotives have four motors, duplicates of those on the express passenger locomotives. They are of the 0-4-0+0-4-0 classification. These locomotives are rapidly nearing completion in the Westinghouse works at East Pittsburgh.

In addition to the passenger engines, there are seven switching locomotives of 480 hp., weighing 67 tons and developing a speed of 34 m.p.h. These locomotives have four motors and steeple type cabs. Some of these are now on the way to Chile, and the balance will soon leave East Pittsburgh.

This Chilean electrification project has been fully covered in earlier articles in ELECTRIC RAILWAY JOURNAL which appeared as follows: Vol. 59, page 151, 309, 667, 988; Vol. 60, page 325.

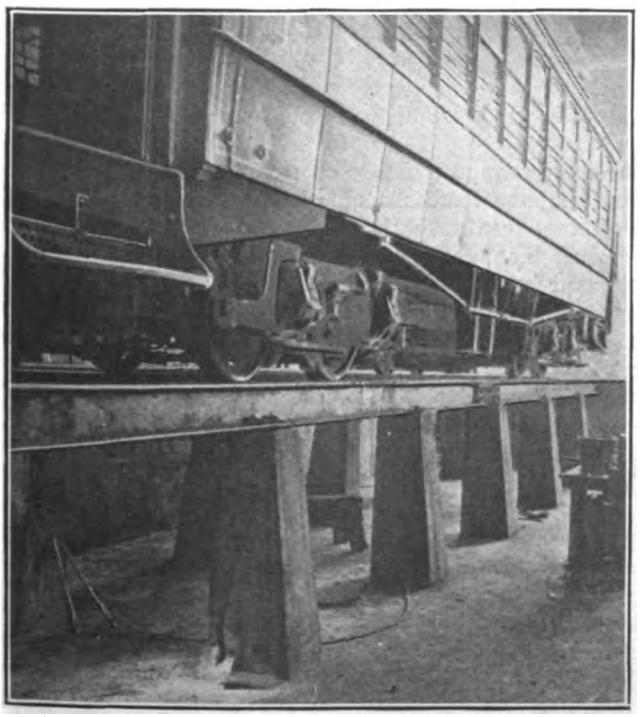
Observations on the Railway Situation in Three Virginia Cities

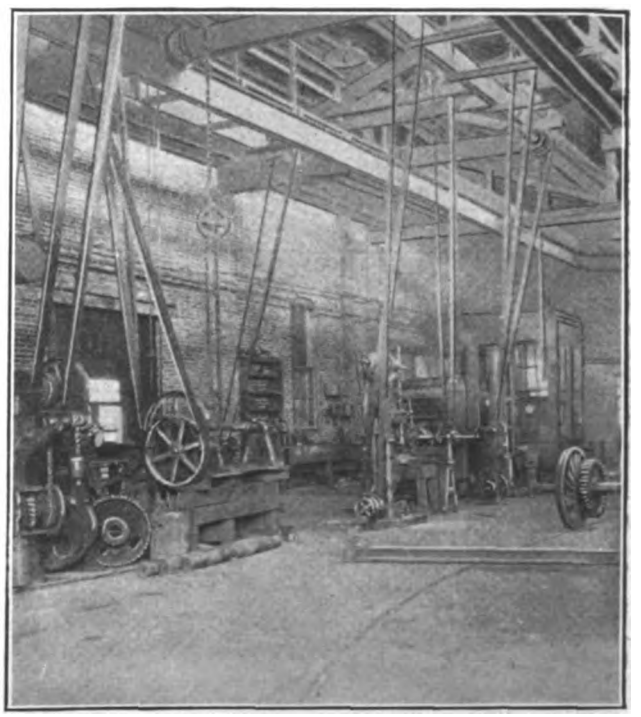
In Hampton, Newport News and Roanoke the Solution of the Transportation Problem Is Frequent Service—Fares Are Low, but Proximity of Residence and Business Districts Encourages Pedestrian Competition

By "Spectator"

AT THE time I visited Hampton, last month, the Newport News & Hampton Railway, Gas & Electric Company was in the throes of a voluntary valuation which was being made at the suggestion of the state commission. This was to be submitted to the several municipal councils involved and if acceptable will be made the basis of future negotiations. The company was assisted in this work by W. D. Maltbie of Baltimore, but the appraisal was the work of the company's staff. The fare is low, being only 5 cents per zone. There are three zones on the system—Newport News, Hampton and Phoebus and Old Point Comfort.

While the fare in each zone is low, by present-day standards, the cities served are of such size that many





Left—Overhauling Work Is Facilitated at Hampton by This Substitute for Pits. Right—Skylights Give the Machine Shop a Cheerful Appearance

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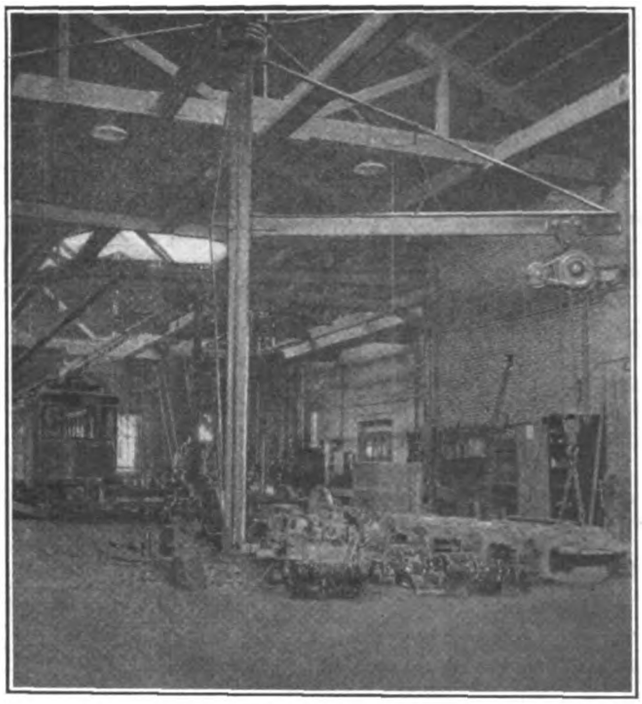
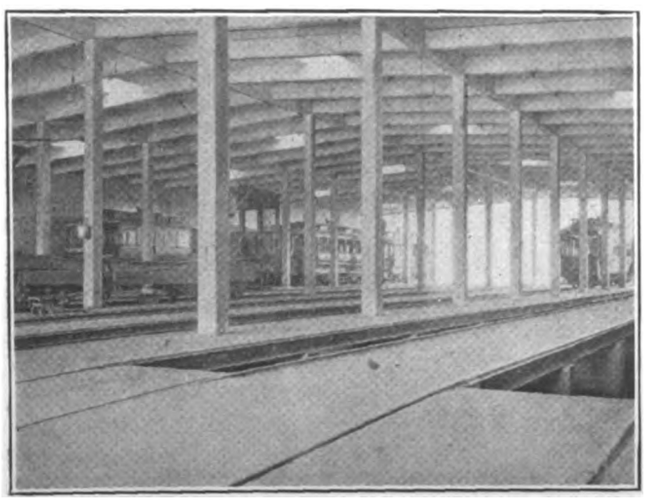


Mechanical Devices Are Used to Eliminate Manual Lifting and Carrying in the Hampton Shops

Coal for the Power Plant at Roanoke Is Handled by Means of a Traveling Clamshell Bucket



The Carhouse at Roanoke Is Fireproof and Is Well Provided with Inspection Pits

patrons would walk if it were higher. The same principle applies to the service given, which is more liberal than the traffic warrants, also judged by usual standards. The traffic is unusually sensitive to headway. Fortunately this company has a diversified business which enables it to weather the storms of electric railway tribulation.

The present fare of 5 cents is the result of a recent reduction from 6 cents. The effect of the reduction was increased traffic on some lines much more than sufficient to make up the difference; on other lines this was not so. The net result was a slight reduction in income so far. The ultimate result will be awaited with interest.

I was impressed, at Hampton, by the shop layout and procedure, which for a property of moderate size seemed unusually good. The shops are laid out to facilitate simultaneous work on different parts of a car while it is undergoing overhaul. Cars are completely overhauled after they have made 75,000 miles, or at the rate of two cars per month. Two spare equipments are kept constantly on the floor ready for installation. As a result of close attention to details there were last year only 359 failures of equipment for nearly 1,700,000 car-miles, involving more than 21,000 operations. There were but fourteen armature failures and one field failure. In these shops the moving of heavy objects by manual labor is reduced to a minimum.

Roanoke Also Operates on a 5-Cent Fare

On the way to Bluefield to study the Norfolk & Western electrification, I stopped off at Roanoke, which is the administrative headquarters of the N. & W. I found President N. D. Maher and his associates full of enthusiasm for electric operation and desirous of extending it. An interview with Mr. Maher, published in the July 14 issue of this paper, in my opinion reflects the attitude of the railroad management toward this important development.

The electric railway problem in Roanoke is similar to that at Hampton. The local utility, the Roanoke Railway & Electric Company, is a subsidiary of the American Electric Power Company, formerly the American Railways Company of Philadelphia. As in the case of most combined utilities, the non-railway section of the property has of late years been more profitable than the railway, and it is due in part to this situation that the company has been able to give service at the low fare of 5 cents on the urban lines. J. W. Hancock, general manager, explained that the company is restricted by its franchise to a 5-cent urban fare, but that on the line running from Roanoke to and through Salem (9 miles) there are three 5-cent zones, with ticket fares of 10 and 12½ cents. The company also operates cars from Roanoke to Vinton (3 miles). Another factor which enables the company to maintain a 5-cent fare is that the average length of ride in the municipalities is short.

The company is now building additional passing points on the interurban division. It is getting from another subsidiary company six cars, which are being released there by new cars of lighter weight. These four-motor double-truck cars fit in very well, after some remodeling, with the present equipment at Roanoke. With these additional cars and improved track facilities the company will be in position to cut the headway on the interurban division in half. Getting these cars at a low valuation the local company can

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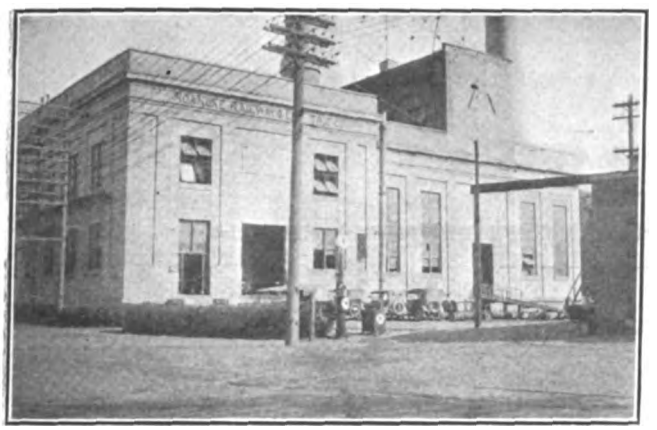

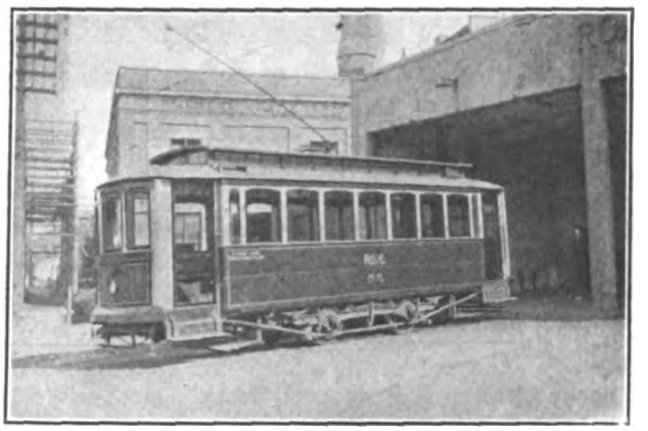

At Left, the Roanoke Power Plant. At Right, a Typical City Car at the Entrance to the Carhouse

furnish the added service without proportionate increase in overhead expenses. While on a large property the addition of a half dozen cars might not seem important, it means an increase of nearly 15 per cent here.

The company is also reconstructing some of its old car equipment for one-man operation.

The management believes that with improved car service between Roanoke and the suburban towns of Salem and Vinton the use of private automobiles will be decreased. Of assistance in this is the difficulty of securing parking places for automobiles in the downtown district, the streets of Roanoke being narrow.

The Readers' Forum

Use of Welding Wire Specificatians Urged

CITY OF DETROIT
DEPARTMENT OF STREET RAILWAYS
DETROIT, MICH., June 25, 1923.

To the Editors:

I was much interested in the editorial on page 992 of the ELECTRIC RAILWAY JOURNAL for June 16, 1923, under the caption "Railways Should Use Welding Wire Specifications Drawn by Welding Society." Would it not be a good idea for the ELECTRIC RAILWAY JOURNAL to publish these specifications in toto, either as an insert or a permanent part of some future issue, in order that they may be more readily available to electric railway users?

Our welding division, particularly in the winter time, does considerable reclamation work for other divisions, such as welding gear cases, making repairs to track machinery, etc. This work covers not only iron and steel but brass, copper and, in one or two instances, we have had occasion to weld aluminum.

It is my opinion that the only way to have these specifications put into practical use is to cram them into the users' heads. While they can be obtained from the American Welding Society at what may be considered a nominal price, still there seems to be no disposition on the part of electric railway users to purchase welding wire according to these specifications. A campaign of education should be taken up in order to create more particular interest.

H. M. GOULD,
Electrical engineer.

[The editors agree with Mr. Gould that the practical use of the welding wire specifications, as published by the American Welding Society, has been neglected by both the electric railway operators and manufacturers. It is hoped that by publishing Mr. Gould's letter attention will be called to the desirability of these specifications, leading to their more general adoption.

There is always great pressure on the columns of this paper for the publication of news and articles relating to electric railway practice. For this reason the editors would prefer, if possible, not to publish the welding specifications in full, believing that the readers would prefer to have that space devoted to material which cannot be obtained elsewhere. The American Welding Society is the logical publisher for welding specifications, and these specifications can be obtained from the society at a nominal price.—EDITORS.]

Electric Door Operating Mechanism

THE West Penn Railways, Connellsville, Pa., being equipped with magnetic brakes, has no compressed air supply on its cars for the operation of auxiliaries. A simple door-operating mechanism has been worked out, which is quite as satisfactory for this company's service as the standard pneumatic control.

Center side doors are employed on the interurban cars. They are of the standard folding type, there being two doors at each side, and each door consists of two leaves, hinged together. The doors on each side of the car are equipped with an independent control. This is accomplished through the use of a small 250-volt electric motor, which moves the doors through a system of spur gearing. The power supply is controlled by small drum controllers, one for each side, located above the conductor's compartment in the middle of the car. These drum controllers may be operated from any position in the car through the use of cords, similar to the bell cord. Should the doors be closed, a pull on one of these cords moves the drum controller, to which it is attached by means of a ratchet, so that the motor is energized and the doors opened. A second pull on the cord will close the doors. The doors on either side of the car may be controlled independently.

The use of this device permits the conductor to move freely through the car, collecting fares or performing other duties, but still having the doors under his control at all times. In this way the car operation is facilitated.

Handles are provided above the doors, so that merely by turning the large gear they may be operated by hand. The operating mechanism is not disturbed by this procedure, so that no complicated connections are needed to provide this emergency feature.

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Association News & Discussions

Public Relations and Freight Main Topics at C.E.R.A. Summer Meeting

Three-Day Convention at Cedar Point, Ohio, Has Usual Interest—Engineering Council Reports on Work Done Toward Development of Best Practices—Better Public Understanding of the Railways Was the Keynote of the Convention's Mission

THREE HUNDRED strong, the men of the Central Electric Railway Association and their families gathered at the famous Cedar Point summer resort on Lake Erie for the annual summer convention. While many felt that this was not the equivalent of the usual six-day cruise on the Great Lakes, the land convention was at least a welcome change and every one seemed thoroughly to enjoy the meetings and the recreation. There were five morning and afternoon business sessions on July 18, 19 and 20, with the question of public relations standing out as the predominant interest of the convention. Some time was also devoted to engineering subjects, the Engineering Council having charge of the Thursday afternoon session and making report on the results of its endeavors. Another meeting was largely devoted to the subject of freight traffic.

A dance on Wednesday evening and a banquet on Thursday evening comprised the planned entertainment aside from that afforded by the popular beach and other Cedar Point amusements. At the banquet, J. P. Barnes, president Louisville Railway and president of the association, ably presided, as he did over the business meetings. The principal speaker at the banquet was John B. Maling of New Haven, Ind., whose subject was the "Origin and Effect of Class and Freak Legislation." In a most interesting exposition of facts, he pointed out the great dangers in our present political tendencies and inspired the delegates with the need for every educated citizen to give something of his time and effort in support of the constitution and the fundamentals of our form of government. At this banquet, the delegates were entertained by the Inspectors' Quartet of the Louisville Railway. whose songs were enthusiastically received.

The President's Address

At the first session, on Wednesday morning, President Barnes addressed the convention briefly, as follows:

"Looking over the programs of conventions of railway associations, during several years the predominant note will probably be found to be an ever-increasing emphasis upon the position of the railway as a public servant, accompanied by an increasing breadth of vision as to the real meanings of this public service. Now service is of many kinds and each wears its own and appropriate livery. Mark Twain in the 'Yankee in King Arthur's Court' makes the Yankee complain of the discomfort of his armor. In response King Arthur points out to him that armor is the livery of knightly service and is a proud burden proudly borne. So should the livery of the public servant be proudly worn in the knowledge that our service, well and truly rendered, does indeed make livable the modern city, and that without it the people would perish.

"More and more emphasis is being placed from year to year and from convention to convention on public relations. The importance of frankness and honesty in public relations is no longer a matter of discussion, so obvious has it become and so generally recognized. We have truly reached the day when 'backstairs' are obsolete and our proud being of public service is unashamed to enter by the front door of commission or executive office.

"All of this is neither novel nor unfamiliar to this audience and is mentioned here but as the background for the picture of our industry today. The problems—many of them—of today will be discussed as our program unfolds, and there remains for your presiding officer but one thought to express before we proceed.

"Inward conditions will find reflection in external relations, as truly in corporate as in individual life. Seldom is the dyspeptic individual a pleasant companion, and seldom is the internally sour corporation a pleasant or efficient public servant. I doubt if an unpleasant public servant can be an efficient one, for the delicate adjustment of correct public relations depends largely on the cordial public reactions that arise from pleasure in the service received.

"I doubt, also, whether pleasure can be derived from a service which is not touched with some degree of pleasure in the service itself by the one who renders it. How could you or I, working under conditions of discomfort, restraint and uncertainty, render a service to any person that would be productive of real pleasure to that person? How can any employee of our corporations do that thing?

"Let us look, then, to the adjustment of our internal mechanisms. Let us see that methods and working conditions are not only reasonable but as comfortable as may be. Let us take a real interest and concern in the state of mind of our company's employees. And, let us go to trouble, expense and personal inconvenience, if necessary, to understand the mental and spiritual, as well as the physical, conditions under which our public service is rendered.

"Would we be efficient public servants, let us be pleasant public servants, and let us see to it that each individual on our payrolls gets the vision, so far as we can carry it to him, and reflects in his individual attitude to his labors the attitude of the corporation to its public service—a proud burden proudly borne."

Following the president's address, Secretary L. E. Earlywine made an extended progress report on the various activities of the association. He showed the association to be in a healthy condition financially and that the committee work was well in hand. Among things done by the Central Electric Traffic Association, as noted by the secretary, an item of general interest is the decision that value of excess baggage carried will be limited to $500 for any individual. Another item was the conclusion reached by a vote of eighteen lines for and eight opposed, that the present per diem charges for freight equipment on interchange, of $1 a day for the first seven days and $2 a day thereafter, should be increased to $5 a day after five days.

Progress reports were made by James Harmon for the safety committee, John S. Bleecker for the publicity committee, and M. B. Lambert for the supply men's committee.

Discussion on Freight Possibilities

That the future success of the interurban lies in the further development of the freight business was the opinion of T. H. Stoffel, whose paper on this subject appears elsewhere in this issue. That it is a profitable venture for the interurban railways was largely concurred in by those who discussed the paper.

J. S. Bleecker raised some questions as to the proper method of allocating expenditures between freight and passenger service, which induced considerable discussion, the gist of which was that regardless of the accounting details as to the manner of distributing expenses, if the final result shows a net earning larger than without the freight business, then the freight business is profitable. It was brought out, however, that there must be a reasonably accurate allocation of expense, in order

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that it may be possible to avoid taking classes of business which are unprofitable.

Attention was called to the standard allocation recommended by the American Electric Railway Accountants' Association, which makes the division on a mileage basis as to fixed charges and divides employees' salaries in proportion to the time actually spent in each branch of the service. It was thought that although the freight business could be classed as a by-product at the start, after it reaches the point that it is responsible for 50 per cent of the gross revenue, then it should be classed as a separate department and the fixed charges carefully allocated.

Harry Reid, president Interstate Public Service Company, said that six years ago the freight business on his property amounted to 6 per cent of the gross revenue, while today it is in excess of 42 per cent of the gross. He mentioned the additional equipment and facilities which have been provided for handling freight and pointed out that in addition to the direct benefit to the railway in the way of increased revenue, there has also been an indirect benefit as a result of the favorable attitude created with the people on account of this additional transportation service.

Charles L. Henry, president Indianapolis & Cincinnati Traction Company, spoke to the effect that he believed the success of the electric railways depends in final analysis on the freight business, for it certainly is not apparent that the passenger business is going to increase sufficiently to make money for the interurbans. As evidence of his faith in the prospects for hauling freight in a profitable way, he referred to the extensive freight terminal that is about to be built in Indianapolis as a joint proposition of the several interurban lines entering there. He said this would probably be the finest interurban freight terminal in the United States.

Recognizing the fact that the private automobile, motor bus and motor truck are certain to find a traffic which they can haul profitably, Mr. Henry said that the interurban railways must develop that kind of traffic which the automotive vehicles cannot economically handle. As an example of this he cited the hauling of livestock by the Indiana interurbans and reviewed the circumstances which led the farmers to propose and support the passage of legislation authorizing the hauling of livestock through the city streets. This livestock service now brings an average of 170 carloads of business per month.

L. G. Parker, Cleveland Frog & Switch Company, said that the Cleveland Chamber of Commerce had been influential in bringing the electric lines a 200 per cent increase in their freight business during last year. This was distributed among the interurban lines in proportion to their ability to handle it.

H. A. Nicholl, general manager Union Traction Company of Indiana, expressed some doubt as to the general profitableness of livestock haulage. He said that where it was necessary to make long hauls in one direction and operate empty on the return trip, it was difficult to show a profit. He pointed out also that a great many things, such as lack of standardization of cars, sufficient capacity of sidings and stations, and lack of co-operation between traffic men on foreign lines, tended to prevent the building up rapidly of a profitable through freight business.

A timely meeting of the committee on standardization of freight equipment was called immediately following this discussion.

P. V. C. See, Akron, Ohio, said, in regard to freight equipment, that the Northern Ohio Traction & Light Company had at first made use of reconstructed passenger cars, built over with round ends and nicely painted and having a length of 50 ft. With this equipment there had been no trouble with the various municipalities through which the line runs, but it was found that trouble developed from overloading, from too great speed, and from the fact that the cars were too long. This resulted in high maintenance expense. On the freight cars purchased since the original equipment, the length has been reduced to 40 ft. and the gear ratio reduced so that the possible speed is 30 m.p.h. instead of 50. This has materially reduced the operating cost, one factor being that the 40-ft. cars are built very strong.

Mention was made of the possibilities of the interurban railways going into the pick-up and delivery service and Mr. Barnes said that in connection with a survey of the Kentucky lines of the Louisville Railway Company by A. C. Eastman, it had been recommended that the railway not enter into this character of service as it is seldom profitable.

Manufacturers' Part in Developing Railways

A paper on "What Manufacturers Have Done for the Electric Railway Industry" was presented at the Thursday morning session by H. L. Andrews, railway engineer General Electric Company. In this paper, Mr. Andrews summed up the imposing list of contributions which the manufacturers have made in the development of transportation equipment and power apparatus. The period through which the railways have been passing has called for methods of increasing the earnings and reducing the expenses. Working in these directions, the manufacturers have produced the Birney safety car, which Mr. Andrews said is responsible for adding from $17,000,000 to $18,000,000 to this year's net earnings of more than 400 companies using them. The extension of the safety features and one-man idea to other city and interurban cars is adding further savings which probably amount to about $4,000,000. The low-wheel light-weight interurban and city cars in use on more than sixty city and interurban properties will add more than $5,000,000 to this year's net earnings of the companies using them.

Other contributions of the manufacturers are the automatic control for substations; the development of the turbine, which has reduced the coal consumption from 7 to 8 lb. per kilowatt-hour to 2 lb. or less; the 60-cycle rotary converter, which has made it more practical to purchase power from central station companies rather than operate small generating plants in order to produce 25-cycle energy; the development of equipment for increased voltages, making transmission of energy over long distances more economical; the development of the commutating pole and ventilated type railway motor, which has resulted in a reduction of average maintenance cost from $3.50 to $5 per 1,000 motor-miles to 50 cents to $1 per 1,000 motor-miles; the production of multiple-unit control for train operation; the modernizing of air compressors and the introduction of automatic air brakes, with the striking development of the safety devices; and numerous labor-saving tools and machines for use in railway shops.

Mr. Andrews showed a comparison recently worked out to illustrate the reduction in investment cost made possible by modern motor design.

The following table is based on the sales of railway motors in this country by the two large electrical manufacturers for the year 1922. The upper figures represent the approximate number, weight and selling price of the motors actually sold; the lower figures are what a similar number of the heavier non-ventilated type of equal working capacity would have weighed and cost had the manufacturers remained idle for the previous ten years.

RAILWAY MOTOR SALES

Horse Power	No. Sold	Approximate Weight In Pounds	Approximate Price
25	3400	3,400,000	$2,550,000
35-45	3800	6,150,000	4,200,000
50	950	2,170,000	1,250,000
60-70	940	2,800,000	1,400,000
Total...	9090	14,820,000	$9,400,000
SAME VOLUME OF SALES WITH NON-VENTILATED MOTORS			
35	3400	6,800,000	$4,100,000
50	3800	10,500,000	5,720,000
60-70	950	3,300,000	1,630,000
75-90	940	4,250,000	2,100,000
Total ...	9090	24,850,000	$13,550,000
Savings to operators		10,030,000	$4,150,000

These figures indicate that the economies obtained by the railway industry in one year directly due to motor development were measured by 10,030,000 lb. less weight to be carried on the rails and $4,150,000 less in investment. The annual saving from this would be about $600,000 in fixed charges and at least as much more in operating costs.

Discussing Mr. Andrews' paper, M. B. Lambert pointed out that the operators have in many cases also taken the initiative and have presented ideas which have formed the basis of fundamental developments, such, for example, as the low-floor, small-wheel car.

The work being done by the state committees and by the Indiana Committee on Public Utility Information in particular was presented in a paper

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by John C. Mellett, which appears elsewhere in this issue. This paper was discussed by Labert St. Clair, E. F. Kelley, Harry L. Brown, J. S. Bleecker and J. W. Colton. The importance of the right kind of publicity was emphasized and of the need for continuous, consistent effort in this direction. That the railways are taking this work up seriously was indicated by the report that 300 companies in the Central West are now advertising and that 170 of these are using purchased newspaper space for the purpose. The American Electric Railway Association is co-operating with the state committees, which are best able to handle this work locally, by supplying them regularly with information and statistics. There are now only fourteen states in the country which do not have committees actively working or in process of formation to broadcast utility facts.

The advantages to be derived from personal contact between railway executives and the communities which they serve, the ready medium for advertising offered by space in the cars, and the necessity for frequent changes of copy used for this purpose were also pointed out. It was shown that any form of advertising campaign should be carefully planned and consistently carried out by setting aside in the budget a definite appropriation for this purpose. The amount of this appropriation was discussed, it being pointed out that one company considered one-half of 1 per cent of the gross not too much. It was urged that a definite appropriation for publicity and advertising purposes should be made, even though it amounted to only one-tenth of 1 per cent of the gross, and that on such a basis effective work could be accomplished.

Engineering Council Session

The Central Electric Railway Engineering Council was in charge of the Thursday afternoon session, with Frank R. Coates presiding. The work of the council was reviewed in a series of short papers covering the scope and advantages of this work, which were read by the directors of the four sections. Rufus Moses, Youngstown, Ohio, outlined the purpose of the council and said that it should devote its activities to the solution of immediate construction and maintenance problems, rather than to the preparation of technical papers or the development of standards, which should properly be left to the national bodies. A. V. Brown, Sandusky, Ohio, went into the necessity for proper support of this work on the part of the executives, emphasizing the desirability of their attendance at sessions of the council. L. A. Mitchell, Anderson, Ind., showed how the council benefited the railway industry by helping the mechanical department heads through the interchange of ideas and the co-operative study of maintenance problems and methods. This tends to hold the cost of such work to a minimum. The future of the council was treated by Charles L. Stiles, Columbus, Ohio, who contended that it depends on the support received from executives of member companies.

The reports of the committees on track and roadway, power supply and transmission, and car equipment were presented by the three chairmen, T. H. David, G. H. Kelsay, and P. V. C. See, respectively. The work of these committees of the Engineering Council consisted of a presentation of the conclusions developed out of discussions on certain specific maintenance and operating questions. These reports are printed on succeeding pages of this issue. M. B. Lambert and J. P. Barnes took exception, in the discussion of the car equipment report, to allowing more than $\frac{1}{16}$-in. wear on axle bearings. A suggestion was also made that the conclusions in the report on emergency stop tests be compiled in legal terms for use by member companies in defending damage suits.

The report of the committee on track and roadway was accepted as "suggested practice" by the convention; that of the power and transmission committee was accepted in so far as definite recommendations were made; and the report of the committee on car equipment was referred back to the committee for further consideration.

William P. Day, president International Steel Tie Company, made a brief talk on the importance of tamping concrete under the ties and rails in building modern permanent type track. His talk was illustrated with two motion picture films which showed how this tamping was done on several railway properties.

At the final meeting on Friday morning, a talk was made by C. A. Boddie on the use of wired wireless by electric railway and central station companies. This appears in abstract elsewhere in this issue.

The main topic of the Friday morning meeting was "Co-operation of Manufacturers," which was presented by E. F. Wickwire. This address was enthusiastically received and is printed practically in full elsewhere in this issue.

Building in the Public Mind the True Conception of the Railway*

The Chairman of the A. E. R. A. Committee on Co-operation of Manufacturers States in Humorous But Pointed Manner How Manufacturers and Railways Can Jointly Create a Powerful Influence that Will Change the Popular Misconception of the Railways and Stave Off Proposed Ill-Advised Legislation

By E. F. Wickwire
Secretary Ohio Brass Company, Mansfield, Ohio

FIRST permit me to say that I think the man who invented conventions must have been troubled with insomnia. When I woke up this morning I looked in the next room and saw Jimmy Walker standing in front of the mirror with his eyes closed. I said, "What's the big idea, Jimmy?" He said, "Oh, I just want to see how I look when I'm asleep."

I might as well confess that I had very little sleep myself last night. So the first thing this morning I thought I'd take a little dip in the lake. When I got out on the beach a lady rushed up and said to me, "Excuse me, sir, but are you a lifeguard?" I said, "No, lady, I'm a wreck."

It won't take you long to discover that making speeches is not my specialty. In fact, when I come to Cedar Point I usually go out on the beach and practice my regular profession—astronomy, or gazing at the heavenly bodies.

We all know that for many years the general public was led to believe that electric railway companies were plutocratic; were coining money on a lot of watered stock, and that even 5 cents was too much for a ride on the trolley, no matter what the distance. In fact, the more people got in the way of trolley transportation the less they apparently expected to pay for it—just the reverse of what they demand in respect to other commodities.

We all realize that it's hard to deal with the public and get the true story across to it. It don't seem inclined to recognize the fact that it's probably more difficult to approach 100 per cent service in the electric railway business than in any other industry and it makes no allowance for that fact.

And lack of recognition often leads to serious results. For instance, you all remember the night the amendment went into effect. And the night after, when you went home sober and your dog bit you.

In short, it became evident to all of us a long time ago that the public needs more light on the subject, as the fellow said who took a lamp when he went courting. He met a friend who laughed at him and said, "Why, I never took a lamp when I went courting." The other fellow said, "No, and just see what you got."

Legislation directed against public utilities has won hearty applause from a large percentage of unthinking people who have not realized that their own welfare is connected with the fortunes of the very enterprises they are attacking.

A man will buy a house on the installment plan, paying so much a month. And in two years his payments will be just about one lap ahead of his depre-

*Address made before Central Electric Railway Association at Cedar Point, Ohio, July 20, practically in full.

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ciation. Yet the same man seems to think that every dollar a public utility takes in is profit.

So the trolley companies long ago recognized the importance of getting the true facts of the electric railway situation across to that man, and some very excellent work has been done by the trolleys along that line. Unfortunately, however, a great many people are still suspicious of public utilities and are disposed to discount statements and articles put out directly by the utilities, especially in the form of paid advertising. And, as Northcliffe once said, "You can't disarm the nations until you have disarmed suspicion."

I'm driving at the psychology of this proposition. How many of you in this meeting would think of standing up and attempting to set forth your own virtues and expect to get away with it? But you might not hesitate to get up and extol the merits of your friend next to you, and the chances are the rest of us would believe you, especially if we didn't know him better than you did.

About two years ago the American Electric Railway Association realized the significance of this psychological fact and also the fact that to educate the public effectively required a still broader and more comprehensive effort than had been put forth.

Unless the educational work is done thoroughly there is danger of the public becoming somewhat confused, like the Irishman who was visiting his friend in America. Pat saw some cranberries for the first time. "Whut's thim?" "Cranberries," answered Mike. "And whut are they for?" "Why," says Mike, "they're foine to eat. When they're cooked right they make better apple sauce than prunes do."

The association awoke to a greater realization of the fact that electric railways have occasion to buy products of a great many manufacturers. It therefore follows that the prosperity of these manufacturers is closely linked with the welfare of the electric railway industry. So they decided to promote the idea of a closer relationship with the manufacturers, on the theory that two bodies which do not quite present the desired impression when standing apart, oftentimes harmonize when joined together.

Like the fellow and girl I saw on the beach this morning. He was very bowlegged and she was extremely knock-kneed. And yet, when standing together, they formed a perfect "O.K."

So the A.E.R.A. started a movement to enlist the active support of the manufacturers, and to that end appointed a committee to organize and direct the work, which I think is a pretty good committee, making allowance for the fact that it is burdened with me as its chairman.

Our committee was organized at the beginning of 1922, and its aim, in a nutshell, was to enlist the active co-operation of manufacturers in a comprehensive effort to improve the relations of the electric railway industry and the public.

One of the first and most important moves of the committee was to arouse the interest and active support of the vast army of employees and stockholders of manufacturers identified with the industry. And that was a problem of education. Strange as it may seem, very few of this influential section of the public realized that they had a dollars and cents interest in the welfare of the trolleys. Practically no effort has been made to educate them along this line, and yet there were many ready-to-use avenues open through

The Conception of "Mr. Electric Railway" Held by the Average Person, According to Mr. Wickwire

which this education could readily be carried on.

For instance, many of the manufacturers have factory publications and house organs, which reach all their employees. Bulletin boards are available in every factory connected with the industry. Meetings of factory foremen and employees are open for presentation of helpful and instructive talks. Stockholders are readily accessible through manufacturers' lists.

And yet these and many other channels through which the hundreds of thousands of manufacturers, employees and stockholders could be reached and profoundly impressed had never been utilized to any extent until our committee was organized.

At first our committee sent to the manufacturers printed matter which was so prepared that it could be modified to suit local conditions. The idea was that each manufacturer could pick out the portion which best suited his requirements and then put it out in the most effective form.

However, we soon learned by experience that we had to send out our ammunition in cartridge form—all ready to fire. In other words, we had to furnish material all canned and ready for use, so that the manufacturer would only need to apply a can opener and use the contents. In some cases we even had to furnish the can opener. We felt something like the young married man who went home one evening and asked his wife what they were having for dinner. "Well," she said, "Dearie, I'm afraid we'll have to go downtown to eat, I've lost the can opener."

Even when it came to following directions, we found some of the manufacturers a little absentminded. Like Bill Fincher at breakfast this morning. Bill was so absentminded that he poured the cream on his head and scratched his berries.

The work of our committee has been going on now about a year and a half and during that time we have been greatly encouraged by the interest and active co-operation displayed by a large number of manufacturers identified with the industry.

(At this point in his talk Mr. Wickwire called detail attention to an exhibit of samples of the co-operative work that is being done by the manufacturers. Included in this was a printed "Honor Roll" of those manufacturers who have taken part in this work.)

We feel quite sure that most manufacturers identified with the industry will take an active part in this movement as soon as they get a real understanding of the importance of the work and the value of their help. Of course, in every constructive movement of this kind there are always a few who take the attitude of the fellow who always grabs the stool when there is a piano to be moved. You gentlemen can help us with the manufacturer who is indifferent to the importance of this work and who is not participating. It has been said that an army fights on its stomach. But it moves on its feet. And if these manufacturers expect you railway men to keep their stomachs filled with business, why shouldn't you insist that they get to their feet and join this movement.

Now, having given you a little idea of what has been accomplished under the direction of our committee, I would like briefly to give you an outline of a further plan that we are working upon right now.

Based upon the committee's experience and observations in connection with this work, we have concluded that one of the outstanding aspects of the present electric railway situation is the mental picture of "Mister Electric Railway" which the average citizen carries around between his false teeth and his toupee. We have found evidence of the fact that a great many people are still carrying around in the back of their craniums a mental picture of Mister Street Railway as a plutocrat, with a fat tummy and a fat pocketbook.

As an indication of that fact, I have something here to show you. A.E.R.A. headquarters asked an artist to paint his conception of Mister Electric Railway—he was not given detailed instructions—look what he turned out!

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It's a ridiculous conception of the real Mister Electric Railway, of course, but there are too many people who are still carrying around some such mental pictures as this of him. And furthermore, they seem to think that the process of dropping a nickel into a fare box changes it into a dollar bill and that the dollar bill goes solely to upholster the fat body of the fat man with the fat pocketbook.

Now, contrast that atrocity with another work of the same artist. This time he was interpreting his conception of Mister Bus Owner. And here is the result.

In other words, the man in the street —or the man in the cellar, if you wish— thinks of Mister Electric Railway as a pampered son of Paradise, while he considers Mister Bus Owner as a regular guy—a human being whom he can understand and sympathize with and help along in the world.

That seems to be one of the deep-rooted prejudices that we've got to dig out and overcome. And in order to get the result that we're after, it seems to me that we've got to get right down to a basis of plain talk to the plain people—something they can understand and which appeals to them—like the Greek restaurant keeper who has no bill-of-fare, but lets his patrons order direct from the table cloth.

I'll admit that it's not an easy job to offset the work of the radical element, which has poisoned the public mind to such an extent that some people actually think that public utilities are organized with the sole aim of robbing the public.

A chap went into a music store and asked to look at a harp, a guitar, and a lyre. The clerk said, "I can show you the harp, and the guitar, but the boss is out to lunch."

The radical agitator is not particular whether he plays on the harp, the guitar, or the lyre, so long as he strikes a chord that hypnotizes the masses. To combat this, we must combine all the present loose ends of the industry into one powerful unit. Then, if we keep pumping the facts into the public from all sides, it will gradually absorb the truth.

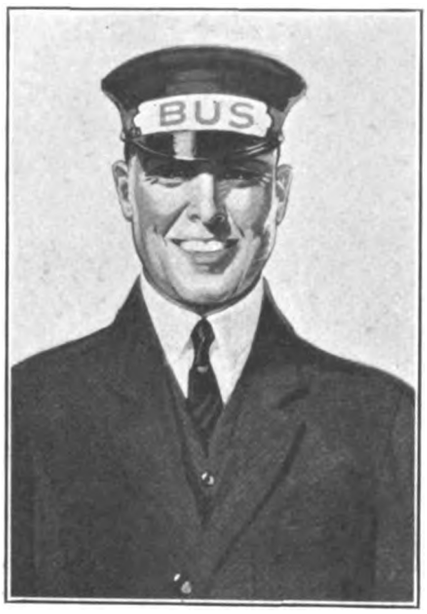
The brain cells of the most stupid person are always in action. Cerebration goes on whether they will it or not. A soft brick placed in water will absorb a quart if left a few days. A human brick will likewise absorb a bit of knowledge if it is soaked into him long enough.

Why is it that a man who wouldn't think of trying to cheat a jitney driver will brag about "slipping one over" on the electric railway company? Why is it that a man will make a joke out of it if a motor bus limps along half an hour late and "bawls out" the traction company if an electric car happens to be five minutes off schedule?

The other day a street car was standing peacefully on its own track when along came an automobile and tried to enter the car without paying. Why did the newspaper come out that night with a headline reading, "Street Car Hits Automobile."

Why is it that in many places the public officials, who are always imposing special taxation, regulation and other burdens upon the traction companies, turn right around and donate terminal facilities and other favors to the bus lines?

I know of at least one place where the county officials have actually turned over to the bus lines a part of the county court house, with its comfort station, for a waiting room. In other words, they encourage the bus lines by calmly appropriating for their use public property, maintained by the taxpayers. What do you think these public officials would say if the electric railways attempted to avail themselves of the free use of this same waiting room? In other words, why should some public officials do so much to encourage the bus lines and do everything possible to discourage the electric railways?



By Contrast, This Is the Popular Conception of "Mr. Bus Owner"

The other day a citizen of the community referred to parked his car at the court house and went in to pay his taxes. When he came out he found that he had been pinched for parking in the "private preserves" of the bus lines. Can you beat that?

Why is it that the public complacently accepts such things as a matter of course? Perhaps the "Minute Men" are increasing in the country; you know, "one born every minute."

I heard of another place where the street railway, by the terms of its franchise, is compelled to maintain frequent service eighteen hours of the day to a certain factory district. This means operating the cars most of the time at a loss. During the off hours of traffic the cars run light, of course, and in the busy hours "wildcat" buses back up to the factory doors, not only to skim the cream off the city tariff, but also to steal the business of the interurbans, which are compelled by ordinance to maintain waiting rooms.

In other words, the public officials insist on the railway company feeding and housing the "transportation cow," but they give the buses equal milking rights.

Can you imagine a traction line which provides service only during the busy and profitable hours of the day?

Can you imagine jitney or bus lines being compelled by ordinance to provide service eighteen hours a day, in off hours as well as rush hours? Any council would laugh at such a supposition.

What's the answer to such discrimination?

Isn't it because public officials have reason to believe that public sentiment approves this scheme of things?

And, going still deeper into the cause, isn't it largely because too many men are carrying around this false mental plutocratic picture of Mister Electric Railway?

That being the case, why not strip this counterfeit plutocratic garb from the electric railway industry and let it appear in its true garb of overalls! The public at large seems to have a sympathetic fondness for the man in overalls. The "people's choice" seems to cater strongly to and has a wholesome fear and respect for the vote in overalls.

Therefore, why let them overlook the fact that the electric railway business is essentially an industry in overalls? We know that the picture of the fat man is not a true likeness of the man who prospers as the electric railways prosper.

Here is the real personification of the electric railway industry (page 141).

He represents more than half a million laboring men—motormen, conductors, linemen, shopmen, trackmen, factory workers, who depend for their living upon the success of our industry. We want to awaken in the public mind a spirit of sympathetic understanding for this man. We want the public to respect him and his rights. And, above all, we want to arouse *him* to a realization of the fact that it is to his interest to stand up and fight for the industry—*his* industry—upon which he depends for his livelihood.

Now it is one thing to outline the result to be obtained and it is quite another to point out how to go about getting the result. I want to submit to you a plan our committee has hit upon to help create a mental picture of the electric railway industry as a man in overalls.

Some photographs of real workmen, who are a part of the electric railway business, have been taken and printed in car poster form for the use of the electric railways. One pictures Martin Donnelley, one of 77,000 motormen, not to mention 63,000 conductors. Another shows Adam Stillwagon, who has been working on the track for eighteen years. Dan Leonard, who has been a lineman since he was a youngster, is the subject of another poster, and so on. This group of railway wage earners totals close to the 300,000 mark. Another

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poster shows Bill Ernst, who has been making electric railway supplies for fifteen years—a representative of a group which numbers untold thousands.

There is a vast army of workers like these, all dependent upon the welfare of the industry for their livelihood, and our plan is to put out in poster form these actual photographs of men in overalls identified with the industry.

Imagine thousands of these posters broadcasted through the country, displayed in street cars and plastered on factory bulletin boards, showing the workingman as an integral part of the electric railway industry. Surely such pictures as these will begin to take the place of the inaccurate portrait of the plutocrat which is now hanging in too many cranial galleries, and I think you will agree that there is likely to be a favorable reaction on the part of the public.

That sort of thing should go a long way toward convincing the plain people that when they throw mud at the trolleys they are really besmirching their own fellow workers — brother members of their own lodge. And once we get the public feeling that way about it, we will have the statesmen of the "cobblestone" wards on our side too.

When the voters really begin to show a friendly disposition toward anything, their chosen representatives respond as quickly as a seal when there is fish in the air. They have to. They know that if they don't their erstwhile constituents will be saying, "Yes, old Mike was a good office holder, as office holders go—and as office holders go, he has went."

However, our committee realizes that it is not enough to run a few thousand posters through the press and put them in the mail. They must be displayed widely, thoroughly and intensively. There are good places waiting for thousands and thousands of them, where they will be seen and understood and where they will help accomplish what we are after. This plan needs to be put across in a big way in order to create the kind of impression that we are after and everybody connected with the industry should realize that his help is needed to make the plan a success.

Now I would like to mention the fact that this important work has been carried on by a voluntary committee, with the part-time assistance of Labert St. Clair, publicity director of the American Electric Railway Association. In spite of the other demands upon Mr. St. Clair's time, he has given us very able co-operation and enabled us to do some very effective work.

However, I believe that we have gone far enough to show that the work is much too broad and too valuable to be left to the direction of a voluntary committee, composed of men who must give most of their time to their personal business affairs.

In short, it seems quite evident that this whole movement should be handled like any other big enterprise, if it is to reach its full measure of success.

It is important enough and productive enough to justify the entire time of a capable director with a competent staff —men who can devote their whole energies to the organization and direction of the work.

Please don't overlook the fact that, in addition to the educational activities of such an organization, a truly tremendous force could be brought into play and utilized in connection with legislative matters affecting the industry. A capable director and his staff of office and field men could card index the organization as it was built up and they could mobilize its full strength and throw it into the fight as a powerful unit whenever occasion demanded.

But the Man in Overalls, Some 300,000 Strong, a Cheerful Public Servant, Is the True Personification of "Mr. Electric Railway"

Take the automobile club plan of organization, for instance. In Ohio we have something like seventy local clubs affiliated with state and national associations. That means that the membership of the local clubs combines to make up the membership of the state and national association.

When a legislative matter at Washington is to be influenced one way or the other, the full strength of every club is drawn into the fight.

When action is needed at the state Capitol, all the affiliated clubs in the state respond as a unit. And when 80,000 votes speak together, with one voice, the people's choice listens and most generally acts.

A municipal matter is, of course, handled by the local club.

In other words, the same machinery is used, as required, for local, state and national legislative matters. As a matter of fact, the automobile organization has made itself so profoundly felt that legislators are always casting about to find some way to please it.

For instance, two Western states this past year have enacted laws to compel night-driven herds on the highways to be equipped with tail lights. This is an excellent idea, but I think it would be better to compel pedestrians to be equipped with reflectors—a red light for females under thirty, a violet light for grass widows and a green light for old maids. In that way a lonely motorist could tell at a glance just who to run over and who to pick up.

Now just stop and imagine that the full strength of our industry would be combining the railways, with their employees, and the manufacturers, with their army of workers. Properly organized, under adequate competent direction, think what a powerful central station could be created, with its network of communication lines flung the length and breadth of the land. Surely there would be energy enough available to get a square deal and reasonable regulation for the public utilities then!

But we must get in the right condition for it. I met a railway man the other day coming out of a chiropractor's office, and I said to him, "What are those chiropractors, anyway?" And he said, "Why they knead your spine — your backbone." And I said to him, "Well, I need my backbone myself; and our whole industry needs a stiff backbone. And every man connected with it should become imbued with a fighting spirit, so that he will be ready to fight a whole regiment single-handed, if need be. Like an Irishman over in the fighting zone of Ireland, watching an Orange parade that was passing. He watched for a minute or two and growled, "Begorra, they wouldn't dare to pass Chistnut and Cork Streets four years ago." And as more went by he muttered, "Yis, and bejabers they wouldn't dare pass by Clancy's saloon two years ago." He glared a little longer, went into Clancy's for a drink, came out and with rising wrath shouted, "Yis, an' there hadn't many more of thim better pass by here right now."

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Possibilities from Interurban Freight*

Best Future of Electric Lines Is in Handling Freight—Main Handicap Has Been Lack of Adequate Equipment and Terminal and Station Facilities—500 Additional Box Cars Could Be Profitably Utilized in C. E. R. A. Territory

By T. H. Stoffel
Railway Department, Westinghouse Electric & Manufacturing Company

SERIOUS reductions in the income of the interurban railways have resulted from the use, by the riding public, of the passenger motor vehicle. It is generally conceded that there is no way permanently to overcome this condition, but that still further reductions may be expected, due to the ever-increasing number of automobiles on the highways. It is questionable whether the present tendency to effect economies in passenger operation, through the use of lighter weight cars, etc., is more than a temporary solution of the problem.

With these conditions in mind it naturally follows, therefore, that if interurban railways expect to continue to live, some means must be found to augment their depleted incomes to such an extent as will enable them to again build up the properties to a high standard of maintenance, demonstrate their earning capacity, and make investment in their securities attractive to capital.

The most logical and the surest means of accomplishing this is through the development of freight business. Existing operating facilities, including roadway, track, power plant, etc., are idle a large part of the time, or are employed to the extent of only a fraction of their capacity. Much tonnage can be hauled at night and during these idle periods and off-peak hours, thus making unnecessary any further investment in power facilities, and at the same time utilizing this idle equipment in revenue-producing service. The cost of providing adequate terminals, motive power and rolling stock, also a competent traffic organization, which are other essential requirements for conducting a successful freight business, is comparatively small.

It is true that more or less freight is being handled by a considerable number of electric lines, but it is also true that, in the past, the managements generally have given but little attention or encouragement to this phase of operation. Such service as is being provided is largely the result of insistent demand on the part of shippers, and as a general rule no consistent efforts have been made to conduct the business economically or along progressive lines, notwithstanding this branch of service is a proved source of net income.

The general lack of transportation facilities is today the principal factor limiting industrial development and trade, and the situation has become so acute that many national associations and civic bodies, including the United States Chamber of Commerce, have undertaken investigations and studies at considerable expense, to determine if possible what can be done to improve existing transportation facilities and methods, and to provide more adequate means of taking care of the constantly increasing requirements.

A study of the electric railways of the country shows conclusively that they afford a definite and existing means of relieving the situation, and that they can, if they will, make for themselves an important and permanent place in the general transportation scheme of the country, with much financial benefit to themselves. There is no tenable reason, for example, why a co-ordination of transportation facilities should not obtain, which would provide that electric railways should handle all freight between terminal and jobbing centers for destinations common with the steam roads, thus relieving facilities of the latter for the more remunerative and longer haul tonnage.

Transportation authorities have presented figures which show that short-haul, and especially less-than-carload traffic, say for distances up to 75 or 100 miles, cannot be handled by steam lines except at a loss, on account of the necessarily large overhead expense involved in providing extensive terminals, trackage, etc., suitable for heavy long-haul traffic. The electric line can handle such tonnage more economically and at a profit, by reason of its more flexible and lighter equipment, smaller terminals and much lower overhead.

Net Earnings on Freight Investment

That the handling of freight is a very profitable source of income for electric railways needs no proof other than the results obtained by lines now engaged in this branch of service, notwithstanding that as a general rule rolling stock, motive power and other facilities are wholly inadequate and often not suitable. Only a few electric lines have undertaken to separate freight income and operating costs from those of other branches of operation, and therefore the majority do not fully realize the extent of the net returns from freight business.

It may be truthfully stated, however, that net earnings of from 15 to 40 per cent on the freight investment may be expected, depending on the location of the line, the class of tonnage available, the methods and efficiency in handling and the facilities provided. As an example, one line which a few years ago undertook consistently and intelligently to develop its freight possibilities received a gross revenue in 1922 of approximately $390,000 and enjoyed a net profit of over 27 per cent on a freight investment of $320,000, or equal to 7 per cent on an investment of over $1,250,000. In allocating operating expenses on this line everything which could properly be assessed against freight income was so charged, including interest, depreciation and taxes. Another line has developed its freight service to the extent that 75 per cent of the gross revenue is derived from this source.

The vast industrial territory comprising the states of Indiana, Ohio and Michigan, traversed by a network of some 5,000 miles of electric lines included in the membership of the Central Electric Railway Association, without question produces the greatest volume of tonnage of any district in the United States, of the class which can be readily handled by the average interurban road, and for which such roads are especially adapted. The amount of such tonnage available is almost unlimited, in both carload and less then carload quantities.

While practically all of the lines in this territory are offering freight or express service to some extent, the surface of possibilities has hardly been scratched. With few exceptions no consistent efforts have been made to develop the traffic; terminal facilities are wholly inadequate and congested, resulting in excessive station labor costs and delays and expense to shippers; team tracks and sidings for carload loading and unloading are almost unknown; motive power is of small capacity, making necessary the operation of many small train units, with consequent excessive train labor and power costs; and the shortage of trail cars of various types is very acute. Solicitation with present facilities is hardly necessary and it is found difficult, by reason of the shortage of rolling stock, to take care of even the merchandise tonnage which is practically forced upon them. Many lines are confining their efforts to the handling of less than carload tonnage on account of this lack of equipment, with the idea of providing maximum service to the greatest number, and make no attempt to handle carload and more remunerative business.

Need for 500 Additional Trail Box Cars

The most urgent and immediate need of the lines in the Central Electric Railway Association territory today is trail box cars. It is believed that 500 additional cars of this type would be absorbed in the service at once, and without effort to find loading for them. Three or four times that many would ultimately be required under consistent development. One result of this shortage of rolling stock is the tendency to load present cars beyond their capacity. This is not only dangerous, but increases equipment maintenance costs and causes loss in revenue while cars are out of service for repairs, and is a practice which should be regulated.

*Abstract of paper presented before the Central Electric Railway Association, Cedar Point, Ohio, July 18.

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There is an ever-increasing amount of interline tonnage available, the movement of which is now limited by the number of trail cars which can be spared from local service. In many instances when cars are permitted to run through to destinations on other lines, there are frequent and sometimes serious delays in returning them to the owners. In view of these facts and also due to the general pressing need for additional rolling stock, it is believed that in the purchase of new cars some scheme of common ownership should be worked out which would make it possible for all lines to have a supply of cars for both local and through loading at all times.

Along these lines it has been suggested that the electric lines in the group represented by the Central Electric Railway Association form a Car Trust Association, each member road of such association to delegate a representative, and the group of representatives to form a car trust committee, which would have power to purchase cars on the car trust plan. Financial standing should be given this committee by underwritings of the member roads; the individual amounts of such guarantees to be based proportionately on a certain number of cars to be allotted to each line for inventory purposes, the car trust member lines to pay the car trust committee a fixed per diem charge with a minimum guarantee; the per diem and minimum to be of such amount as to enable the car trust committee to pay certificates as they become due. If it should happen that any of the cars are idle during slack periods or for any other reason, the per diem charge should be prorated on a basis of the original allotment. Under this plan each member road would carry an adequate supply of parts for repairs, and M. C. B. inspection at transfer points would govern responsibility for damage or mechanical defects.

The principal advantage of such a plan for the purchase of rolling stock lies in the fact that cars will be available for use on any line in the territory, and the necessity for prompt return is to some extent eliminated, which in many instances would permit of use for other loading, thereby reducing empty car mileage. Another advantage is that if there was a falling off of available tonnage on any certain line or in any particular district, cars could be assigned to roads having loading, keeping them continually in service.

Before purchasing cars under this plan it would be advisable for all interested roads to develop and decide upon a standard type of interurban freight car, suitable for operation on all lines. This car should not be longer than 40 ft. inside measurement, and should be equipped with M. C. B. radial draft rigging and automatic air brakes. No doubt a much lower price per car could be obtained from manufacturers for such a standard car if purchased in quantities.

Another outstanding and serious disadvantage to the proper development of freight traffic is the lack of adequate station and terminal facilities, including team tracks and sidings. At practically every terminal of any size, shippers' conveyances are delayed, sometimes for several hours, to unload shipments at the platform. These delays, to say the least, are costly to patrons and as a result many shippers take advantage of electric line service only to non-competitive destinations, and often resort to the use of the more expensive motor vehicle in their desire to satisfy customers, when as a matter of fact the interests of all would be better served by the electric line.

There is a large amount of carload tonnage which might be handled, but the failure to provide terminal team tracks and convenient sidings in the rural districts, together with the shortage of cars, prevents the securing of this very desirable traffic. While carload rates as a general rule are lower than the merchandise rates, the labor expense of loading and unloading is avoided and net earnings per car in many cases amount to more than when loaded with the higher class merchandise. With suitable terminal team tracks it is also frequently possible to load solid cars of merchandise for certain destinations, direct from dray to car, thus relieving congestion in the warehouse and materially reducing handling expense.

Another matter worthy of serious consideration is the possibility of materially reducing train operating costs. The greatest items of expense in freight handling are station and train labor. Due to the large number of small capacity motor cars in freight service, a great many trains of from two to four cars each are operated over the same line daily. Both train labor and power costs can be materially reduced through the use of motive power able to haul longer trains. Motor equipment capable of handling trains of from six to fifteen cars, known as the low-speed, field-control motor, has been designed by manufacturers especially for interurban line freight service. A distinct advantage in the use of this type of motive power is that trains of ten or more cars can be handled with no greater power consumption than for a single high-speed passenger car and therefore the possibility of overloading substations is practically nil.

The handling of long trains may be deemed impossible on account of restrictions imposed by certain communities through which trains must pass, but it has been found that as a general rule the public and the authorities are inclined to be reasonable and will withdraw their objections if fully informed as to the necessities and advantages of such operation, or if they can be made to feel that advantage is not being taken of them.

Carload Business Very Desirable

What can be done in the way of securing and handling carload freight, under well directed and systematic effort, is emphasized by what has been accomplished in handling live stock by the lines reaching Indianapolis. Information at hand indicates that during the past year electric lines transported approximately 8,500 carloads of livestock in and out of the Indianapolis stock yard, or about 35 per cent of the total business of that yard. One of these lines also demonstrated its efficiency and capability by handling over 1,500 carloads of cement within a few months, and with such satisfaction that the manufacturer felt justified in making a considerable expenditure to increase the capacity of his plant with the idea of reaching out for other markets having electric line freight service.

The same line has also developed and expedited perishable freight service and is hauling trains of from four to seven or eight cars of fruit and vegetables daily during the season. This service provides for shipment late in the evening and insures delivery at the terminal before three o'clock in the morning, in time to be disposed of before business hours, and is exceedingly popular with shippers and profitable to the carrier.

There has been a general understanding that steam roads were unwilling to join with electric lines in through traffic arrangements. No doubt some foundation exists for this, but it is evident that steam roads are beginning to realize that co-operation and co-ordination with electric lines is not only feasible, but is mutually advantageous. As a matter of fact, practically all interurban lines located west of the Missouri River have been able to secure joint through-traffic arrangements with steam roads, and as a general rule are parties to steam line tariffs, including trans-continental. Recently, too, a number of electric lines in the East have completed similar arrangements; in fact I believe one of the lines, a member of this association, has successfully concluded negotiations, opening to it steam line territory extending from St. Louis and Chicago to Buffalo. One of the Ohio lines, also, has joint tariffs and divisions with steam lines between Chicago and Buffalo and intermediate points, and stations on its line. In both instances the prospects are bright for a still further extension of territory.

There are many other ways and methods open to electric lines for developing freight tonnage, such, for example, as locating industries on the line, building sidings to established industries, finding markets for products of the farm, etc., but after all any program of development is useless unless the tonnage can be handled expeditiously and facilities and equipment for doing so are available. It is practically impossible to estimate the amount of tonnage which might be secured under intelligent direction and consistent development. It is the experience of electric lines generally, and especially in the C.E.R.A. territory, that whenever facilities for handling have been provided, tonnage was available.

The statement was recently made by a large shipper in C.E.R.A. territory, that the use of electric lines in the forwarding of his shipments had enabled him to triple his business in three

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states within a short time, and that trial shipments made by him for distances up to 250 miles, indicated that the service of electric railways was from three to ten days better than either the steam roads or the American Railway Express. At that time this concern desired to load from six to eight trap cars per day for various junction points, for distribution, if cars could be furnished. Another shipper who has practically discontinued the use of electric lines in his shipments because of the lack of facilities and equipment would load four trap cars per day, if rolling stock could be furnished regularly and a place for loading provided. Any number of similar instances could be cited.

Work of Indiana Information Committee*

By John C. Mellett
Director Indiana Committee on Public Utility Information

"UTILITY Information Work," the subject of this discussion, may not mean a great deal. I shall therefore introduce the subject with a text, taken from the last of the prophets, Abe Martin. He says, "The fe'ler that don't advertise may know his business; but nobuddy else does." If anybody present does not like that text, he may use this one, offered by a writer in that big book the Gideons are pushing. The Gideons do a good deal of business with the tractions, and some of you may prefer to reciprocate and follow a text from their book. Here it is: "Let your light so shine before men that they may see your good works." That is the advice of Matthew, seconded by the Gideons.

We in Indiana like our own prophet and his suggestion with regard to advertising, but we also try to follow Matthew. We have been doing it, in the utility business in our state, for more than three years. The Indiana Committee on Public Utility Information was organized in January, 1920, in order to let the good works of Indiana's gas, traction, electric, telephone and water utilities shine before men, so that the state might see their good works; and, if I may say so, in order that the light might continue to shine.

For the Indiana committee, like a good many other healthy youngsters of this day and age, was born of necessity. War conditions brought Indiana utility operators to the realization that they had to tell the people about their business. They should have realized it sooner, but they are entitled to credit for seeing their need before the operators of most other states had opened their eyes. Only Illinois preceded Indiana in organizing and maintaining such a committee.

In Indiana during the war the utilities, tractions first of all, were called upon to be patriotic and self-sacrificing while many unregulated businesses profited and some profiteered. Under regulation they were held down until the rising waves of production costs threatened to drown most of them. The theory and promise of state regulation was that after the war the utilities would be permitted to increase their rates and re-establish themselves on the firm footing to which they were entitled. But the war ended, and the public demanded lower prices. In Indiana the public knew nothing of any patriotic starvation suffered by the utilities, and when it began demanding lower prices, it included requests for lower prices on all utility services. Utilities appealing to regulation therefore found regulation, for the time being, helpless in the face of public opinion.

In a word, the utilities were holding the bag, which is a worse job in business than in snipe hunting. It was decided that advertising and publicity must be used extensively to build up the utility case before the public. Utility men in our state were confident that, once the facts were presented, the people would permit justice to be done the utilities and their owners. Therefore they organized the state committee, and set to work.

We started at once the publication of a small weekly paper, for distribution among newspaper editors, city and state officials, libraries, schools and colleges, and women's clubs. We arranged to provide speakers to discuss utility problems before all kinds of meetings, and undertook to educate backward utility operators in the merits and benefits of advertising and publicity.

At first, our work dealt with the subject of rates, more than anything else. The immediate task was to show the people of Indiana that the utilities, though vital to comfort and prosperity, had been mistreated. With this in mind we emphasized increases in the cost of producing traction, gas, electric, telephone and water services. We showed how these increases were still, at that time, growing, while rates had in the main stood still. By hammering these points day and night, we managed so to educate the people of the state that regulation was able to grant increases in rates. We have kept up this program, with the result that Indiana utilities are generally in good condition now.

Having tasted the fruits of publicity and advertising, Indiana utilities found them good. We have therefore gone into other problems as well as rates. We have worked to educate the people in the fundamentals of the utility business, treating such subjects as valuation, turnover of capital, the fair return, and so on. Within the last eighteen months our committee has met and fended off the threat of abolishment of state regulation—chiefly by means of widespread publicity showing the benefits of and necessity for state regulation. And just now we are working on the subject of taxes, in the hope of escaping a slow, lingering death from acute or malignant taxation.

Indiana utilities have learned that they can exert a much greater influence in protecting themselves against misunderstanding, ignorance and politics when they are compactly organized than they can when they are not organized. In years past, Indiana utilities operated each for itself, "and the devil take the hindmost," with the result that he took not only the hindmost but several others as well. The cost of co-operation has been so small as to be almost negligible to the individual companies, but the results have been large. Our assessment against member companies is only one-fiftieth of 1 per cent of gross receipts, but most of the members would multiply their contribution by several times before they would give up the educational program we have undertaken.

In the main, the committee endeavors to restrict its efforts to problems that are general to all the utilities. But last year we made an exception and rendered some service to the tractions by helping them convince the public that unrestricted, unregulated motor bus and jitney operation is unfair and dangerous. The fight on this point is not yet won, but it is coming our way. We convinced everybody in Indiana, last year, that the jitneys and buses should be regulated—except their operators and the Legislature. We have no hope of convincing the jitney and bus men, but we do expect to convince the Legislature by our own efforts and the efforts of the public, which is for us, thanks to publicity and advertising efforts.

So much for co-operative work in behalf of the utility industry. Our committee has done one other thing, to the everlasting good of the business. It has preached for three years the importance of maintaining friendly relations with the newspapers. The committee has worked on the state as a whole. Individual operators have been asked to keep in touch with their local newspaper men, and they have been doing so more consistently than ever before. I do not mean by this that they have been hanging around upon the editor's coat tails. They have simply made it a point, when anything was in controversy, to see that each editor knew the facts in the case, and that he conveyed these facts to his readers, either through publicity, news or advertising. The result has been a fairer public opinion throughout the state.

Indiana's committee has worked hand in hand with Illinois, Ohio, Michigan, Kentucky and a score of other states where the utility executives took up this program. We hold no brief for the others, but in our state the operators are glad they have been letting their light shine before men, according to Matthew's advice. And in keeping with the spirit of Abe Martin's axiom, since utilities have been advertising, the state knows more about the utility business than it ever did before. Which is a good thing for both the public and the utilities.

*Abstract of paper presented before Central Electric Railway Association at Cedar Point, Ohio, July 19.

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Emergency Stop Tests

C. E. R. A. Special Committee Reports on Distance to Stop City and Interurban Cars With Air and Electric Braking

A SERIES of braking tests on several types of cars was made during the week beginning May 13 under the auspices of a special committee of the Central Electric Railway Association consisting of S. W. Greenland, chairman; S. D. Hutchins, H. C. DeCamp, C. A. Brown, G. K. Jeffries and D. D. Ewing. These tests were described briefly in ELECTRIC RAILWAY JOURNAL for June 2, page 933. Emergency stop tests were made on: (a) Interurban car, double truck, four motors. (b) City car, double truck, four motors. (c) City car, double truck, two motors. (d) Birney safety car.

CONCLUSIONS

As the result of a careful analysis of the test data, the following conclusions were reached:

1. There is no one best way to stop any car in an emergency. In general, the best way will depend somewhat on the type of brake and motor equipment.

2. As a broad rule, subject to occasional exceptions, it may be said that the best way to stop a car equipped with air brakes is to apply emergency air and sand simultaneously throwing the controller to the off position.

3. The electrical methods of braking, reversed motors and bucking motors, subject the equipment to very severe strains. Because of the abruptness with which the braking force is applied, the value of these methods in emergency braking is more apparent than real, except in those cases in which the air brakes from some cause are inoperative.

4. Of the two electrical methods, reversed motors and bucking motors, the reversed motors method is the most effective.

5. If the motors are reversed in conjunction with emergency air and sand, skidding invariably results, and even under good rail conditions, the results are not superior to those obtained using air alone.

6. The electric braking methods are more likely to produce erratic results than the emergency air, and for this reason should not be resorted to as a general practice.

7. Because the rail conditions under which these tests were made were better than those ordinarily obtaining on city streets, the results should be regarded as minimums rather than averages or maximums.

8. The best way to stop a Birney safety car in an emergency is for the motorman to raise his hand from the controller handle.

A brief summary of the details of the four cars tested is given in the accompaning table. The test track selected was on the Lebanon-Crawfordsville branch of the Terre Haute, Indianapolis & Eastern Traction Company, and consisted of a stretch of level tangent track about 1 mile in length just west of Pettigrew substation. During the first two days of the test, the weather was unsettled and the track was wet at times. Mostly, however, the rails were dry and in excellent condition for braking tests.

DETAILS OF THE TESTS

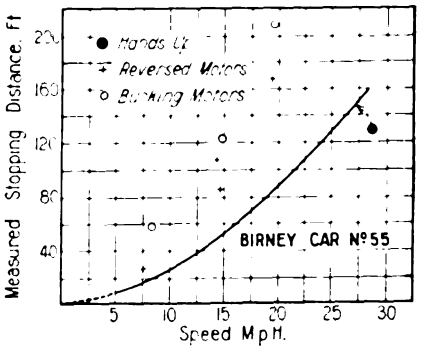
While under test, each car was equipped with: (1) A chronograph, recording time in half-seconds and car wheel revolutions; (2) a trainograph, recording brake cylinder and other pressures, and time, the time mechanism being operated from the chronograph; (3) a graphic recording speed meter with a time pen operated from the chronograph; (4) an electrically-operated counter for car wheel revolutions.

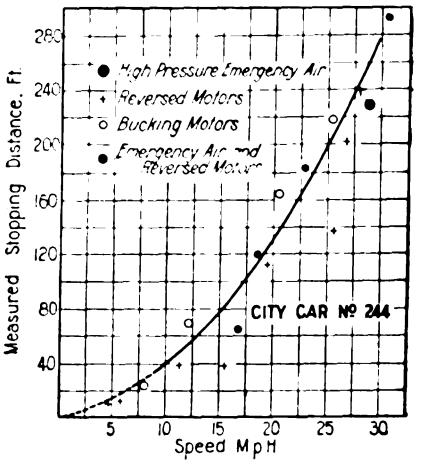
These instruments were so connected as practically to eliminate personal errors in timing. Time was also measured with stop watches. A shotgun was used to mark the track, and the report of the gun was the emergency signal to the motorman. This plan was decided upon in order to take into account the personal element of the motorman in reacting to a signal. The stopping distance was measured with a surveyor's steel tape. The speeds were determined from the chronograph records.

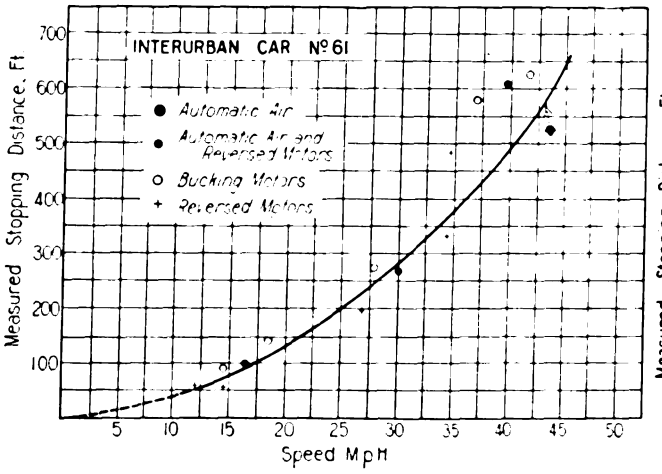
The more important data resulting from the tests are shown in the speed-distance curves. On the curve sheets the lines drawn to represent the data for emergency air braking are average lines, the points from which they were drawn not being shown. For comparative purposes, these were drawn as reference lines, and the points for the other tests were simply marked on the sheets, no curves being drawn. It must be remembered that individual points for the airbrake curves fall both below and above the average line.

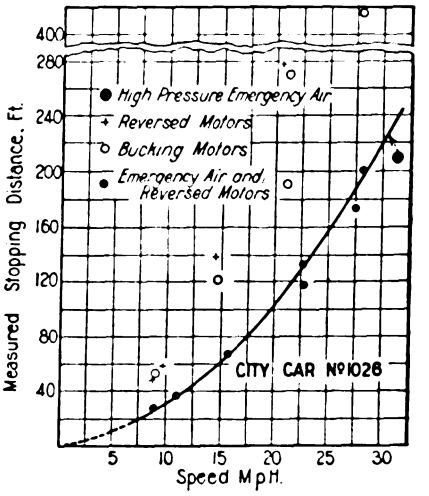
In the tests, with the Birney car, marked "Hands Up," the motorman simply raised his hand off the controller handle when he received the emergency stop signal.

Of the four cars, No. 244 was the only one in which the method of reversed motors showed any decided advantages. However, the braking power









Distances for Stopping with Emergency Air Are Shown by the Curves, and for Other Methods by the Points

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SUMMARY OF CAR DATA

Car No.	61	1026	244	55
Owner	T.H.I. & E. Tr. Co.	I.S.R. Co.	Ind. Ser. Corp.	N.I.P. Co.
Type	Interurban	City	City	Birney
Weight (empty)	77,400 lb.	39,700 lb.	34,200 lb.	15,200 lb.
Number of trucks	2	2	2	1
Number of motors	4	2	4	2
Kind of motors	W-304	W-310-E-2	W-506	G.E.-264
Gear ratio	24-63	15-69	14-78	13-74
Type control	K	K	K	K
Type of brakes	Straight and Automatic	Straight	Straight	Safety
Wheel diameter	35 19/32 in.	31¼ in.	29¾ in.	24¼ in.
Per cent braking Power at 50 lb. brake cylinder pressure (car empty)	102.1	58.0	83.5	167 0

of this car is about 80 per cent, or considerably below the commonly accepted standard of good braking practice.

The tests were run under the direction of D. D. Ewing of Purdue University, assisted by P. B. McGinnis and C. W. Melephant. The analysis of the data has been under the direction of Professor Ewing, assisted by J. Y. S. Fralich. Owing to the importance of the detail data taken in addition to that on stopping distance and time, the Engineering Experiment Station of Purdue University has offered to analyze and publish the detail data. This work is now in process, and is sufficiently advanced to permit drawing of the general conclusions outlined above.

Reports of Committees, Central Electric Railway Engineering Council*

Report of Track and Roadway Committee

1. (a) What is the best way of reclaiming old track in pavement?

The best method of reclaiming old track in pavement is by welding either thermit, cast or seam welding.

If the joints are seriously surface bent, rail of the same section in lengths not less than 12 ft. should be inserted, welding the joints by any of the foregoing methods.

Inasmuch as the paving area in this 12 ft. or more of track is disturbed we recommend new ties be installed at this time upon 6 or 8 in. of gravel or stone ballast.

If it is not deemed advisable to expend a large amount of money on tie renewals and joints, iron and wood shims can be resorted to as a temporary relief, and will probably keep track in fair condition from one to two years depending entirely upon tie and subsoil conditions.

Where track is 1 in. or more over gage, tie rods should be installed, and if not too expensive as regards paving repairs, the track should be regaged and lined.

(b) What is the best way of reclaiming old track in unimproved streets?

Make a general lift, add new ballast, take care of drainage where possible by installing drainage systems through the center. Replace old bars where necessary, and if rails are surface bent to any extent, they should be replaced or straightened. This is a broad question and local conditions will have to be considered.

2. (a) What results have you had with welded joints in inclosed track?

Good results.

(b) What results have you had with welded joints in open track?

The committee recommends that only intermittent and all combination joints be welded in open track. No rail to be continuous for greater length than 60 ft.

3. What has been your experience with electric welder in reclaiming special work?

The committee has found that a great amount of special work has been reclaimed with the electric welder and very good results obtained in many cases. We think there is much room for improvement along this line. While the welding of manganese has not been as successful as hoped for, special work of this type has been kept in service for as high as three years, thus delaying renewal for that period.

4. What has been your experience in building up special work by oxy-acetylene?

The committee finds the use of oxyacetylene economical only in rail cutting and shop welding.

5. What experience have you had with treated vs. untreated ties?

The committee recommends the use of treated ties in open track and unimproved streets.

6. When joints are welded are rail bonds necessary?

No.

7. When rail joints are welded are bonds removed?

Where welding is done on old rails, if bonds are functioning, they should be left, as the welding of rail is not always as successful as expected. The general practice is not to bond the joints on new rail when joints are welded.

8. What methods have member companies used to provide proper drainage at crossings between steam and electric roads so that proper surface can be maintained?

The experience of the committee has been that no drainage is provided in most cases. In cases where drainage has been provided it has been found possible to maintain good surface, but in a few cases installation of a drainage system has been unsatisfactory. Would recommend that wherever possible some method of drainage be installed. Local conditions would determine the method to be used.

9. Has any difficulty been experienced in properly maintaining automatic track circuit block signals where cinder ballast is used?

The committee is of the opinion that with cinder ballast in contact with the rail more trouble will be experienced with signal circuits than with other kinds of ballast, but all kinds of ballast should be kept clear of the rail.

10. Should track bonding be installed and maintained by track or overhead departments?

All bonding, design, application and responsibility should be under the supervision of the electrical department. All work to be done with maximum economy possible to all departments interested to avoid duplication of work.

11. Give comparative efficiency of the Weber or other continuous types of splicers of the four and six-hole type.

We believe while the two joints are equally efficient the continuous type requires less upkeep and the lower cost would be in its favor.

12. What effect has bad track on the upkeep of equipment?

Bad track has a decided effect upon the cost of equipment maintenance.

13. Is there a welding machine on the market that can do track welding as well as bond welding economically?

The majority of welding machines on the market can be used for bond welding economically.

Report of Power Supply and Transmission Committee

1. What is the effect on the overhead line of the use of sliding contact shoes, and are there any advantages from a transportation standpoint or from the standpoint of economy?

The principle of the sliding shoe seems to be good but the committee does not believe it has yet been fully developed to a finished and practical article, either from a transportation or economical standpoint. It has been reported as being quite successful on a few roads, reducing vibration and thus being more quiet than a trolley wheel at high speeds. There have been many sliding devices designed but none of them fill all requirements. With most of them there is trouble in backing up and some claim there is an excessive wear on the trolley wire. It is the opinion of the committee that the trolley system as developed in the past for the purpose of operating the trolley wheel is not properly designed in every respect for the operation of the shoe. The committee believes that an investigation of the subject has not been sufficiently complete and the subject would be well worth additional study.

2. (a) Are any companies furnishing power to individual consumers in the rural districts where special transformer equipment is required? (b) What equipment is furnished by the railroad company? (c) What is the basis of charge for such electric service?

(a) Yes.

(b) The committee is of the opinion that it would not be economical or practical to furnish current to any small individual consumer or limited number of individual consumers direct from any important high-voltage line. For service from low voltage lines consumer should be required to pay the entire cost of primary and secondary lines, transformers, auxiliary equipment and cost of installation, and same to become the property of the company and to be maintained and operated by it.

(c) The basis of charge should be sufficient properly and safely to maintain all the apparatus and equipment, to supply the service, to cover all the losses incidental to the service, interest, depreciation, taxes, insurance and a reasonable profit.

This subject of rural service has been most puzzling to lighting and power utilities for several years, and is receiving a great deal of study by committees of the National Electric Light Associations, various state associations, state commissions and many individual companies. It is, therefore, the opinion of your committee that this is a matter of sufficient importance to justify the Central Electric Railway Association in appointing a special committee to make a study of the reports and data available for the purpose of being able to present a more practical working plan to take care of such service.

3. What should be the length of ear for No. 00, No. 000 and No. 0000 trolley wire, both round and grooved?

It is the opinion of the committee that all trolley ears for No. 00, No. 000 and No. 0000 should not be less than 12 in. in length for both round and grooved wire except in catenary construction, where a shorter type ear seems satisfactory. The committee finds no available data from which to recommend definite length of ear for each size of wire.

4. What factor of safety is allowed in insulating value for transmission line insulators?

The committee recommends for wood-pole

*Presented before the Central Electric Railway Association convention at Cedar Point, Ohio, July 19.

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construction an insulator with nominal rating 30 per cent above the line voltage. For metal-pole construction an insulator with a nominal rating next higher than that used for wood-pole construction. Climatic conditions and geographical location will also influence the selection of insulators.

It has been suggested to the committee that interconnection to an extensive transmission system backed by a large source of power might call for an increased insulator rating, and it is therefore recommended that this phase of the question be further investigated.

5. Which trolley wire has proved most satisfactory, round or grooved? What size?

The committee recommends for heavy interurban service No. 0000 grooved trolley wire and for light interurban service No. 000 grooved wire and for city service No. 00 round wire.

6. What is the most practical and economical length of span for power transmission lines carrying up to 33,000 volts on wooden poles?

The factor of safety and details of construction as required by regulatory authority should be carefully observed in design and construction of transmission circuits. When these requirements are met the most economical line is that which will have the least fixed charge and maintenance costs.

In general the following has become the practice with many member companies on transmission lines carrying up to and including 33,000 volts on wooden poles. When used jointly for trolley span or bracket construction the transmission span is 200 ft., and shorter intermediate poles are set to assist in supporting trolley wires. On other than above types of construction span length for wood-pole lines should not as a rule exceed approximately 250 ft. on single-pole construction. On H frame or steel-pole construction greater span lengths may be used.

7. What has been your experience on high-voltage transmission lines with two- and three-piece porcelain insulators of same voltage rating?

Applying this to pin-type insulators of 22,000, 33,000 and 45,000-volt service, the committee favors a two-piece insulator if properly designed.

8. What type of lightning arrester is most efficient for protection of cars, power stations and substations, and what maintenance do they require?

This question refers, as we understand it, to protection of d.c. feeders and car equipment, and for this electrolytic arresters inspected periodically and following all severe storms are recommended.

9. What are the advantages, if any, in the use of overhead ground wire for high-voltage transmission lines? (a) What kind of wire is used? (b) How installed? (c) Method of grounding.

The committee is of the opinion that the use of an overhead ground wire properly installed will eliminate the majority of insulator failures and interruptions due to electrical disturbances and is justified from an operating standpoint.

(a) It is recommended that wire be non-corrosive, preferably of copper or copper clad and of greater tensile strength than line conductors and never smaller than No. 4 AWG.

(b) Preferably on bayonet, for single-arm construction and supported by an insulator of not less than 6,600-volt rating. On two-arm type of construction ground wire should be supported by insulator or pin in end pin hole of top arm.

(c) The aerial ground wire should be connected to earth at intervals not greater than 500 ft. The wire used for this purpose preferably should be copper and effectively grounded and should not come in contact with any of the pole-line hardware.

Report of Car Equipment Committee

1. (a) Have any of the companies experienced difficulty with 9¼-in. hub on steel wheels in boring out for 6½-in. or 7-in. axles? Have any companies been able to secure larger hub?

(b) On 26-in. wheels are companies able to secure a 3-in. or 3½-in. interurban flange and tread?

(a) No actual breakage has been experienced with the 9¼-in. hub but most of the mechanical men feel that the hub is too small for the bore of the axle. This matter has since been taken up with the American Electric Railway Association, and a 10½-in hub has been adopted and companies should have no further difficulty in getting the larger hub.

(b) This is not a standard wheel but the committee has taken up the matter with various wheel manufacturers. One firm at the present time agrees to furnish this wheel.

2. (a) What is the minimum length of trolley pole that can be used for 22-ft. and 24-ft. trolley height, taking into consideration the various heights of cars? (b) Is it possible to standardize length of trolley pole? (c) What tension should be used on trolley pole for various heights of trolley wire?

(a) Trolley pole length should be figured for car and wire heights. A pole riding wire at an angle from 45 to 60 deg. with car roof gives very good service.

(b) Cars of the same height can use a standard length pole, but a standard for the field at large cannot be established. The committee is of the opinion that this subject should receive further consideration and a report be rendered at a future date.

(c) Trolley pole tension can be determined best locally due to the fact that the overhead trolley construction, the condition of track and condition of rolling stock all affect the trolley tension. The committee recommends the subject be given further consideration.

3. (a) What are the relative merits of the sliding contact shoe as compared to the standard trolley wheel? (b) State average life and mileage of both trolley wheel and contact shoe?

(a) The shoe has greater area of contact, making a more efficient current collector. Rides the wire better than the wheel. Makes less noise and less vibration at high speed. Less tension required on trolley pole. Causes trouble when running backward.

(b) Wear on trolley wire not determined. Tests show 60 per cent greater mileage with shoe as compared to trolley wheel.

In view of the fact that the shoe is still in an experimental stage, the committee recommends that same receive further study.

4. What experience have you had with building up flanges by electric welder on city cars? On interurban cars? What is the cost of building up such flanges? How much extra mileage can be obtained in this manner? What is your method of building up flanges?

The committee has found that a few roads have been apparently successful in building up flanges by the welding process on steel wheels. A number of roads have reported as failing to obtain results worth while. It is believed that equipment available and experience of operators during such welding has been responsible for discouraging results in a number of shops. We believe the subject has sufficient merit to justify additional study.

5. What is the average life of brush-holders on ventilated motors and non-ventilated motors?

No definite figures were obtained as to the average life of brush-holders, but it was agreed that all cars with the ventilated type of motors wore out brush-holders and also the brushes more rapidly than the non-ventilated.

6. What saving, if any, can be made in the wiring of cars by the use of flexible metallic conduit as compared to rigid conduit? What saving can be made in insurance costs if underwriters can be induced to accept flexible conduit at the same insurance rate as the rigid?

The committee does not recommend the use of flexible metallic conduit for power wiring, as it has been found too light for motor work. It can be used for light wiring and a saving made in installation costs. No difference in insurance rates has been expressed as it has been approved by the fire underwriters.

7. What are the relative merits of tin base vs. lead base metals for bearings?

The committee recommends tin base metal for motor bearings, lead base for journal bearings and brass for axle bearings.

9. What is the effect on motor and gear maintenance of too much wear on body and collar of axle bearing? (a) What is permissible wear on the body of axle bearings? (b) What is permissible wear on collar of axle bearings?

Excessive wear on collar or flange of axle bearings permits the motor to lunge from side to side as the car hits sharp curves or sways from side to side. This aggravates the condition, causes the armature to pound its bearings and causes sparking at the commutator. It permits misalignment of gear and pinion faces, resulting in more rapid and uneven wear of both and increases the liability of tooth breakage due to the uneven surface worn across the face of the teeth.

Excessive wear on the body of the axle bearings allows the gear centers to spread. This increases the wear on gear and pinion teeth and in extreme cases might permit the gear and pinion to disengage. After a little wear, the tooth loading is all thrown upon the tips of the teeth, which results in tooth breakage if allowed to continue for any length of time.

(a) It was agreed by most of the roads that good practice allowed about from $\frac{1}{8}$ to $\frac{3}{16}$ in. wear on the body of the bearing.

(b) It was agreed that the flange wear was not as vital with the main body of the bearing but that this was easier to keep maintained so that it was thought that the maximum allowance should be about from $\frac{1}{8}$ in. to $\frac{3}{16}$ in. as this is a very easy and inexpensive matter to adjust.

10. There has been but little improvement in design of gear cases for twenty years. What suggestions for improvement in this design are recommended?

This question has been thoroughly discussed and no definite suggestion in designs have been developed.

11. What effect, if any, does fast controller feeding have on equipment?

Effects are most noticeable in city service where frequent stops occur with close headway of cars. Generally too rapid notching causes more equipment failures and increases maintenance cost. On short runs fast controller feeding frequently is one cause of overheating of motors. The tendency of some motors to flash is also increased because the motor is saturated magnetically from the high accelerating current while the rapid notching imposes sudden and wide volt variations in motor. Excessive heating dries out the insulation, causing loose bands and windings. The excessive accelerating currents set up magnetic stress which produce severe mechanical strains in the winding and cause armature leads to break. Gears and pinions are affected. Controllers wear out contacts and fingers unduly because of excessive current handled. Circuit breakers operate more frequently. Flickering of car lights becomes a source of annoyance to passengers.

12. What is the best practice for making emergency stops to avoid accidents?

By tests made very recently by a committee of the Central Electric Railway Association it was found that up to 15 m.p.h. reversing the motors was most effective. For speeds greater than 15 m.p.h. the use of the air brake was more effective. (See report of special committee on emergency stop test, printed in this issue.)

13. Should the Engineering Council pass upon the merits of new equipment or devices submitted by manufacturers for test?

Yes, in so far as they have facilities and equipment.

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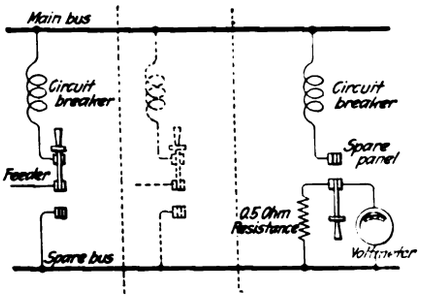
Maintenance of Equipment

Test Resistance Reduces Breaker Maintenance

By G. H. McKelway

Engineer of Distribution Brooklyn-Manhattan Transit Corporation

When a ground causes a reclosing circuit-breaker to open, the line can be made alive as soon as the ground has been cleared; or when the breaker opens because of an overload it can be closed immediately. With a manual circuit breaker, however, this cannot be done. The general practice to test the line after an interruption is to close the breaker. If it stays closed it proves there is no ground, while if it opens again a ground is present. The usual procedure is to wait perhaps a minute and then try again, repeating at intervals until the circuit breaker



Circuits for Test Panel to Indicate Grounds

stays in or word is received that there is trouble and the line is to be left open until further orders.

Testing in this manner is very hard on the breaker, as the heavy current must be broken repeatedly in case of a ground. A bank of lamps or a voltmeter cannot be used to test for a ground, since the car lamps, or sometimes the controllers on the stalled cars, are usually turned on so the car crew will know when power is restored.

In order to determine if it is safe to close the switches and pick up the line after the circuit breaker has blown, and yet save the breakers from abuse, one large company is making use of what it terms a "test resistance." The switchboards of this company have two positive buses, one of which is used regularly, the other being used only for transferring a feeder from its usual circuit breaker to a spare one mounted on a separate panel. Each of the regular panels has a double-throw switch, with the outgoing feeder terminal attached to the center stud. The main bus is connected to the upper stud through the circuit breaker, and the spare bus is connected to the lower stud.

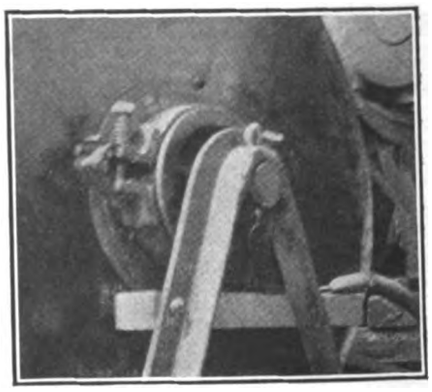
The center stud of the spare panel is connected to the spare bus through a resistance of about 0.5 ohm. By throwing the feeder switch down the feeder is connected to the spare bus, and through the resistance to the switch of the spare panel and thence to the circuit breaker on that panel and to the main bus.

The resistance limits the current with a dead ground to a little more than 1,000 amp., an amount that can be broken without damage to the breaker. A voltmeter is connected so as to measure the drop across this resistance, by which means the station operator can see whether the line is grounded. In case it is, he opens the breaker and tests the line a little later, the comparatively small amount of current flowing through the resistance being insufficient to trip the breaker automatically. If a low reading of the voltmeter across the test resistance indicates that but little current is flowing, it is safe to pick up the line again on the regular circuit breaker.

By the use of this test resistance, the feeder breaker has to endure the strain of opening under a heavy overload but once for each short circuit, since thereafter the load is transferred to the spare circuit breaker; and the current flowing into the feeder is limited by the resistance.

Motor Truck Facilitates Track Welding and Bonding

The Newport News & Hampton Railway, Gas & Electric Company has rigged up a portable welding outfit which facilitates bonding and rail-welding work. A General Electric motor-generator welding outfit is mounted in a light truck,

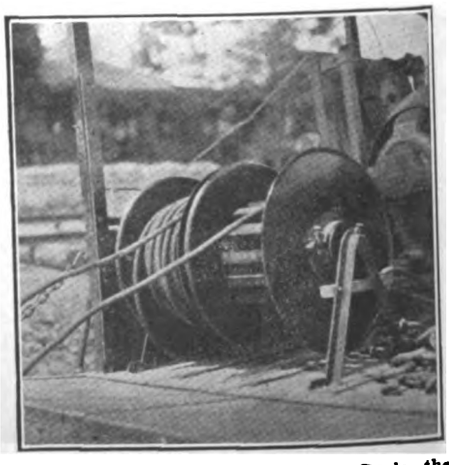


A "Close-Up" Which Shows the Details of the Bearings and Electric Contact Device

which also carries, just inside the tailboard, a pair of reels for the positive and negative cables.

One end of each cable is connected to an insulated sleeve projecting from the end of the reels, to which current is fed through a band contact device. The band is held close around the sleeve by means of a light

This Truck Renders the Welding Outfit Highly Portable



By Means of Cables Wound on Reels, the Outfit Is Given a Wide Range of Action

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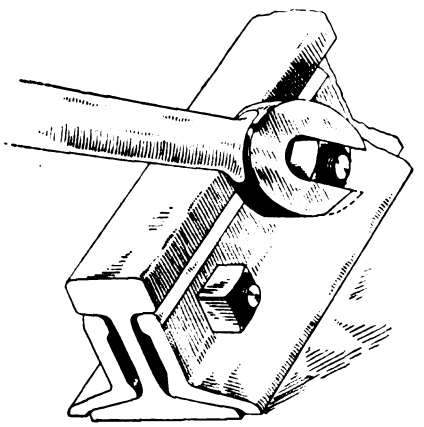
spring which presses together two angles attached to the end of the band. The reels are supported on angle-iron stands of inverted U-form.

Modified Track Wrench

IT HAS been found advantageous by the Municipal Railway of St. Petersburg, Fla., to grind off a portion of the wrench used in tightening track bolts, as shown in the accompanying illustration. Where a square nut is used with bolted joints on low T-rail, the track wrench is likely to become worn where it comes in contact with the base of the angle bar. If the wrench is tempered sufficiently so that it does not wear out, it will often chip off at the point. The difficulty has been overcome on this railway by grinding down one side of the wrench. Both sides of the wrench are not ground down, as it is felt that to do so would weaken

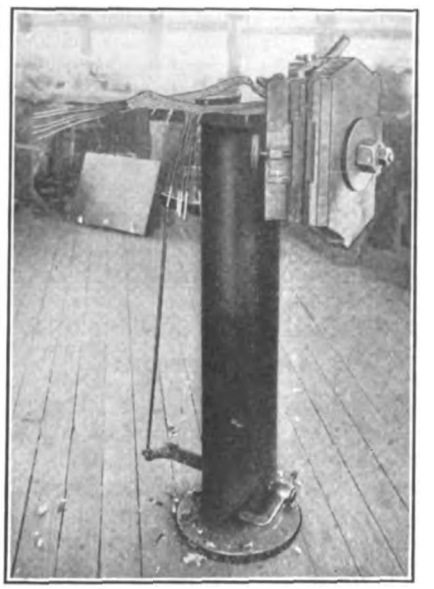


Clearance for Turning Nuts on Low Rail by Grinding Off Wrench

it. After the wrench has been modified it is used in one direction only, because one side is stronger than the other. It may occasionally be reversed, but should not habitually be used in that way.

Convenient Home-Made Coil-Winding Machine

A SHOP-CONSTRUCTED machine for winding armature coils is used by the Lehigh Valley Transit Company, Allentown, Pa. The head for holding the coils has convenient hand screws and plate attachments and, in addition, provision is made for rotating the head so that it is unnecessary for the operator to leave his place in order to get a more advantageous working position. The head is locked and unlocked by operating a pedal which has a connecting rod attachment, with a bellcrank lever working the locking rod in and out of the head portion. When the pedal is depressed the coil fixture can be rotated as desired.



Home-Made Armature Coil-Winding Machine

The Air Brush Is Supplanting the Hair Brush

BY DENNIS O'BRIEN
Foreman Painter Brooklyn-Manhattan Transit Corporation

AN AIR-BRUSH or paint-spraying machine has been used for applying paint to car trucks, under bodies of passenger cars and miscellaneous equipment for a considerable time. The air brush, however, was not used with any great success as a vehicle to be used in applying the finishing coats to the body of the cars until quite recently. While the air brush will never entirely supersede the hair brush, it is and must be recognized as a valuable adjunct to the paint shop and the greatest contribution engineers have ever given to the paint trade.

The economic value of the air brush cannot be overestimated. Its use reduces the cost of car painting from one-third to one-half of the cost of painting by the hand-brush method. The savings on two actual jobs show its true economy. On a 28-ft. body, semi-convertible inclosed vestibule type of car, the time consumed by hand-brush enameling the exterior of body (long oil heavy bodied para red enamel) was nine hours (piece work). The actual time taken with an air brush for the same job was four and one-half hours, a saving in time of 50 per cent.

Let us make an analysis of the operation and see what is saved in varnishing 420 sq.ft. of surface:

	Labor	Varnish
Hand brushing 420 sq.ft. at $0.65 per hour	$2.60	$3.00
Air brushing 420 sq.ft. at $0.65 per hour	.65	3.60
Labor saving by air brush	$1.95	
Additional cost of varnish		$0.60

By subtracting the 60-cent additional cost of varnish from the amount of labor saved by use of the air brush we find a saving of $1.35 for the operation. The amount of material used is about 20 per cent greater with the air brush over the hand-brush job, but it does not follow that this 20 per cent of material is wasted. It is true that in the process of atomizing some of the material goes into the atmosphere, but the greater portion of the additional material adheres to the surface being painted or varnished. You will find more enamel and varnish on the floor of the paint shop where they still use the hand-brush method than you will find in the shop where the air brush is used.

The question uppermost in the mind of the man about to adopt the air-brush method for painting is: What outfit is best for the particular line of work? There are a number of outfits in the market today, each with some individual feature not contained in the others which impresses the buyer.

Several types employ a needle valve to take care of the viscosity of the materials. The needle valve requires adjusting, and for that reason some foremen painters do not favor it as they feel that a new man being introduced to the air-brush method of work cannot be trusted to make adjustments on the machine.

One outfit has no needle valve; the viscosity of the material is cared for by five different sizes of fluid parts through which the material passes. These fluid parts resemble cartridges. Each part is made to satisfy the viscosity of material, from a japan color to the heavy body paints or enamels. These fluid parts can be attached or detached in an instant and no adjustments are required. In addition to the fluid parts there is an oil and water separator attached to the material tank, thus insuring free, clear, clean air.

Another feature of importance in spray painting is the type of container used to hold the material.

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Small railway properties often use several different colors on the car body and so do not favor a container that must be cleaned out after each color.

Any paint, enamel or varnish that can be hand brushed can also be air brushed. Obnoxious fumes and excessive vapor can be overcome by the paint or varnish maker. A pure turpentine spirit instead of turpentine substitutes, or vegetable oils, made soluble in mineral turpentine and called pure turpentine, used by the varnish manufacturer will do a great deal toward eliminating excessive vapor. The less the amount of volatile matter and the purer the volatile the less vapor and fumes.

There may be some objection to using white lead with the air brush due to lead poison or painters' colic. Lead poison or painters' colic is classified as an occupational disease by the workmen's compensation boards and as such leaves the employer liable. White lead is not the only and best white pigment, however. Oxide of zinc will do all that white lead will plus a greater permanency of color and it is not a poison.

Lithopone for interior work is far superior to white lead and is not poisonous. In roof or floor paints where the basic pigment is silica, china clay, or barytes, it is advisable to use metal-lined material hose. These paints on account of their peculiar pigmentary structure and stony nature act like an abrasive and readily destroy any hose which is not metal lined. The ordinary rubber material hose is satisfactory for use of other paints or varnishes.

Air-brush manufacturers recommend using thinners in the paint. I am opposed to thinners in any paint. Enough air pressure will make the air-brush function; thinners and extenders tend to destroy paint and cause a vapor which would never otherwise be there. I don't quite agree with those who hold that any Tom, Dick or Harry can be taught to use the spray in jig time. The better the painter the better the air-brush job.

Sags and ugly runs are caused by operating too close to the surface being painted. The air brush should be held and operated from about 8 to 12 in. away from the surface. The painter learning to operate the air brush should in the beginning carry a hair brush to pick up sags and runs. This will be for but a short time as he will soon become adept. The painter operating the air brush should also be furnished with a respirator and goggles. The respirator can be of light aluminum with a moist sponge and the goggles the standard safety make. The glass in the sash of the cars can be protected from an accumulation of paint and varnish by shop-made window shields.

New Equipment Available

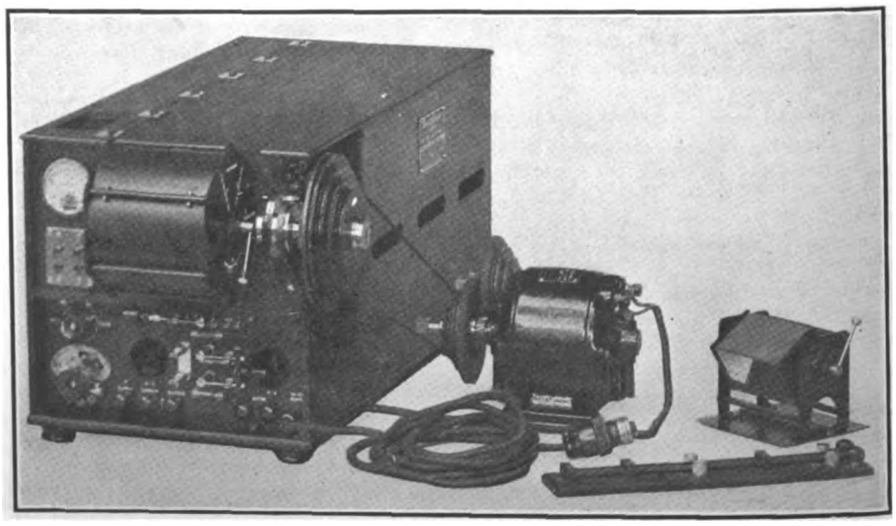
Portable Three-Element Oscillograph

TO MEET the increased need of electric railways for an oscillograph outfit which is readily portable and which will work satisfactorily on a moving car, the Westinghouse Electric & Manufacturing Company has recently brought out such an instrument. The new oscillograph is compact and portable and is more easily operated than previous types.

The instrument consists essentially of an instantly responding moving coil galvanometer and an optical system to cast a beam of light on the vibrating mirror from the galvanometer, from which it is reflected to a photographic film passing at right angles to the vibrating beam. This gives a current-time record on the film in which distance along the film is proportional to the time, and the deflection is proportional to the instantaneous value of the current passing through the galvanometer vibrator.

This new oscillograph galvanometer actually consists of a single turn of very fine conductor supported by two ivory bridges so that the effective part of the coil is essentially two parallel wires with the current passing down one wire and up the other. This coil is located in a strong magnetic field. The motor action of the conductors carrying a current at right angles to the lines of force of the magnetic field tends to force one wire forward and the other backward in proportion to the current passing through them. These parallel conductors are kept very taut by a tension spring which transmits its force to the loop through a lever and tiny ivory pulley. A very small mirror bridges the parallel conductors at the center of the magnetic gap. This reflects the beam of light to the photographic film, the deflection being proportional to the instantaneous current in the conductors. Any vibrator element may be connected across a shunt to record instantaneous values of line current, or it may be connected through a series resistance to act as an instantaneous voltmeter.

The new oscillograph is complete in one unit except for the motor and film holder. The main unit is 11 in. wide, 11½ in. high, and 25 in. long, and includes the entire optical system, special incandescent lamp, sensitive three-element galvanometer, complete control equipment for vibrator elements, transformer for operating lamps and motor, and control for galvanometer field. There is also a "Rectigon" for charging the galvanometer-field storage battery and a set of busbars, fuses and for controlling the apparatus.



Three-Element Oscillograph with Motor and Film Holder Attached

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The News of the Industry

Wage Rise in Chicago

Arbitrators Decide Surface Men Shall Have 3 Cents More Now and 2 Cents More Next Year

Employees of the Chicago Surface Lines will receive a wage increase of 3 cents an hour for one year, retroactice to June 1, and an increase of 5 cents an hour from the present rate for the year beginning June 1, 1924.

This is the award made by the arbitration board which settled the wage dispute between the union men and the railway. It means that conductors and motormen, who have been receiving 70 cents an hour, will be paid 73 cents during the current year and 75 cents an hour next year. The increase will add $1,200,000 to the company's payroll in 1923 and $2,000,000 in 1924.

The wage increase applies to about 11,000 trainmen and 3,000 employees in various other departments. The only groups excepted from the pay boost are substation operators, maintenance of way men, linemen and wreck wagon men. The wage advance affects conductors, motormen, mechanics, who are members of the carmen's union, electricians, car repairers, "dopers" (men who grease cars), shopmen, body repairers, washers and many others. These classes are working under various wage scales, but all will get the same increase per hour.

The men had demanded an increase of 10 cents and hour and a strike was narrowly averted by Mayor Dever, who succeeded in getting both sides to agree to arbitration and to accept a wage scale which would be binding for two years. The pay boost sought by the men would have added $4,000,000 to the company's payroll.

Arbitration of the wage dispute between the union men and the Chicago Elevated Railroads began on July 26.

The decision in the case affecting the wages of the surface line men was hailed by all concerned as a great victory for arbitration. Both sides were pleased with the speed with which the hearings were conducted and the rapidity with which the award was made. While union representatives were disappointed that the wage increase was not greater, they accepted the ruling of the arbitration board and the company officials announced that they will carry out the provisions of the award. It was stated that no request for a fare increase will be made of the Illinois Commerce Commission unless the increase in operating expenses forces it.

The hearings began on July 9 and the presentation of evidence actually consumed only nine and one-half days. Francis X. Busch, who acted as umpire of the board, said:

> This is, I believe, a record for the country. In 1912, the traction arbitration dragged through three months here. Employees naturally had set up the cry that mediation was a subterfuge through which they were "stalled" for an unreasonable time. We have dissipated this conclusion, we believe, and much credit for the achievement is due to William D. Mahon, international president of the carmen's union, for his willingness to arbitrate.

Mr. Mahon issued a statement accepting the award without reserve and stating that the cause of arbitration had been helped very materially by the prompt action of the board. He said:

> We accept the award in the same spirit that we have always accepted arbitration awards and mediation agreements. The award will be carried out faithfully.
>
> I regret that the board could not get our viewpoint and award us the 80 cents an hour that we sought. However, I realize that the board has not only taken into consideration the contentions of the men and the company, but also considered the public's interest, which lies in the rate of fare question.
>
> As to the arbitration and the manner in which it was conducted, I want to congratulate the board and especially Chairman Busch. For a big arbitration, involving as many men as this one did, it was carried through and finished more satisfactorily and more quickly than any other arbitration with which I ever had anything to do. During the arbitration he made both sides eliminate all unnecessary evidence, and in that way hastened and brought forth an award speedily. If arbitration in disputes of this kind is to be successful that policy must be followed.

The cost of living and the trend of wages in industry were the chief factors considered in the arbitration proceedings. William Levine, representing the unions, submitted a budget intended to show that men with families of five, said to be the average, could not live decently on less than $2,214 a year, which would be their income at 80 cents an hour, working eight hours a day through 313 days. The companies' attorney placed against this the so-called Washington budget, brought up to date, which would allow $1,302 a year for a family of five.

Company Not in Default on Improvements

Cincinnati Traction Denies Charges Made by Street Railway, Which It Operates Under Lease—Refinancing Plan Details Made Public

AN EMPHATIC denial was expressed by the Cincinnati Traction Company on July 20 of the charge that it was in default to the extent of $4,000,000 in repairs and renewals to the properties of the Cincinnati Street Railway. The reply of the traction company to the street railway is the result of a letter sent to the traction company by the Cincinnati Street Railway on April 23, in which the latter company requested the lessor company to make repairs to its properties to the extent of $4,000,000 or surrender its franchise. The claim of the railway is based upon a survey of the property made by the engineering firm of Stone & Webster, Inc., Boston. In its reply the traction company contests this claim to a large extent and produces figures of its own to show that the $4,000 000 is greatly in excess of the actual sums needed to put the property in first-class condition.

Following receipt of the reply, the special committee of the Cincinnati Street Railway announced that it would move for arbitration of the controversy. Under the terms of the franchise each company has thirty days in which to name an arbitrator, the two arbitrators to choose a third.

The traction company contends that the city of Cincinnati is responsible for the situation. because under the service-at-cost franchise passed by Council on Aug. 23, 1918, the city administration received full authority over all expenditures to be made by this company for maintenance, repairs, renewals, additions and betterment of the property. Furthermore, the traction company held that it had combined in all respects with the terms of the service-at-cost franchise and in additions has expended money upon the property as permitted by the city's Street Railway Director, who under the terms of the franchise has full regulatory jurisdiction over the street railway system of Cincinnati and its operating companies.

The traction company says that the report of Stone & Webster, Inc., did not take into consideration conditions that it holds are vital to the question at issue. A considerable amount of trackage that the report declares should be renewed has been or is to be abandoned and in such cases the traction company contends there is no occasion to go to the expense of renewing such tracks. This also applies to the power stations that were discontinued when the traction company arranged to buy a large percentage of its current from the Union Gas & Electric Company. Further, the contention is set forth that it is impossibe for the company to go ahead with new track replacements except where the city is ready to renew the streets in which these tracks are laid. The traction reconstruction program must of necessity wait on the

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city's street reconstruction program. In view of this situation it is said to be impossibe to make all the replacements demanded this year, and in any circumstances such program would have to be extended over a period of years to comport with the city's program.

In furtherance of its refinancing program, the Ohio Traction Company, which owns the entire capital stock of the Cincinnati Traction Company, filed for record a mortgage to secure a bond issue of $4,400,000 in which the Union Trust Company, Cincinnati, is designated as trustee, the mortgage covering all of the properties of the Ohio Traction Company subject to a prior mortgage to the Fidelity Trust Company, Philadelphia, March 1, 1911.

It was announced that $2,648,000 of new bonds will be issued at once to refund the 7 per cent notes of the traction company which matured on Jan. 1 last, but which were extended to Oct. 1 next, of which there are still outstanding about $700,000.

William Jerome Kuertz, City Director of Street Railroads, explained that the 6½ per cent bonds which the Ohio Traction Company announces it will issue to refund old debts will require no further authorization from his department nor from the Ohio Public Utilities Commission. The issue was provided for in 1920, when the Utilities Commission and W. C. Culkins, then Director of Street Railroads, authorized the issuance of 7 per cent short-term debentures to take care of outstanding obligations.

The mortgage given by the Ohio Traction Company is designated as a general and refunding issue securing twenty-five-year convertible gold bonds, all bearing interest at 6½ per cent per annum. The bonds will run to Dec. 31, 1945, with interest payable semi-annually in January and July.

The Ohio Traction Company conveys under this mortgage to the Union Trust Company, trustee for the bondholders, all its system now owned or hereafter constructed or acquired in Cincinnati, including the line to Hamilton, and as further security pledges 14,995 shares of capital stock of the Cincinnati Car Company of the par value of $100, aggregating $1,499,500 and being all the capital stock of said company, except five shares. It also pledges 19.989 shares of capital stock of the Cincinnati Traction Company of par value of $1,998 900, being all the capital stock of said company, except eleven shares. The mortgage also covers the Traction Building, located on the corner of Fifth and Walnut Streets. The mortgage is made subject to a mortgage of March 1, 1911, made to the Fidelity Trust Company, Philadelphia, to secure a bond issue of $2,500,000.

The letter of the Cincinnati Traction Company to the Cincinnati Street Railway was signed by W. Kesley Schoepf, president. After referring to the several communications between the companies and to the charges that were made, Mr. Schoepf said:

This company denies that any condition exists which would constitute a default, under the above mentioned lease, as claimed in your first letter of April 20, 1923, with Exhibits A, B and C attached. Your before mentioned communication is the first and only complaint received from you as to the condition of the street railway property leased from your company during the twenty-one years of this company's operation.

On Aug. 23, 1918, the Council of Cincinnati passed Ordinance No. 253-1918, revising the terms and conditions of the grant from the city of Cincinnati to the Cincinnati Street Railway, adopted by the Board of Administration of the city of Cincinnati on Aug. 13, 1896. Your company was represented by its officers and legal representative throughout the negotiations of the terms and conditions to be embodied in the revision of the franchise, which was considered in public meetings in the Council chamber, and after its passage said Ordinance No. 253-1918 was formally accepted by your company.

No complaint was made about or of the condition of the property leased from your company at the time of the passage of the revision ordinance, and since then it has been continuously maintained and operated under the terms of said ordinance.

This ordinance, which you accepted and the terms of which you agreed to, provided, among other things, that the city of Cincinnati was clothed with full authority over all expenditures to be made by this company for maintenance, repairs, renewals and additions and betterments to the property, and this company has complied in all respects with the terms of said ordinance and has expended upon the property leased from the Cincinnati Street Railway all sums required or permitted to be expended by the city of Cincinnati and shall continue to do so throughout the terms of the franchise.

Purchase Contract Terms Drawn

Special Committee Ready to Report on Milwaukee Service-at-Cost Arrangement

F. W. Luening has been contributing to the Milwaukee *Journal* a series of signed articles on the matter of the contemplated purchase of the local railway lines and light property there by the city, brief mention of which was made in the ELECTRIC RAILWAY JOURNAL of July 21, page 114. The exact terms of the proposed contract will not be made known until the ordinance covering the matter has been introduced in the Council, but the general provisions have been discussed publicly. Mr. Luening says that members of the acquisition committee consider the tentative contract highly favorable to the city and believe its terms should be accepted by the municipality. It also is said that they have endeavored to correlate the views of those who favor municipal ownership, those who favor municipal control, and those who favor private management. They have established a mutually agreeable arrangement whereby the property will continue to be privately managed, municipally controlled, and ready for municipal purchase if, after a period of trial the people of Milwaukee should desire to make such a purchase.

In commenting on the valuation matter Mr. Luening said:

The property value of the Milwaukee Electric Railway & Light Company, as appraised by the Railroad Commission in 1914, was $35,805,654. The value of the Milwaukee Light, Heat & Traction Company property, as estimated by the Railroad Commission in the same year, was $15,426,105. This gave a total combined value of $51,231,754, from which was deducted depreciation and other items bringing the total down to $43,871,530. There have, however, been additional investments since this appraisal was made and for this reason additions to the total have been agreed to.

It is said that the contract provisions will include:

1. Management shall remain with the company, but the character and quality of the service shall be prescribed by the city.
2. Street car fares may fluctuate, from a possible minimum of 4 cents to 5 cents, to a probable maximum of 8 cents. The fluctuation will be automatic and will be controlled by a "stabilizing reserve fund."
3. The company will be required to make extensions in its railway system, light and power lines whenever and wherever ordered to do so by a three-fourths vote of the Common Council; but if such extensions are arbitrarily ordered by the city and should prove ill-advised and unprofitable, the city will pay the actual cost of the extension, but ownership of them will thereafter rest with the city.
4. The city may participate in the financing of the company by purchasing its bonds, junior to all outstanding bonds or liens, as of Jan. 1, 1923.
5. A "city equity fund" also will be established to which will be credited any amount exceeding necessary requirements in any of the company's reserve funds.
6. A public utility commissioner will be appointed and the cost of his department, not exceeding $60,000 in the first year, is to be considered part of the operating expense of the company.
7. The commissioner will be named by the city. His department will constitute a kind of local railroad commission and will be the instrument through which the city will exercise its rights in public utility properties.
8. Matters of disagreement or dispute will be submitted to a special arbitration board or the Railroad Commission, if so elected by the city. However, the city's right to control and demand service shall not be subject to arbitration nor shall the stipulated rate of return to be allowed the company be arbitrated.
9. The company's relation with its officers and employees will not be disturbed.
10. The proposed contract will continue ten years and may then be terminated, but only if voted upon by the people during the eighth year. Unless rejected by the voters the contract will automatically continue for ten-year periods thereafter.

The committee on acquisition was organized by resolution of the Common Council on Feb. 24, 1919. Its members are Fred S. Hunt, chairman, president of the Milwaukee Dustless Brush Company; William E. Black, attorney and member of the firm of Upham, Black, Russell & Richardson; J. J. Handley, secretary, Wisconsin State Federation of Labor; Lyle H. Olson, general manager of the American Appraisal Company; J. W. Radke, Albert Janicki and John Doerfler, Jr., members of the Common Council, and M. E. Glaser, secretary of the committee.

The committee began its work almost immediately after organization. It undertook an analysis of the company's operations, its investments and all that related to street railway, light, heat and power service in Milwaukee.

It compiled a report that includes hundreds of pages of typewritten matter and hundreds of charts, maps and diagrams. It prepared a summary report in printed form July 25, 1921, submitting it to the Common Council. In that report it was able to offer a mass of historical data, but was not ready to announce conclusions. It suggested, however, that a contract with the North American Company—the company owning or controlling the local property—would be needed and that in such contract agreement might be reached whereby Milwaukee could receive its electric service at cost, while private

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management could still receive a fair return on its investment.

Following the submission of this document, the committee was instructed by the Council to continue its work. This it has done in the intervening period.

Mr. Luening said of the future:

It is said that there are only minor details awaiting adjustment and that the acquisition committee and the North American Company undoubtedly will be able to reach an agreement in the next few weeks. It is admitted, however, that the remaining details are vital and relate to the exact amount in profits, or returns for managerial services, to be allowed the North American and local company.

If these final details can be consummated, it will remain for the Common Council to accept the proposals outlined in the contract and thereafter submit them to the people at a special election.

Electrification Rumors Premature

Recent reports in the daily press regarding possible electrification of the Santa Fé were based on rumors of a study made for electrification of one of the divisions of that company in the Western desert country. From authoritative sources it is learned the company has no work of this kind under consideration to be carried out in the near future. Like most of the other roads operating out of Chicago, the Santa Fé has reports of one kind or another on electrification possibilities, but these are only preliminary studies that mean nothing but a basis for possible future improvements. Probably every road in Chicago has in hand preliminary plans looking toward electrification of the terminals there, but the Illinois Central plans are the only ones that so far have been reduced to anything like tangible form in carrying out.

Arbitrators Named for Cincinnati Wage Issue

The board of arbitration has been selected which will hear the demands of employees of the Cincinnati Traction Company for a wage increase. The members are former United States Judge John Weld Peck, selected by the traction company; Attorney James H. Vahey of Boston, selected by the employees, and former Ohio State Supreme Court Judge Joseph W. O'Hara, selected by the two other members. Under the terms of the present agreement between the company and the men the decision by the board of arbitration will be final and binding upon both sides. The present scale is 42 cents an hour for the first three months service with the company, 46 cents an hour for the next nine months and 48 cents an hour after one year. The platform men (conductors and motormen) are asking for an increase of 17 cents an hour for all grades. The carhouse men, numerically a small proportion of the company's total employees, are asking for a 35 per cent increase. The present wage scale expired June 30, but under the terms of the agreement the existing wage shall be paid until a new agreement is reached.

Strike of Electrical Workers Settled in St. Louis

The strike of 175 electrical workers of the United Railways, St. Louis, has been settled. The men returned to work on July 25 agreeing to negotiate further with the receiver. This means a return to conditions of a week ago when they walked out over the demand for 92 cents an hour. The present scale is 78 cents. The receiver offered 83 cents and the men's final demand was 87. They rejected arbitration. The deadlock lasted six days. On July 25 Manager Ferkins delivered an ultimatum in which he said he would fill the men's places and not negotiate further unless the men first returned to work. He gave a twenty-four-hour time limit. The men voted to return. Meantime service has not been interrupted. The office force and foremen have manned the power stations and line work.

Ford to Electrify D., T. & I. Road

Plans are under way for the electrification of Henry Ford's Toledo & Ironton Railroad, running from Detroit, Mich., to the Ohio River. This is indicated in an article printed in the "D., T. & I. News," official publication of the railroad. The power will be supplied from Ford's Rouge River plant, the capacity of which is to be greatly enlarged.

The article in the "D., T. & I. News" concerning the electrification of the road follows in part:

The present plans call for the building of new locomotives, the doubling of the power capacity of the Rouge River plant, which will furnish power for the first division to be electrified, and the construction of 13¼ miles of double track between the Rouge River plant and the Flat Rock yards.

In keeping with the general improvements that the Detroit, Toledo & Ironton Railroad has undergone under Ford ownership, electrification will give the road a vastly superior motive power.

The new electric locomotives for the D., T. & I. railroad for freight service will weigh 360 tons, have a normal capacity of 4,000 hp. and be capable of producing 5,000 hp., for an hour. They will have sixteen axles and will develop 108,000 lb. drawbar pull at 25 m.p.h.

Transit Company Ready

T. E. Mitten, chairman of the executive committee of the Philadelphia Rapid Transit Company on July 17 definitely pledged his company to the operation of the rapid transit lines comprised in the comprehensive plans agreed upon by the engineers of the city, the company and the central business interests. On the question of terms under which operation is to be undertaken, Mr. Mitten stated that he was unable to make any definite proposal until the completion of the traffic check.

A significant development at the meeting of the Councilmanic Transit Commission on July 17 was the announcement by Mr. Mitten that if the city would, in addition to "Step No. 1," undertake the construction of a surface subway on Chestnut Street, to enable the removal of the present surface tracks on that street and on Walnut, the railway would contract to pay during the lifetime of the city's bonds the full amount of the required interest and sinking fund. This would mean that with an assured return from the outlay the $18,500,000 estimated cost of the surface subway would not have to be counted against the city's borrowing capacity. The advantage of this was so obvious that the commission, by unanimous consent, added this feature to its "Step No. 1," final adoption of which is on its program for its next session.

Two other important changes in the program for immediate construction were made, providing for a four-track subway on Broad Street for the full distance from Olney Avenue to Spruce Street, and for the modification of the Chestnut Street-Darby line by extending it as a subway west on Chestnut to Forty-second and thence on Forty-second to Woodland Avenue by an elevated structure, the remainder of the line on Woodland Avenue also to be elevated.

Key System Employees Accept Three Cents Increase

After twice rejecting the offer of the company, employees of the San Francisco-Oakland Terminal Railways (Key System) on July 7 voted to accept the company's proposition of an increase in wages of 3 cents an hour over the former scale. The vote was 444 in favor to 115 against.

The new rates for traction division motormen and conductors and Key division brakemen are 49 cents for the first three months and 52 cents for the next nine months and 56 cents thereafter. Key division motormen and conductors will receive 2 cents higher than the scale just mentioned. These rates, according to the company's original proposition are retroactive to June 1 and will remain in effect until May 1, 1924.

The trainmen of the San Francisco-Oakland Terminal Railways, comprising Division 192 of the Amalgamated Association, served notice upon their company for reopening their agreement as of June 1, 1923. After a number of conferences with the officials of the company, the company offered an increase of 3 cents an hour over the scale then in effect, which was for traction division motormen and conductors and Key division brakemen, 46 cents for the first three months, 49 cents for the next nine months and 53 cents thereafter.

For Key division motormen and conductors the rates were 2 cents higher.

At a midnight meeting held on June 9 the men rejected the company's proposition and after several more meetings, when the company continued the same offer unchanged, the men by a referendum vote on June 27 again rejected the offer. The company then officially notified the men that they would be given a chance to reconsider their former decisions, but that if the company's offer was again rejected the next step would be arbitration. This led to the men's acceptance.

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Strike Looms in New Jersey

Railway and Employees Fail to Agree Upon Means of Arbitration to Avert Walkout Threatened Aug. 1

"We are through holding the bag" said Thomas N. McCarter, president Public Service Railway, at a meeting with the Mayors of twenty-five New Jersey municipalities held at the Newark City Hall on July 26 to try to arrange a means of arbitration acceptable to both sides and prevent a strike next Wednesday. "If the men stop work we will not import strike breakers or try to run the cars. Of course, it is possible that the cars will eventually run again by means of court action, reorganization or the like, but I mean it when I say that we are through."

He at first declined to consider arbitration by any board except one having power to increase the company's revenue to correspond with any wage increase recommended, namely, the public utilities commission. Later Mr. McCarter said he would agree to an arbitration board consisting of one man chosen by each side and Harry V. Osborne, head of the utilities commission, as the third member. But he left the meeting abruptly after a verbal battle with the Mayor of Jersey City.

Prior to this meeting the men had submitted a demand for 30 per cent increase in wages after the termination on Aug. 1 of the existing agreement, as told in the ELECTRIC RAILWAY JOURNAL last week. The present rate is 50 cents an hour. The railway had refused to accept such proposal but had offered to continue the present scale for five years more. This offer in turn was unanimously rejected at meetings of the various local organizations of the union.

Arbitration by the public utilities commission had been suggested by the company and refused by the men. The latter had suggested the selection of an arbitration board of three, one to be chosen by each side and those two to select a third. The railway, however, had declined to participate in this plan.

In the hope of getting the two sides to agree upon a method of arbitration, Mayor Breidenbach of Newark called a conference of representatives of the various municipalities served by the railway, officials of the company and of the union, to meet on July 26. At this meeting Mr. McCarter explained fully his position. Increased taxation, paving charges never contemplated in the original franchises, and automobile competition, particularly bus competition, have placed almost insurmountable difficulties in the path of the company. No dividends have been paid since 1917, he said, and a deficit of more than $1,000,000 has been accumulated.

According to Mr. McCarter, the Public Service Railway has no money to pay the increase asked, and is unwilling to submit the matter to arbitration by a board which might recommend higher wages, but would have no power to provide means to pay them. Arbitration under the terms previously stated is therefore, the only method to which the company will consent. The union, however, feels that the public utilities commission would not have the courage to make an award in favor of the employees because it might then have to authorize an increase in fare or cut down competition.

No progress toward arbitration was made at the Mayor's meeting because neither side would recede from the position which it had taken. Mr. McCarter said that he saw only three possible ways for the controversy to end: a higher fare, elimination of bus competition, or the collapse of the railway. As a result of the failure of this meeting it appeared at noon on July 27 that a strike was almost inevitable on Aug. 1.

Extensive plans are already being made to meet the transportation crisis if the railway stops operation on that date. There are about 1,500 buses now operating in the territory served by the railway, approximately 425 being in the city of Newark. The maximum number of cars operated on the entire railway system is about 1,450, of which 600 are in Newark. It is planned to import additional buses from neighboring states, and by a system of short routings as well as by the elimination of bus layovers, it is hoped that fairly adequate emergency service may be provided. In fact, many look upon this, if the strike occurs, as a test of what the bus can do. The bus men in Jersey are in a far better position to undertake the task of supplying emergency transportation that was the case in connection with suspensions of railway service in Toledo, Bridgeport and Des Moines.

Report of Possible Change in Voltage Premature

Rumors have been current that the Chicago, Lake Shore & South Bend Railway Michigan City, Ind., plans to change over to 1,500 volt d.c. operation. The reports are based on the apparent necessity of the company conforming to the Illinois Central Railroad system of electrification for its terminal lines into Chicago. The Chicago, Lake Shore & South Bend has gathered some information of possible value to it in any study which it may make in the future, but it is not planning any such change at this time. In short, the matter is wholy tentative and of no consequence in so far as the present is concerned.

News Notes

Convention Date Announced.—The Amalgamated Association of Street Electric Railway Employees will hold a convention in Oakland, Calif., beginning Sept. 10.

Wages Advanced.—An agreement has been signed between the management and employees of the Berkshire Street Railway, Pittsfield, Mass., to run until June 1, 1924, which provides for a 7.2 per cent increase in wages, retroactive to June 1. Working conditions are unchanged by the new agreement, which was reached without resort to arbitration. Following the announcement of the agreement, General Manager C. Q. Richmond said there would be no movement at present to increase fares as a result of the wage advance.

Views on Municipal Ownership Aired.—The Columbus Railway, Power & Light Company, Columbus, Ohio, is running quite a conspicuous advertisement in all three daily newspapers of Columbus, entitled "Municipal Ownership." The advertisement tells the history of the Municipal Railway of Seattle right up to a short time ago, when the fare after being reduced was raised again to 10 cents upon the vote of the City Council to return to the former rate. The ad says that municipal ownership leads to government usurpation of private rights; it develops, in the long run, inefficiency and waste; it increases burdens of the taxpayers, destroys individual initiative, incentive and enterprise, and tends toward socialism.

Election Called Off.—The election which was to take place in Goldsboro, N. C., on July 9 to determine whether the city should take over and operate the street cars was recently rescinded at a called meeting of the Board of Aldermen. The city of Goldsboro has not had car service for several years, and more than once it was announced that an election would be held to determine just what would be done with the railway property. It was announced early in the year that the city had about $35,000 which could be used for the rehabilitation of the property from the sale of the old power plant and that the money was being held as a sort of trust fund. Later it was announced that the amount of money to be used for rehabilitation purposes had been increased to $40,000.

Increase of Five Cents an Hour.—A new wage scale was negotiated by the Milwaukee Electric Railway & Light Company with its employees which became effective on June 1. This scale represents an increase of 5 cents an hour for all hourly employees in the transportation department and increases were also granted to the monthly employees. This is the second increase in 1923, the wages being advanced 5 cents an hour on Jan. 1. All men employed since May 1, 1921, received this increase the first of the year. With that increase considered the scale up to June 1, 1923, was for conductors in city operation 45 cents for the first year, 47 cents for the second year, 49 cents for the third year and 51 cents for the fourth year and thereafter. For the motormen the wages in cents per hour were 50 cents for the first year, 52 cents for the second year, 54 cents for the third year and 56 cents for the fourth year and thereafter. Negotiations are conducted semi-annually, thus permitting frequent adjustment of wages and working conditions to meet increases or decreases in the cost of living.

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Financial and Corporate

Oakland Lines Sold

Way Cleared at Receivership Sale for Reorganization of San Francisco-Oakland Terminal Properties

J. F. Schuman of San Francisco on July 17 bid in the property of the San Francisco-Oakland Terminal Railways at foreclosure sale for the sum of $10,000,000. No other bids were made and the sale was closed over the objections of E. P. Troy, San Francisco, claiming to represent a minority of the stock and bond holders.

The sale of the property is the last step but one in the reorganization plan which has been under consideration since 1919, when the State Railroad Commission recommended that the transportation system be placed on a "sound financial basis" before any adjustment of fares could be considered by the commission.

The property was purchased in the names of Hugh Goodfellow, Warren Olney and W. I. Brobeck, as joint tenants and agents of the reorganization committee. The sale was ordered under a decree granted by Superior Judge James G. Quinn foreclosing a mortgage held by the Mercantile Trust Company and the Union Trust Company on various bond issues of the company. The judgment was for $20,000,000.

Final Steps Soon

The actual sale brought out a sharp conflict between Attorney Troy and J. B. Lanktree, commissioner named by the court to conduct the sale. Mr. Troy demanded that the lengthy decree of sale be read. This consumed fully half an hour. At the conclusion Mr. Lanktree called for bids and Attorney Schuman, on behalf of the joint tenants, bid $10,000,000. In payment of the bid Schuman offered three certified checks for the following amounts: $132,721.68, $132,721.67 and $132,721.27. He also added a list of stocks and bonds to make up the balance of the purchase price.

Following the sale, it was announced on behalf of the joint tenants that W. R. Alberger is named general manager and F. W. Frost, treasurer, to operate the properties, under the direction of the reorganization committee's agent. Mr. Alberger immediately issued an order appointing all former executive heads to the positions they had held. He also announced that all transportation forms bearing the name of the San Francisco-Oakland Terminal Railways would be honored pending the completion of the reorganization.

The final and last steps of the reorganization will be taken immediately when the new owners of the system will apply to the State Railroad Commission for approval of the details of the plans and the issuance of securities under the name of the Key System Transit Company. It is estimated that the first new issue will be for $10,000,000. Of this amount only such sum will be sold as will be needed to pay for one of the two new ferryboats recently purchased by the company, for such street paving as the company must do immediately, and such other expenses as cannot be cared for under the company's regular income.

Offer Made to Purchase Entire Common Stock

The West Penn Company, Pittsburgh, which some months ago bought a controlling interest in the Monongahela Valley Traction Company, Fairmount, W. Va., and changed the name to the West Penn-Monongahela Public Service Company, is now offering to buy all the common stock of the old company.

Under an agreement dated July 2, the company purchased from Senator C. W. Watson, on July 16, all his common stock in the West Penn-Monongahela Company. In accordance with his personal request the company now offers until Nov. 1, 1923, to all holders of common stock of the West Penn-Monongahela Company, the same opportunity to sell their stocks on identical terms and conditions.

Holders of record on July 16, 1923, of less than 100 shares will receive the full purchase price of $5 a share in cash. Holders of 100 or more shares of stock will receive $1.25 in cash for each share and certificates evidencing their right to receive the balance of the purchase in three equal annual payments on July 15, 1924, 1925 and 1926, with interest at the rate of 5 per cent per annum, payable semi-annually.

Dividend Tax Opinion Revised Again

Attorney-General Daugherty has rendered an opinion that "in cases where one corporation has received from another corporation distributions out of earnings or profits accumulated by such other corporations prior to March 1, 1913, or out of increase in value of its property accrued prior to March 1, 1913, the receiving corporation after having first distributed all of its earnings and profits accumulated since Feb. 28, 1913, may distribute to its stockholders exempt from tax, the amount so received by it from such other corporation."

Several months ago the Treasury Department issued a ruling to this effect and then rescinded it. It is said that the expression of opinion now made by the Attorney General will probably cause a restoration of the ruling.

Separation Planned

Staten Island Receivership to Be Lifted and Railway and Light Properties Separated

Plans were announced on July 21 for taking the Richmond Light & Railroad Company, Richmond, Staten Island, N. Y., out of the hands of the receiver. A letter sent to the stockholders and signed by J. H. Pardee, president of the company, said that the plans contemplate the division of the light company from the railroad company.

The directors have reached the conclusion that the most successful financing can be arranged by a separation of the lighting and railroad properties, each to be vested in a separate corporation, the lighting properties to be held by the principal corporation and the railroad properties by a subsidiary corporation. Moreover, under the present arrangement the company is subject to the overlapping jurisdiction of both the Public Service Commission and the Transit Commission. Accordingly, the Staten Island Edison Corporation has been organized to acquire the lighting properties.

The railway and ferry properties will remain in the possession of the Richmond Light & Railroad Company which will become a subsidiary of the Staten Island Edison Corporation. There is an alternate proposal by which the railway and the ferry property would be vested in a corporation already organized as the Richmond Railways, Inc., which also would be a subsidiary company of the Staten Island Edison Corporation.

Stockholders of the present Richmond Light & Railroad Company would get shares in the new Staten Island Edison Corporation on the basis of two shares of no par value for each share of the Richmond Light & Railroad Company stock. J. H. Pardee, president of the company, said:

> Preparation for the termination of the receivership are well under way, and it is hoped that an order of the Federal Court for the discharge of the receiver will be secured on or about Aug. 1. The termination of the receivership cannot, however, become permanently effective unless this company's indebtedness and receivership expenses are promptly paid. For this purpose bonds of the Staten Island Edison Corporation must be issued at once. Arrangements for the underwriting of the bonds have been practically completed.

Mr. Pardee announced also that a special meeting of the stockholders of the company would be held on July 31 to give the necessary statutory consent to the transfer of the lighting properties to the new company. Interests representing nearly 90 per cent of the stock have already signified their approval of the plan, President Pardee said. He further pointed out that the plan calls for no contribution from or assessment upon the stockholders, although they will retain their entire ownership in the property.

The Richmond Light & Railroad Company was formed in 1902 by a consolidation of the Staten Island Electric Railroad, the New York & Staten Island Electric Company and the Richmond County Power Company. It owns the

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entire stock of the New Jersey & Staten Island Ferry Company, and a majority of the stock of the Southfield Beach Railroad.

Captain John J. Kuhn was appointed temporary receiver for the company on April 28, 1920. On Oct. 5, 1922, new interests acquired a majority of the capital stock of the company with the expressed intention of taking it out of the hands of the receiver.

The transfer of the lighting properties and exchange of stock were authorized on July 12 by the Public Service Commission. The order of the commission also authorized the issuance of bonds of Staten Island Edison Corporation to provide funds for the payment of existing indebtedness and receivership and readjustment expenses, such bonds to be secured by a modern mortgage with flexible provisions for future issues. The Transit Commission had previously authorized the transfer of the railway properties to Richmond Railways, Inc.

Approval Sought for Extension of St. Louis Bonds for Three Years

Special Master Henry Lamm of the Federal court for the Eastern District of Missouri has set July 27 as the date on which he will hear further arguments on the application of Receiver Rolla Wells of the United Railways, St. Louis, to have $14,800,000 of the railway's obligations which become due Oct. 1 next extended for three years.

Opposition to the granting of the extension has been registered by security holders of the road. Judge Lamm instructed T. E. Francis, attorney for Receiver Wells, to prepare an order reviewing the arguments for the extension.

The hearing held on July 13 developed that the termination of the road's receivership scheduled for next October has been indefinitely postponed pending final outcome of the valuation case now before the Missouri Public Service Commission. Mr. Francis indicated that the matter probably would go to the United States Supreme Court.

Sam O. Jeffries, counsel for bondholders of the Suburban Railway, has opposed extension of any securities other than those issued by the receiver. Advocating reorganization of the road Mr. Jeffries stated it was the duty of the court to take the railway out of the hands of the receiver and let its owners operate it. He favored a "hasty reorganization."

Col. Albert T. Perkins, manager for the receiver, testified that while net earnings in May reached "$31,000 plus," June was not so good. The hearing developed that the railway has a reserve fund of $7,031,000. Asked if this sum could not be diverted to meet the road's obligations in part, Colonel Perkins said that would be "unfortunate,'" as this fund is and should be maintained to pay off claims for accidents and to settle similar liabilities.

Operation Ceases in Henderson

Railway operation ceased on July 17 when the Henderson Traction Company, Henderson, Ky., was placed in receiver's hands following the filing of a petition by the Ohio Valley Banking & Trust Company, trustee for the bondholders. The receiver, Henry P. Barrett, a bondholder and member of the State Board of Charities and Corrections, was appointed by Circuit Judge N. B. Hunt. The petition asked that the city of Henderson be requested to answer and set up its claim against its co-defendant and asked for judgment of $148,800 from the company with accrued interest on the bonds. It also prayed that a receiver be appointed by the court to take charge of the property described in the mortgage. The traction company has defaulted on the annual interest on the bonds for five years. The city holds a prior lien of $5,000, due as a street oiling tax against the company.

City commissioners on July 19 applied for a court order for the removal of rails and tracks on Second Street from Ingram to Clark Street and Green Street from First to Clay Street so that the city could start its own street improvement program.

The $25,000 insurance on the rolling stock of the company has been transferred to Henry P. Barrett, receiver.

The loss of the car line in Henderson has been expected now for some time. The action of the Court of Appeals on the paving question undoubtedly hastened the end. It decided that the company must pay for paving between the rails. The city commissioners then passed an ordinance covering the streets on which cars are operated ordering pavement improvements. When asked immediately after the passing of the ordinance what they intended to do, the railway officials said there was only one thing to do and that was to take up the rails.

Messrs. Tumulty and Choate Receivers of Jersey Road

Federal Judge Lynch, in Newark, N. J., on July 24 signed an order placing the Morris County Traction Company in the hands of temporary receivers. Joseph P. Tumulty of Jersey City, former secretary to President Wilson, and Joseph K. Choate, New York, president of the company, were named receivers.

Application for the receivership was made by the People's Savings & Trust Company, Pittsburgh, trustee. Consent to the receivership was given by Mr. Choate. The action is the result of a proceeding in equity on a bill of foreclosure in which the People's Savings & Trust Company was the complainant and several electric concerns were defendants.

According to an affidavit filed by Otto S. Schultz, secretary and treasurer of the company, the company is in default $6,100 interest on bonds; $65,102 for past due franchise and local taxes; $38,108.26 for this year's taxes; $15,000 for a judgment obtained against the company, and $26,000 in current bills. The cash on hand of the company is said to be $2,500.

The main line of the company runs from Maplewood to Wharton via Springfield, Summit, Chatham, Morristown, Morris Plains and Dover. There is a branch connecting Elizabeth and Springfield and another running from Dover to Lake Hopatcong. There are about 60 miles of track in the system. Competition from jitneys has been unusually keen in the territory served by the company.

Charlottesville Road Reported Sold

Control of the Charlottesville & Albemarle Railway, Charlottesville, Va., is reported to have passed to the Virginia-Western Power Company through the purchase of all of the common stock of the railway by the power company. The Charlottesville & Albemarle Railway was incorporated in 1913 as a consolidation of the Redland Power Corporation and the Charlottesville & Albemarle Railway. It has perpetual light and power franchises in both city and county. The railway franchise in the county is perpetual, but that in the city expires in 1944. For some time past the company has been controlled by Norman James, John L. Livers and their associates.

The property is a comparatively small one, but under the present management it has been unusually successful as a money maker for an undertaking of its size. It has outstanding $122,700 of 7 per cent cumulative preferred stock and $500,000 of common stock. There is outstanding against the property only one issue of bonds dated April 1, 1915, and due April 1, 1943. The trustee under the terms of the indenture securing the bonds is the Equitable Trust Company, Baltimore. The authorized amount of the issue is $750,000, but of this sum only $437,000 is outstanding at the present time.

It is understood that Mr. Livers, who has been vice-president and general manager at Charlottesville, will remain with the company in that capacity.

Maryland Property Merged with Capital Traction

After more than a year's controversy over leasing trackage, an agreement has been reached whereby the Kensington (Md.) Railway will pass from its present ownership and become part of the Capital Traction Company, Washington, D. C. A settlement with the Kensington Railway, the Sandy Spring Railway and the Capital Traction Company several times seemed near but was held up each time by objections of one or the other interested companies.

The Kensington Railway consists of 3½ miles of track and extends from Kensington and Sandy Spring to

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Chevy Chase, connecting with the system of the Capital Traction Company at the District line. It has been in existence for about twenty-eight years.

The Capital Traction Company may establish through car service this summer from Kensington, Md., to the downtown section of Washington.

The proposal is for the Capital Traction Company to lease the Kensington Railway for ten years under certain conditions set forth in a contract now awaiting the signatures of the parties concerned.

John H. Hanna, vice-president of the Capital Traction Company, stated recently that the agreement should be closed within a few days unless some unforseen difficulty arises.

The plan is to have the Maryland Public Service Commission fix a rate of fare that will cover operating expenses and provide whatever surplus the commission regards reasonable. Of such a surplus, if any, the Kensington security holders would get 75 per cent and the Capital Traction Company 25 per cent.

New Orleans Earnings Decline

The report of the third quarter of the trial year of the Public Service, Inc.,—April, May and June—just submitted by the company to Paul H. Maloney, Commissioner of Public Utilities at New Orleans, shows a material reduction in the per cent of income earned by the company on the rate basis of $53,348,000, as of March 31, 1923. There has been a decline of $116,703, in the net operating income for the quarter just lapsed as against that of the three months previous, a contingency which was not, however, unexpected by the city on account of the closing of the schools for the summer and the departure of many people from the city for the country and seashore.

The report shows that $3,000,000 has been added to the base rate since the commencement of operations on Oct. 1, 1922, and further that $394,405 of the earnings during the past three months has been added to the base rate.

There has been set aside for the sinking fund, dividends and surplus reserve during the past six months the sum of $322,711, equivalent to 6.99 per cent on the present rate base of $53,348,000, which is about $3,000,000 in excess of the $50,000,000 rate base fixed when the company started in on the trial year to earn 7.50 per cent.

It is not apprehended by Commissioner Maloney that the company will be unable to earn this per centum on the rate base which will finally be adopted at the conclusion of the trial year.

The gross earnings in the railway department were $747,928; in the electrical department $641,835, and in the gas department $474,960.

Line to Be Abandoned.—The Berkshire Street Railway will shortly abandon the line from Great Barrington, Mass., to Sheffield and Canaan, Conn., and the tracks, poles and wires will be removed.

Equipment Trust Certificates Authorized.—The Department of Public Utilities of Massachusetts has approved an issue by the Milford & Uxbridge Street Railway of $52,249 of 6 per cent equipment trust notes.

Seeks Increase in Budget for 1924.—In its budget for 1924, filed with the City Council, the Seattle Municipal Railway asks $6,747,173, an increase of $163,861 over 1923, the increase charged largely to miscellaneous labor and supplies.

Appeal in October.—The appeal of the Philadelphia Rapid Transit Company from the Public Service Commission's valuation and 7-cent, four-for-a-quarter ticket fare case will be argued in the October term of the Superior Court in Philadelphia.

Net Income Decreases. — The Eastern Massachusetts Street Railway, Boston, Mass., reports a net income of $474,123 for the first six months of 1923. The figure for the same period a year ago was $506,191. Expenses and taxes increased from $3,962,890 in 1922 to $4,377,324 for the period from January to June, 1923.

Bond & Share Company to Increase Capital. -A special meeting of the stockholders of the Electric Bond & Share Company, New York, N. Y., has been called for Aug. 3 to vote on increasing the capital stock from $40,000,000 to $50,000,000 by the issuance of 50,000 shares of preferred and 50,000 shares of common stock of $100 per value of each.

Auction Sales in New York.—At the public auction rooms in New York on July 25 there were sold $3,000 of United Traction Company (Albany) 4½ per cent bonds, due 2004, coupons June and December, 46½ per cent; $25,000 Broadway & Seventh Avenue Railroad first consolidated mortgage 5 per cent gold bonds, due December, 1943, 62½ per cent.

Earnings and Passengers Increase.—The net earnings of the Boston Elevated Railway for the six months ended June, 1923, were $1,062,134, against $1,045,534 for the same period a year ago. There was an increase in the total passengers carried, 177,955,358 being the number for the first six months of 1922 and 195,051,019 for the same period of the current year.

Earnings Increase Under Restored Fare.—A gain in earnings of the Seattle Municipal Railway is shown in a check of receipts for the first fifteen days under the restored 8½-cent fare, as compared with a similar period last year. There were fewer passengers, but receipts were $257,274, an increase of $1,506. The discrepancy was due to a smaller number of school fares during the period this year.

Income and Passengers Increased.—For the six months ended June 30, 1923, the Philadelphia Rapid Transit Company realized a net income of $1,335,881. For the same period ended June 30, 1922, the sum was $1,299.707. There were 459,437,387 passengers carried from January to June, 1923, against 420,345,082 passengers carried for the same six months a year ago. The passengers revenue increased from $20,681,618 in 1922 to $22,150,187 for the first six months of 1923.

Conspectus of Indexes for July, 1923

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4 84	July 1923 **6.92**	June 1923 **6.92**	July 1922 **7.04**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	June 1923 **171**	May 1923 **173**	June 1922 **172**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages* 1913 = 100	July 1923 **212**	June 1923 **218**	July 1922 **210**	Sept. 1920 **232**	Apr 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	June 30 1923 **6.39**	May 31 1923 **6.98**	June 30 1922 **5.64**	July 31 1920 **11.12**	Feb. 28 1922 **4.14**
U.S. Bank Clearings Outside N. Y. City (Billions)	June 1923 **15.38**	May 1923 **15.58**	June 1922 **13.47**	Mar. 1920 **16.54**	Feb 1922 **10.65**
Business Failures Number	June 1923 **1,378**	May 1923 **1,467**	June 1922 **1,660**	Jan. 1922 **2,722**	May 1923 **1,467**
Liabilities (millions)	**52.00**	**31.77**	**39.59**	**105.7**	**31.77**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	July 1923 **222.1**	June 1923 **220.7**	July 1922 **169.7**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	June 1923 **153**	May 1923 **156**	June 1922 **150**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913 = 9.21	July 1 1923 **13.09**	June 1 1923 **13.38**	July 1 1922 **12.11**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's — Wholesale Commodities 1913 = 120 9	July 1 1923 **188.7**	June 1 1923 **191.4**	July 1 1922 **173.7**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	June 1923 **144**	May 1923 **143**	June 1922 **141**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	June 1923 **160.1**	May 1923 **160.3**	June 1922 **155.4**	July 1920 **204.5**	Aug 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

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Applies for Note Issue.—The Wisconsin Gas & Electric Company, Kenosha, controlled by the Wisconsin Edison Company, Inc., has applied to the Railroad Commission for authority to issue $400,000 of serial notes to pay in part the purchase price of the electric and gas plants of the Waukesha Gas & Electric Company.

Service Suspended.—The South Carolina Gas & Electric Company, Spartanburg, S. C., suspended practically all railway service at midnight on July 21. In announcing compliance with the order of the commission the company issued a statement explaining the operation of cars on the Glendale-Clifton line, the Saxon line and the operation of buses to make connections at East Spartanburg.

Stock Decreased.—Stockholders of the Montgomery Light & Traction Company have filed in the Probate Court a certificate decreasing the capital stock from $2,000,000 to $2,000 and the number of shares from 20,000 to 2,000. The resolution effecting these changes was adopted at a recent meeting in Montgomery. Early in the present year the company was taken over by the Alabama Power Company.

Grand Rapids Ran Slightly Behind in June.—The Grand Rapids Railway, Grand Rapids, Mich., failed by $3,451 to meet its expenses and make an 8 per cent return on its investment during June, according to its monthly report. This places the accumulated deficit in the equalization account at $16,301. Whenever the equalization account is short $50,000, or ahead $50,000, the fare will automatically increase or decrease.

Subsidiaries Merge.—The York County Power & Light Company and the Westbrook Electric Company have been consolidated with the Cumberland County Power & Light Company, Portland, Me., operating the Portland Railroad. The Cumberland property has for some time owned a majority of the stock on both the above-mentioned companies, although it has operated them under their own names. The merger has been approved by the Public Utilities Commission and became effective on July 1.

Applies to Issue Bonds.—Application to the Public Service Commission for permission to sell $6,000,000 of first lien and refunding mortgage gold bonds, 6 per cent series, was made recently by the Alabama Power Company. The bonds would be due in 1951. The company also applied for permission to issue $6,500,000 in first mortgage, 30-year 5 per cent gold bonds to be deposited with the United States Mortgage & Trust Company, under a mortgage and deed of trust dated June 1, 1921.

Tube Company to Pay Initial Common Dividend.—An initial semi-annual dividend of 2½ per cent has been declared on the non-cumulative preferred stock of the Hudson & Manhattan Railroad, payable on Aug. 15 to holders of record of Aug. 1. The directors have also declared the regular semi-annual 2½ per cent interest on the 5 per cent adjustment income bonds, payable on Oct. 1. The company operates between New York and New Jersey under the Hudson River and to Newark. Traffic has grown tremendously in recent months.

Wants Service Suspended. — The Pennsylvania Public Service Commission has been requested by the Mayor of Titusville, Pa., to order immediately the suspension of service by the Titusville Traction Company until the company properly bonds its rails. This action was taken after Mayor Archer had been shown by Fred Larson, city electrician, a section of pipe taken from lines within the water plant in the west end.

Five-Cent Fare Not Possible.—General Manager Dana of the Boston Elevated Railway recently issued a statement to the effect that a universal 5-cent fare was not possible until the entire deficit of the company was paid off. Further, that it was the intention of the company to turn over about $1,100,000 to twelve greater Boston cities and towns in liquidation of advances made by them to the company. This will be the second payment on the Elevated deficit of 1919 which originally amounted to $3,980,000. It will leave a balance of $2,362,000 to be paid back to the municipalities, as more than $500,000 was "paid on account" by the Elevated last year.

Arguments Heard on Valuation.—The Missouri Public Service Commission on July 19 heard arguments on motions filed by the United Railways, St. Louis, and the city of St. Louis for a rehearing of the railways valuation case. Thomas E. Francis, attorney for Receiver Rolla Wells, pleaded for a reopening of the case on the grounds that the valuation should have been fixed at $69,100,000 instead of $51,781,348, while Former City Counselor Henry S. Caulfield, on behalf of the city, contended the valuation should not have exceeded $30,414,241. He said that the company should have deducted more for depreciation and should not have allowed $2,700,000 in promotion costs. The commission has taken the matter under advisement.

Authorizes Point Gratiot Abandonment.—Commissioner Pooley of the Public Service Commission has granted the petition of the receiver for the Buffalo & Lake Erie Traction Company, operating an interurban line between Buffalo, N. Y., and Erie, Pa., for permission to abandon the so-called Point Gratiot line and portions of the local lines in the city of Dunkirk. The lines to be abandoned were operated by the receiver of the Buffalo & Lake Erie as part of the system of the Dunkirk Street Railway. The commission's decision permits the abandonment of all the franchises for tracks in the city of Dunkirk except those used by the interurban lines. The company has contended that the Dunkirk local lines and the so-called Point Gratiot line were not profitable and should be abandoned.

More Tokens Sold.—Since the Public Service Railway, Newark, N. J., was authorized by an injunction obtained in the Federal court to charge an 8-cent fare, the corporation has carried a total of 679,549,922 passengers, or a monthly average of 33,977,496. The number paying the base fare of 8 cents cash was 246,635,339, or a monthly average of 12,331,766. The remaining passengers, exclusive of school children, paid fares by tokens bought at the rate of four for 30 cents. The railway recently filed its twentieth monthly statement in the Federal court at Trenton showing a total of 35,317,061 passengers carried in June. Of this number 11,515,609 paid 8-cent fares. A compilation of all the statements indicates that at the close of June 803,030 more tokens had been sold than had been turned back.

Line to Be Reorganized.—The two one-man cars that the city of St. Louis purchased several years ago to operate over the St. Louis Municipal Bridge between St. Louis and East St. Louis, Ill., probably will roll over the tracks of the rehabilitated St. Louis & Jennings Railway. Plans are under way for a complete reorganization of this line, which recently suspended operations because of losses suffered in competition with jitneys. J. A. Jeorg, chairman of a committee of citizens appointed to work out plans for reopening the car line, has prepared plans for community operation of the line. A total of $75,000 would be raised to refit the line. Of that sum, $35,000 would be paid the present owner, Wayne J. Staedlin, who bought the line at a bankruptcy sale last March. The balance would be used as follows: $5,000 for grading, $11,000 for rails, $3,000 for ties, $2,000 for car repairs and $5,000 for labor. A further expenditure of $14,000 will be necessary to refit the Helen Avenue branch line.

Surface Lines Bondholders Would Foreclose.—The Equitable Life Assurance Society, New York, as holder of an issue of $1,500,000 of consolidated mortgage 4 per cent gold bonds of the Coney Island & Brooklyn Railroad, has asked the court to permit an action to foreclose the mortgage, the bond interest having been in default. The reorganization committee of the Brooklyn Rapid Transit Company made a tender of the interest on the bonds, and the company asked the court for permission to "accelerate" the principal, have it adjudged due and payable, and to bring a foreclosure action. The railroad and the receiver argued that the property was in the hands of the court and that the trustee under the mortgage had no right to accelerate the principal, in view of the receivership and of the tender of all the back interest. The accumulated interest due up to July 1 amounted to $270,000. The matter is now before the court. The Coney Island & Brooklyn's principal lines are the Franklin Avenue, Smith Street and De Kalb Avenue.

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Traffic and Transportation

Ohio Buses Under Commission

Electric Railway Operatives Attend Conference at Columbus and Discuss Operating Rules

The so-called Freeman-Collister bus bill relating to the operation of buses in Ohio went into effect on July 27. As a result all intercity and local bus lines and all commercial trucking companies doing intercity hauling are compelled to secure certificates of convenience and necessity from the Utilities Commission and post bonds. There is an insurance clause in the new law. The license fees range from $40 to $240, graduated according to the capacity of the buses.

Under the new law bus lines and trucking companies which were doing business in the state prior to April 28, the date the bill was filed with the Secretary of State, were issued certificates of convenience without hearings, except where there were protests filed with the commission. Lines which were established after that date were compelled to file applications for such certificates.

In anticipation of the application of the new law, traction, steam railway, motor bus, commercial trucking and street railway men were invited to meet with members of the Public Utility Commission at Columbus on July 11 and 12, when the proposed regulations which are to be imposed by the commission under the new bill were discussed. The commission reserved to itself the right finally to approve a set of regulations after the Freeman-Collister bill is in effect, but the principal regulations to be imposed were decided upon at the meeting.

The decisions so far reached are all tentative, but copies of the regulations as finally adopted by the commission will be attached to each certificate of convenience to be issued by the commission to the motor bus and commercial trucking lines which operate under the provisions of the new law.

Eighty Rules Will Govern Operation

About eighty rules in all, mostly of a minor regulatory nature, will govern the operation of the bus lines and truck companies. Principal among the regulations were safety measures, which were discussed at great length. The proper manner to approach and cross a railroad or interurban traction crossing was considered from all angles. It was agreed that passenger-carrying buses should come to a full stop before crossing a railroad right-of-way either inside the city or in the country. The matter of stopping at interurban traction crossings was left to the discretion of the commission, with the suggestion that the commission specify all such stops on the route to be traversed by the buses. It was also agreed that buses should pass crossings in second speed.

One rule of operation that will be written by the commission into its final regulations is that bus lines shall adhere faithfully to their schedules. Regular schedule trips will all have to be made on time, except for circumstances over which the operator has no control. Another rule upon which the commission will insist is that when a bus breaks down on the road it shall transfer its passengers to the next bus going in the same direction, whether that bus be operated by the same company or is run by a competing company.

Among the representatives of the electric railways who attended the meeting was John S. Bleecker, general manager of the Indiana, Columbus & Eastern Traction Company and head of the Dayton & Columbus Bus Transportation Company and the Columbus & Zanesville Bus Transportation Company, with offices at Springfield. According to Mr. Bleecker, the regulations so far agreed upon are for the most part practical ones which will be easy of enforcement.

Railway Agrees to Four Beeler Recommendations

Four items in the Beeler report, looking to changes in the railway system of New Orleans, which have been approved by resolution by the Commission Council, have been agreed to by A. B. Patterson, superintendent of the New Orleans Public Service, Inc. The changes will be carried out at once by the company without further parley. They are:

Rerouting of the Tchoupitoulas Street line across Canal Street to Esplanade Avenue and thence to Rampart Street.

Standardization on wide gage tracks throughout the city.

Extension of the Broadway line to Fig Street.

Preparation for the St. Claude Street line extension.

Several other matters in the Beeler report, some of which may require the granting of new permits and the cancellation of others, by ordinances of the Commission Council, are still under consideration by both counsel for the Public Service, Inc., and the City Attorney.

It is generally believed that the matters under discussion will be adjusted at an early date as some very important municipal work is being delayed until the questions in connection with the rerouting of the railway have been solved definitely.

Two-Mile Bus Line Operated by Pennsylvania Railway

The Beaver Valley Traction Company, New Brighton, Pa., of which W. H. Boyce is general manager, is now operating a bus line between Beaver and Vanport, Pa., a distance of a little more than 2 miles. The establishment of this service was brought about by the reconstruction of approximately 6,500 ft. of the local line of the Beaver Valley Traction Company. At the Vanport terminal of the line the road connects with the Steubenville, East Liverpool & Beaver Valley Traction Company, which operates through service from Steubenville and East Liverpool over the local line to Beaver. Local traffic in Vanport did not warrant going to any great expense to maintain service, but it was necessary to do so on account of the through traffic of the Steubenville, East Liverpool & Beaver Valley Traction Company.

In consequence the railway purchased two twenty-four-passenger Reo buses with McKay bodies at a cost of approximately 50 per cent of the amount necessary for a temporary track. Not only did this call for a smaller investment, but upon completion of the reconstruction the buses will be available for other uses.

No attempt has been made to compare revenue and operating expenses, inasmuch as the bus line is not replacing a street car line, but is being used to maintain a service from which the railway has a definite amount of revenue, namely, that received as its portion of the interurban traffic. In other words, the bus operation is purely an expense necessary to maintain the interurban traffic, but is an amount that would be less than would be occasioned if the railway company had resorted to the construction of temporary street car tracks.

Petitions for Municipal Bus System in Schenectady

The city of Schenectady, through Mayor Whitmyre and Common Council President Shay, on July 25 urged Governor Smith to convene the Legislature of New York State in extraordinary session for the purpose of authorizing the city of Schenectady to start a municipal transportation system to compete with the Schenectady Railway, whose cars are now running on all lines but are not patronized on account of the trolley strike. Schenectady's clamor for buses was added to that of Buffalo and New York when a resolution adopted by the Common Council of the electric city was presented to the Governor.

The Schenectady Council in its resolution alleges that the strike, bad service last winter and the fact that the railway is operating at a great loss, which "may prevent it from making needed extensions" to its lines, are sufficient reasons for it to be authorized to resort to the use of city-owned buses for transportation.

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Jitneys in Birmingham Seek Relief

Petitions asking for an initiative election on the jitney question have been filed by the Jitney Owners & Operators' Association with the clerk of the City Commission of Birmingham, Ala.

City officials say an election will be called in the event all the requirements of the law have been met in the petitions. The first step to be taken by the City Commissioners is the verification of the names signed to the petition. An election must, however, be called or refused within thirty days from the date of filing the petition.

Meanwhile the temporary injunction restraining the city from putting the jitneys off the streets has been dissolved. E. D. McLendon, president of the City Commission, announced at once that the city would carry out its agreement with the railway commencing on July 22, the date the dissolution of the injunctions became effective.

In dissolving the injunction Judge Walker held as follows:

That the ordinance is within the city's police power.

That the petitioners have no inherent right to operate motor vehicles as common carriers over the streets.

That the motive of the commission in enacting the law cannot be questioned.

The initiative proceeding is an attempt on the part of the jitney operators to secure relief from the terms of a settlement made recently between the city and the Birmingham Railway, Light & Power Company which the operators of the autos consider unduly detrimental to their interests. Briefly the jitney ordinance recently enacted provides that jitneys cannot be operated on down-town streets within four squares of a railway line; that the jitneys must pay a city license of $100 a year, and that owners must take out an indenmity bond of $10,000. The terms of the city's agreement with the railway provide that fares be reduced from 8 cents to 7 cents cash with a ticket fare of 6¾ cents.

Agreement on Fare Extension

The Dallas Railway recently reached a fare agreement with the city whereby the 6-cent fare will be continued. The conditions under which the extension would be granted were reviewed in the ELECTRIC RAILWAY JOURNAL, issue of June 30.

Bus Restraining Order in Schenectady Will Be Argued

The right of a county judge to set aside an injunction order of the Supreme Court will be argued on July 28 before Supreme Court Justice Henry W. Borst at Amsterdam. The question grows out of the action of County Judge John J. McMullen of Schenectady in vacating the restraining order issued by Justice Edward M. Angell enjoining jitney operators from running automobiles in competition with cars of the Schenectady Railway.

Judge William M. Nicoll, who represented the jitney men and obtained the vacating order from Judge McMullen, has been served with an order to show cause before Judge Borst why the vacating order should not be set aside.

One paragraph states that "by reason of said unauthorized order of the county court of Schenectady, the plaintiff has sustained and will sustain great and irreparable damage and injury to his business."

The Emergency Taxicab Operators' Association announces that there are now 537 operating buses in Schenectady and along the interurban route of the Schenectady Railway. This number includes almost all of the jitney operators who are on regularly assigned routes.

Weekly Pass to Be Continued in Tacoma

At the conclusion of one year of using weekly passes on the Tacoma Railway & Power Company's lines, the company announces its intention of continuing the use of the pass indefinitely. The average fare for folks who used the pass during the year is 4.89 cents. The first week the passes were used 7,007 were sold. Since that time there has been a gradual increase, until the final week in the year showed 12,125 sold.

The average number of passes a week is 11,054; the average passrider uses his ticket for street car transportation 3.81 times a day, or 26.65. times a week, the figures show. For the year, a total of 574,805 passes and 15,282,232 rides on passes is stated. The highest number of rides per pass was registered the week of Aug. 21-27 last year. The average pass holder rode 28.20 times that week, at a cost of 4.62 cents a ride. The lowest normal week was Dec. 25-31, when the pass holders averaged 24.65 per pass.

All Night Service Ends. — All-night service, which has been maintained in New Castle, Pa., for many years by the Pennsylvania-Ohio Electric Company, has been discontinued.

Joker Bill Appears Again.—Under the terms of a bill introduced in the Senate of Georgia passengers riding on street cars, interurban cars or on railroad trains who are unable to secure a seat will be transported at one-half the regular rate of fare.

Two Cents a Mile to Continue.—Basing its decision on tentative appraisals and valuations fixed by the Commission for the Detroit United Railway and its system, the Public Utilities Commission recently directed a continuance of the 2-cents-a-mile rate of fare. The minimum fare will be 5 cents.

Will Decide Fare.—A hearing will be held on Aug. 1 before the California Railroad Commission to determine the rate of fare to be charged by the Fresno Traction Company. The company is now operating on a 6-cent fare and the commission will decide whether the company must return to the old rate of 5 cents or continue at the higher rate.

Wants Fare Lowered.—Mayor Frederick W. Donnelly of Trenton, N. J., expects to introduce a resolution before the City Commission authorizing the City Counsel to take up with the Public Utilities Commission the matter of asking the Trenton & Mercer County Traction Corporation to reduce its fare from 8 to 7 cents and eliminate the 1 cent charged for transfers.

Six Cents in Minneapolis.—Hearings on the Minneapolis Street Railway fare issue were to be resumed the end of this month. Early in June the State Railroad & Warehouse Commission adjourned hearings, which meant the continuation of the 6-cent fare for another few months. The hearings were deferred in order to permit the valuation experts for the city and the company to return to Denver, where a similar hearing was taking place.

Authorizes Continuation of Eight-Cent Fare.—The Public Service Commission of New York on July 19 authorized the Fonda, Johnstown & Gloversville Railroad to continue the 8-cent fare in Amsterdam for an indefinite period. The city sought to have a 5-cent fare re-established in June, when a prior fare restriction waiver expired. The company, in its testimony before the commission, showed that for the four years and four months, 1919 to 1923 (four months) inclusive, a deficit occurring in each year except in 1922 in the operation of the lines in Amsterdam.

May Reroute Entire System.—An announcement has been made by the Tri-City Railway of its plan to reroute the entire railway system in Davenport. The officials of the company are to appear before the Davenport City Council and ask permission to begin the undertaking. If the plan meets with the approval of the city officials the company will start immediately to reroute practically every line in the city. Officials of the railway company claim that if the new plan is approved it will mean a reduction in the cost of operation for the company and the improvement of service. It is expected that the city officials will approve the plan. The cost to the company of carrying it out is estimated at $400,000.

The 100-Mile Strip Plan Extended.—Owing to the success of the 100-mile strips sold since June 1 at $1.25 on the 16-mile Clinton line of the Terre Haute, Indianapolis & Eastern Traction Company, E. M. Walker, general manager of the Terre Haute division, has extended the plan to the three other lines of the division effective July 11 within Indiana and Aug. 10 between Indiana and Illinois points. The company had already made use of low rate round-trip tickets good for ten days as an effective answer to jitney competition. However, these did not take care of people who had to board the vehicles at crossroads. The mileage strip on the Clinton line promptly produced a 2¼ per cent increase in revenue without any particular change in the industrial conditions of the territory.

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Personal Items

B. C. Adams Installed

New Executive at Toledo Has Assumed Duties of President and General Manager There

Benjamin Cullen Adams has assumed his duties as president and general manager of the Community Traction Company, Toledo, and also as vice-president and general manager of the Toledo Edison Company, succeeding Frank R. Coates in both places and as active executive of the Doherty interests in Toledo.

Mr. Coates spends practically all of his time at the New York offices of Henry L. Doherty & Company, having been called there to assume important duties soon after the death of Frank Frueauff, partner of Henry L. Doherty. Mr. Coates still retains the presidency of the Toledo Edison Company and is a director of the Community Traction Company.

B. C. Adams

The new traction executive at Toledo is one of the original Doherty cadets, having entered the employ of the Madison Gas & Electric Company, Madison, Wis., as soon as he was graduated from the University of Wisconsin in 1903. He was born at Madison in 1880. While he is one of the youngest men in the executive ranks of the Doherty operating organization he is one of the oldest in point of service. His preliminary schooling was secured in the public schools of his home city.

Mr. Adams was sent to Lincoln, Neb., as general superintendent of the Lincoln Gas & Electric Light Company, after he had familiarized himself with everything about the Madison company. At that time the plant in Lincoln was obsolete and unable to take care of the requirements. Mr. Adams was instrumental in getting the plant back on a paying basis and was made manager in 1909. In the summer of 1913 he was ordered to Spokane, Wash., to take charge of the Spokane Gas & Fuel Company, where he remained for nine months.

Next Mr. Adams was sent to São Paulo, Brazil, to make extensive investigations and reports on a big utility property there for Ellis & Company, bankers of London, and remained there most of the time until the fall of 1914, when war broke out and he was recalled to the United States. The boat on which Mr. Adams and his family were scheduled to sail was *spurlos versenkt* and no word was heard from them for weeks. Finally they landed at New York on Christmas Day and explained that at São Paulo they had missed the boat that was sunk and had sailed by the next steamer.

His next connection was with the Montgomery Light & Water Power Company, Montgomery, Ala., where he remained for a year and a half until transferred to the management of the Empire District Electric Company, at Joplin. In January, 1920, he was shifted to St. Joseph as successor to James H. Van Brunt in management of the St. Joseph Railway, Light, Heat & Power Company.

Mr. Adams went to Toledo on June 19, this year, from St. Joseph and soon thereafter was formally elected to his present executive capacity in the Doherty properties there.

Mr. Adams has associated with him in the traction management J. Franklin Johnson, as vice-president and general superintendent of the Community Traction Company, and in the power and lighting business Ferd J. Derge, as vice-president and assistant general manager of the Toledo Edison Company.

J. L. Gould, who has been master mechanic for the Wilmington & Philadelphia Traction Company and the Southern Pennsylvania Traction Company, has tendered his resignation and will on Aug. 1 become associated with the street railway sales department of the Texas Oil Company. Mr. Gould received his first electrical training several years ago in the Schenectady N. Y., and Lynn, Mass., shops of the General Electric Company and later was transferred to the Philadelphia office of the same company. He afterward was appointed master mechanic for the Reading Transit & Light Company, which position he held for several years, leaving Reading to become master mechanic in Wilmington, Del., and Chester, Pa. Mr. Gould has taken an active interest in the work of the American Electric Railway Association. He is a past-president of the Keystone Railway Club and at the present time is serving on the equipment committee of the American Electric Railway Engineering Association.

George Kidd President

Excellent Record of British Columbia Official Recognized by Board of Directors

George Kidd, general manager of the British Columbia Electric Railway, Vancouver, has been elected president of the company by the board of directors at a recent meeting in London, England; W. G. Murrin, assistant general manager, has been made vice-president, and A. T. Goward, manager of the Vancouver Island system, has been made vice-president at Victoria.

These changes are the result of the recommendations of Sir Ernest M. Harvey, who made a recent visit to the company's properties in British Columbia, so that the titles of the executive officers would more clearly define their powers and responsibilities. No change in duties will take place, Mr. Kidd remains in charge of the company's entire policies and holds power of attorney from the board of directors in London and Mr. Murrin remains in charge of the actual operations on the mainland of British Columbia and Mr. Goward in charge of operations on Vancouver Island.

George Kidd

George Kidd, the new president of the company, has long been associated with the British Columbia Electric Railway, having been both in the offices in London and in British Columbia. He was appointed secretary to the company in connection with its London work in January, 1908. Later he was made comptroller and removed to Vancouver. This position he held until 1914, when he was appointed general manager to succeed R. H. Sperling. One of his fairly recent accomplishments was the acquisition of the Western Power Company of Canada, which system has been amalgamated with the mainland system of the British Columbia Electric Railway.

Mr. Kidd was at one time honorary vice-president of the Canadian Electric Railway Association. He is a member of the National Electric Light Association, the American Electric Railway Association and the Canadian Electrical Association.

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Frank R. Phillips Acting Manager at Pittsburgh

Frank R Phillips, superintendent of equipment of the Pittsburgh Railways since 1910, has been appointed acting general manager for the receivers of the company, succeeding the late P. N. Jones. Mr. Phillips has long been connected with electric railway work, but heretofore his activities have been confined very largely along engineering lines.

Previous to 1910 he was master mechanic of the Cleveland City Railway. He entered the service of that company in 1894 after leaving high school. He advanced gradually with this company until he became a foreman and then master mechanic of the company. In 1903 on the consolidation of the local lines in Cleveland he became connected with the Cincinnati, Newport & Covington Railway.

Later he served with the Michigan United Railway and the Ohio Brass Company. In July, 1908, he returned to Cleveland as master mechanic.

New General Superintendent at Zanesville

John William Hewitt has been appointed general superintendent of the Columbus, Newark & Zanesville Traction Company, with headquarters in Zanesville, Ohio. He is a railway man of many years experience. A native of Nottingham, England, he moved to Australia when a youth and began his career as a motorman on the New South Wales government tramways at Sidney. On the outbreak of the Boer War he enlisted in the New South Wales bushmen and was in the thick of the campaign in South Africa. At the conclusion of hostilities he came to the United States, where he secured employment with the Seattle Electric Company. He remained with this company from 1902 to 1908, rising to the position of superintendent of employment.

In 1908 Mr. Hewitt was called to the Portland Railway, Light & Power Company at Portland, Ore., as superintendent of interurban lines, retaining this post until 1914, when he went to the Sumpter Valley Railroad, a steam road in southern Oregon, as superintendent. He remained in the capacity just mentioned until 1916, when he went east to Reading, Pa., as superintendent of railways with the Reading Transit & Light Company. After a year's service with the Reading company he returned to the Sumpter Valley line as general manager, continuing in that capacity until he became connected with the Columbus, Newark & Zanesville as general superintendent.

The post which Mr. Hewitt will fill in Ohio was formerly combined with the general superintendency of the Indiana, Columbus & Eastern Traction Company, held by C. C. Fast, but the increasing duties made it necessary to separate the two offices, Mr. Fast continuing with the Indiana, Columbus & Eastern. In addition to the interurban lines between the cities named, the Columbus, Newark & Zanesville properties also include the city systems in Newark and Zanesville and the light and power business in the latter system.

J. T. Hambleton General Manager at Warehouse Point

J. T. Hambleton, who has been appointed general manager of the Hartford & Springfield Street Railway, with offices at Warehouse Point, Conn., was born in Quakertown, Bucks County, Pa., on Oct. 25, 1874. He was educated in the public schools of that town. He began his electric railway experience in Allentown, Pa., in 1894, and has been in that work almost continuously since that time, being for some years with the Lehigh Valley Transit Company's lines in various capacities. After several years of track and shop work he became in 1900 superintendent of construction for the Bethlehem Construction Company, having charge of the work on the Dayton, Springfield & Urbana and other routes. At this time he built the Slate Belt Transit Company line, of which he later became the controlling owner. This road was first run by the Lehigh Valley system, but became an independent road in 1911. From 1911 to 1916 Mr. Hambleton was general manager of the Wilmington Southern Traction Company. Gaining control of the Slate Belt Transit Company in 1916, he was made president and general manager, with headquarters at Pen Argyl. This office and interest he still retains.

H. W. Plummer resigned recently as general manager of the Asheville Power & Light Company, Asheville, N. C. He has gone to Europe for a three months trip to study general business conditions. Mr. Plummer remains a member of the board of directors for the Asheville company.

George D. Yeomans was appointed counsel of the Brooklyn-Manhattan Transit Corporation at a meeting of the board of directors on July 16. He succeeds Carl M. Owen, counsel during Lindley M. Garrison's receivership of the Brooklyn Rapid Transit Company, with which Mr. Yeomans was long connected as counsel.

Eugene Betts has been promoted to assistant consulting engineer of the Southern Pacific Company, at New York. He has been assistant engineer with the company for several years since the war, during which he was a major in the construction division of the army. Mr. Betts was formerly with J. G. White & Company, Ltd., as director and general manager of railway and power properties in Central and South America.

J. J. Vaughan has been appointed master mechanic of the Memphis Street Railway. Since 1905 he has been associated with this property, entering the mechanical department on May 4 of that year. Since then he has served in every branch of this department and was general foreman for several years. In 1900, after serving for three years in the Louisville & Nashville shops at Decatur, Ala., he became connected with the mechanical department of the Birmingham Street Railway.

S. E. Mason of San Antonio has joined the staff of the San Diego Electric Railway as superintendent of equipment. He will have charge of all equipment, way and structures and of the bonding and welding departments. Mr. Mason is a graduate of the University of Texas and has had considerable experience in that state as an electric railway man. For the past six years he has been with the San Antonio Public Service Company and had charge of the reconstruction lines in San Antonio.

C. S. Walters has succeeded Harry W. Plummer as vice-president and general manager of the Asheville Power & Light Company. Since 1913 he has been district manager of the Pacific Power & Light Company's gas and electric properties in the Walla Walla Valley. Prior to that he had been general manager of the Walla Walla Valley Railway and was later elected vice-president. Before going to Walla Walla Mr. Walters was general agent for the Oregon Electric Railway with headquarters at Salem, Ore. Mr. Walters' early connections were with steam railway operation.

Obituary

J. A. McCampbell

John A. McCampbell, for the last eighteen years a valued member of the Stone & Webster organization, died recently. Mr. McCampbell's varied experience in building and operating public utilities soon created a wide demand for his services as an efficency engineer, and he instituted betterment operation in power plants at Houston, Dallas, El Paso, Fort Worth, Key West, Jacksonville, Seattle and Bellingham. When Stone & Webster were called upon by the Buffalo General Electric Company to build a large steam plant on the Niagara River, Mr. McCampbell was brought from Dallas to supervise the installation of mechanical equipment. From Buffalo he went to Philadelphia as general superintendent on the construction of a 100,000-kw. plant for the Philadelphia Electric Company.

Mr. McCampbell entered the employ of Pepper & Register, engineers and electric railway contractors at Philadelphia, in 1892 and remained with them until 1898, when he was employed by the South Shore & Boston Street Railway and later by the Massachusetts Electric Company as chief engineer of power stations at East Braintree and Quincy Point. In 1901 and 1902 he was chief engineer of power stations for the Houghton County Street Railway at Hancock, Mich., and was connected with several other utilities up to the time he entered the employ of Stone & Webster on Dec. 1, 1906. He was born in Knoxville, Tenn., in 1873.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

G. E. Completing Heavy Electrification Work

Important heavy electrification work for seven railroads is nearing completion in the Erie works of the General Electric Company.

Three 120,000-lb. 600-volt freight locomotives are being prepared for shipment to the Bethlehem Chile Iron Mines. A special feature of these locomotives are four offset trolley poles, two on each side of the locomotive, for collection from trolley wires along the side of the track, used for maneuvering on docks close to the water edge. These units will also be equipped with two 600-ft. cable reels for use on sidings or spurs and where no overhead trolley is available. They are of the steeple-cab swivel-truck type, length 37 ft. 4 in., height 11 ft. 11 in. They will also be equipped for dumping cars with compressed air.

Two 120,000-lb. 600/1,500-volt freight locomotives for the Sacramento Northern Railway are now in assembly. These resemble the locomotives intended for the Bethlehem Chile order described above with the exception of the offset trolley poles and cable reels.

The largest order in process of manufacture includes ten 150-ton 3,000-volt locomotives for the Mexican Railway, Ltd. It is expected that the first of these will be ready for test about Aug. 15.

High-speed tests of the locomotive ordered by the Paris Orleans Railroad are expected to be held next month. This locomotive, now nearly completed, will be a 120-ton machine of special construction operating at 1,500 volts with gearless motors and equipped with two three-axle driving trucks, a two-axle guiding truck at each end and two box cabs. It is 62 ft. long. Speeds in excess of 90 m.p.h. are expected.

Two 120-ton 600-volt electric locomotives have recently been shipped by the General Electric Company for use in the Baltimore tunnel of the Baltimore & Ohio Railroad. They are of the steeple-cab type with with articulated trucks and each is equipped with G-E-209 motors. The length of the locomotives inside knuckles is 39 ft. 6 in., length over cab 33 ft. 6 in., height over cab 12 ft. 4 in., over-all width 10 ft. The operating cab is 15 ft. x 10 ft.

A feature of the construction is that buffing and hauling stresses are carried through the truck side frames and an articulated joint, thus entirely eliminating these strains from the cab and platform. Multiple-unit control and four third-rail shoes are provided.

These locomotives have been designed for a speed of 17 m.p.h. with train of 1,200 tons and 14 m.p.h. up a 0.5 grade. The tractive effort is 21,600 lb.

For the Toledo Edison Company, a swivel-truck type switching locomotive with a 750-ft. cable reel is being made. This will be equipped with multiple-unit control and combined straight and automatic air brakes.

A 50-ton 600/1,200-volt locomotive is under construction on order of the Portland Railway Light & Power Company for the Williamette Valley Southern Railway.

STEEPLE-CAB, ARTICULATED-TRUCK LOCOMOTIVES FOR B. & O. TUNNEL

Trade Associations Helpful

The trade association as a means for the promotion and self-regulation of industry has become an important American business institution, according to Herbert Hoover, Secretary of Commerce, under whose direction a book has recently been published on this subject. Generally speaking the public is little acquainted with its scope and activities. The constructive purposes of these organizations have unfortunately been confused with the minority of activities which have sometimes been used as a cloak for action against the public interest.

All trade association activities are not good, according to the Secretary, just as all individual habits are not good until so proved by their reaction on the individual and the community. The purpose and aim of a trade association is to deal with all questions of general application in the branch of industry or commerce it serves, and so to develop its field that the enterprises in it may be conducted with the greatest efficiency and economy. Among the outstanding examples of substantial constructive endeavor may be listed the preparation of statistics, simplification, standardization and the elimination of waste, industrial and commercial research.

Study of Oil Prices Carried Back Sixty-four Years

Interesting figures are given by the Atlantic Refining Company, Philadelphia, showing the average price of Pennsylvania crude oils per gallon at the wells for the last sixty-four years. The figures were obtained from a number of different sources and it is possible that some slight variation exists in the method of figuring the average price in different years. Several sharp fluctuations occurred during this period. Present consumers will view with regret the extremely low prices that prevailed for many years. There may be some slight satisfaction, however, to be found in the fact that the price today is slightly lower than it was a few years ago.

Year	Average Price	Year	Average Price
1859	$20	1891	$0.66
1860	9	1892	.55
1861	* .50	1893	.64
1862	1	1894	.83
1863	3	1895	1.22
1864	9.15	1896	1.19
1865	6.87	1897	.78
1866	3.59	1898	.91
1867	2.74	1899	1.29
1868	3.41	1900	1.35
1869	5.53	1901	1.21
1870	3.89	1902	1.23
1871	4.34	1903	1.59
1872	3.64	1904	1.62
1873	1.83	1905	1.39
1874	1.17	1906	1.59
1875	1.35	1907	1.74
1876	2.56	1908	1.78
1877	2.42	1909	1.64
1878	1.09	1910	1.33
1879	.85	1911	1.30
1880	.94	1912	1.60
1881	.85	1913	2.46
1882	* .85	1914	1.82
1883	1.05	1915	1.56
1884	.83	1916	2.50
1885	.88	1917	3.25
1886	.71	1918	3.97
1887	.66	1919	4.12
1888	.87	1920	5.96
1889	.94	1921	3.33
1890	.86	1922	* 3.25

* Estimate based on incomplete figures.

Metal, Coal and Material Prices

Metals—New York	July 24
Copper, electrolytic, cents per lb	14.625
Copper wire base, cents per lb	17.50
Lead, cents per lb	6.30
Zinc, cents per lb	6.46
Tin, Straits, cents per lb	39.625
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.625
Somerset mine run, Boston, net tons	2.625
Pittsburgh mine run, Pittsburgh, net tons	1.95
Franklin, Ill., screenings, Chicago, net tons	1.675
Central, Ill., screenings, Chicago, net tons	1.45
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$7.00
Weatherproof wire base, N. Y., cents per lb.	18.75
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal	$1.03
White lead, in oil (100-lb. keg), N. Y., cents per lb	11.85
Turpentine, (bbl. lots), N.Y., per gal	80.98

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Rolling Stock

Illinois Power Company, Springfield, Ill., has placed an order with Nic Le Grand, Inc., for seven "positive" safety equipments.

Dubuque Electric Company has given a contract to Nic Le Grand, Inc., to convert six cars to modern one-man cars with safety features.

South Carolina Gas & Electric Company, Spartanburg, S. C., has placed an order with the Bell-Brown Motor Company to furnish buses in Spartanburg following the order of the commission to suspend trolley service. The buses will each have a capacity of twenty-five passengers.

Hudson & Manhattan Railroad, New York, N. Y., has let a contract for twenty-five cars to the American Car & Foundry Company. The construction of these cars begins at Berwick this week. These cars are to be just like the twenty-five cars obtained in 1922 and the twenty-five cars obtained in 1921, making seventy-five cars ordered during the last three years.

Dallas Railway has just placed an order with the J. G. Brill Company for thirty double-truck Peter Witt type cars, the electrical equipment for each of which will consist of four G.E.-265 motors and G.E. C.P.-27 air compressors with standard safety features. The Dallas Railway recently reached a fare agreement with the city of Dallas as a result of which it agreed to purchase these new cars.

Track and Line

Paducah Electric Company expects to improve 19 miles of trackage at an expenditure of approximately $30,000.

Memphis Street Railway is relaying trackage on South Third Street in the vicinity of Union Avenue. Track improvements are being made in other parts of the city.

Pittsburgh Railways will spend $657,800 for repairing tracks and freight stations and for purchasing new motors and a grading shovel. Judge Gibson in the United States District Court recently approved the report of the special master allowing the receivers to spend this amount.

Lewistown & Reedsville Electric Railway, Lewistown, Pa., will improve its line by the making of a double-track system from Burnham Junction to Lewistown proper. A survey is now being conducted by engineers in the employ of Day & Zimmermann.

New York State Railways, Utica, N. Y., will construct a single-track service line along James Street in Utica, starting from the end of the present James Street line and running easterly to the intersection of St. Vincent and James Streets. The Public Service Commission has approved the improvement.

Seattle Municipal Railway will start work immediately on an undertaking which will cost $45,000. It involves the installation of a "grand central" at the north end of the Fremont bridges. The complicated network of trackage was turned out by the Bethlehem Steel Corporation. The installation of this piece of special work will require two months to complete.

Northern Texas Traction Company, Fort Worth, Tex., will spend more than $400,000 in track improvements and extensions in Fort Worth. The contract has been awarded to Stone & Webster, Inc., for paving and double tracking part of Forest Park Boulevard, a 3-mile extension to Riverside line and a 3-mile extension to Oakland division through Sycamore Heights to the city limits.

Department of Street Railway, Detroit, Mich., has advertised for a lot of drop-forged steel single-curve pullovers, and also for drop-forged steel double-curve pullovers. The carbon in these appliances is limited by the specifications to between 0.15 and 0.25 per cent. The forgings are to have a minimum strength of 60,000 lb. per square inch, and be galvanized according to the Department of Street Railway specifications 105021521, which corresponds to the American Electric Railway Engineering Associations' standard specifications of D f 2 b.

United Railways, St. Louis, Mo., will require a court order to extend the Natural Bridge line westward from its present terminus on Kings Highway to Pine Lawn to connect with the Kirkwood-Ferguson line. A petition to this effect has been filed with the United States Federal District Court by the city of St. Louis, North St. Louis Business Men's Association and the Natural Bridge Industrial District Association. The estimated cost of the extension is $175,000.

Charleston Interurban Railroad, Charleston, W. Va., will defer its plans to remove its rails from State Street and to lay a double track on Summers Street to the Lovell Street extension of Washington Street. City Manager Wise of Charleston ordered the plans held in abeyance because in his opinion the filling required when Lovell and Washington Streets were joined has not settled sufficiently to support the weight of street car traffic. The company is engaged in making numerous repairs to paving at various points in Charleston.

Springfield (Mass.) Street Railway has been granted a franchise to loop a single track through Broadway, Pynchon and Water Streets at the eastern end of Hampden County Memorial Bridge. A franchise had been granted previously for a double track through Vernon Street, to establish on outlet from the Bridge to Main Street, and this was approved by the State Public Utilities Commission June 20. Action on the Pynchon Street loop settles a prolonged controversy, and prompt action will be taken in the matter of establishing the designated connections.

Trade Notes

Commercial Indian Agency of Lahore, Punjab, India, is anxious for agency connections for any kind of machinery or other merchandise.

General Electric Company, Schenectady, N. Y., has received an order for fifty interurban car equipments from the Pacific Electric Company, Los Angeles, a Southern Pacific property. Four G.E.-240, 110-h.p. motors with P.C.-12 control will be furnished.

National Pneumatic Company, New York, N. Y., announces that A. Frank Paul, in charge of the company's office in Philadelphia, and Oscar A. Broten, Western representative in charge of the Chicago office, have been appointed direct assistants to the general sales manager and will aid in the supervision of all sales matter.

Sherwin-Williams Company, Cleveland, Ohio, recently announced that L. F. Mullen had accepted a position with its insulating materials department and had been appointed sales insulation engineer for the eastern district. Prior to July 1, Mr. Mullen was connected with the Westinghouse Electric & Manufacturing Company in the insulation section at East Pittsburgh and at St. Louis.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has supplied the Northern States Power Company with two new model extra long Westinghouse underfeed stokers for its St. Paul plant. These double-roll clinker grinder stokers have hollow forced draft agitating mechanisms which facilitate fuel-bed control and give active fuel-burning surfaces, non-clinkering extension sidewall tuyeres and large coal hoppers. The Alemite lubricating system is used on these stokers.

Boston Elevated Railway has placed an order with the Union Switch & Signal Company for a complete a.c. electro-pneumatic interlocking plant of fifteen levers, to be installed at the east end of the East Boston tunnel. This double-track tunnel has heretofore been operated with surface cars only, but it is now being changed over for multiple-unit trains, and seventy electro-pneumatic automatic stops have been ordered from the Union Company for this service. The construction work will be carried out by the signal department of the Boston Elevated Railway.

New Advertising Literature

Chausse Oil Burner Company, Detroit, has issued a circular describing its oil-burning tool and surface heaters for repairing asphalt pavements.

Ramapo Ajax Corporation, Hillburn, N. Y., has issued a sixty-four-page booklet concerning switches, frogs and special work of every description. Various "Racor" switches are illustrated.

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New York, Saturday, August 4, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 5

President Harding Passes On

ELECTRIC railway men will feel that they have suffered a tremendous loss in the death of Warren Gamaliel Harding, for aside from the admiration of his great statesmanship, they feel the industry has had something of a personal friend in him. Ever since his address as U. S. Senator before the Midyear meeting of the American Electric Railway Association in Cleveland in 1920, they have felt that in Harding they had a man who comprehended the problems and the accomplishments of the electric railways and who appreciated their contribution to present-day life. Since that Cleveland speech he has had the greatest good will and support, almost to a man, of the electric railway industry.

His reappearance before a meeting of electric railway men has been sought again and again, not so much because of the value from a publicity standpoint but because it was desired to hear words of wisdom and understanding from him again. He has expressed a sincere desire to accept these invitations, but more important things have commanded his time. Last February in Washington he received a group of the principal executives of the industry and chatted with them in his friendly way for a few minutes, as recorded in the JOURNAL at that time.

There is this consolation. The great things that President Harding has done in bringing the White House close to the people, in pursuing his policy of more business in government and less government in business, of making the government truly helpful to business, in reducing the cost of government—these things have received such an impetus at his hands that they will live on after him for a long time to come. There is another consolation for electric railway men in the fact that Calvin Coolidge, who succeeds to this high office, has also shown his interest in the electric railway industry and his sympathy with its special problems.

Mr. Coolidge was Lieutenant-Governor of Massachusetts in 1916, 1917 and 1918 and Governor in 1919 and 1920, and it was during these years that the acts recognizing the dependence of the public on good electric railway transportation were passed by the Massachusetts Legislature. While Governor in 1920, Mr. Coolidge was called upon in a very definite way to carry out the intent of these acts, when the trustees of the Eastern Massachusetts Street Railway discontinued service in Salem, Peabody and neighboring towns because of jitney competition. The Governor was asked by the mayors of these cities to remove the trustees, but he pointed out that the public could have only such service as it was willing to pay for. Then, after a conference arranged by him, the jitneys were withdrawn and electric railway service resumed. This was shortly after Mr. Coolidge took his famous action in connection with the strike of the Boston policemen. That the new President's interest in good transportation has continued was shown in his address delivered February 16, 1923, at the Midyear meeting of the American Electric Railway Association.

In President Coolidge the country will have as chief executive a sound thinker who is not afraid to follow where he feels that duty leads.

Public Service Shuts Down—Will the Industry Suffer?

AS A RESULT of a strike of all trainmen and maintenance employees, the Public Service Railway has put up its 1,500 cars serving 147 New Jersey communities, has discharged several hundred of the monthly payroll employees and apparently has entrenched itself for a long period of idleness if necessary. The exact course upon which the company has embarked is not disclosed, but the outcome is one of concern to the whole industry.

The public's interest in the issue between the railway and its men has been eclipsed by the determined effort of the buses to demonstrate their ability to replace trolleys for mass transportation in a number of large communities. The union officer supervising the situation for the trainmen charges that the company is in a plot to force elimination of the jitneys by leaving the people without service. If such is the case, the men could not be more short sighted than to strike now, for their jobs are certainly in jeopardy if the jitneys prove able to handle the business.

If this is the plan of the company, the outlook is not any too cheering. There is probably no place in the country where the buses would have a better possibility of being able to provide reasonably adequate service as substitutes for the cars. They were already organized and operating to such an extent that they hauled 141,326,123 passengers in ten cities in 1922, as against 325,265,180 revenue passengers carried by the entire railway system. And this bus service is provided in an orderly, supervised manner with about 1,400 reasonably good buses. Taking into account the large number of people who can walk to the network of steam lines, and to the tubes and the ferries, the additional buses required to provide the entire transportation service are less than would be the case elsewhere under the more usual travel conditions.

Furthermore, the railway seems to have accumulated

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a disfavor extending with lamentable completeness throughout the territory. This is now reflected in the fact that most of the mayors, the Newark director of safety, the supervisor of traffic and other public officials are doing everything in their power, seemingly, to make the present test of the buses a success.

So if it is to force elimination of the buses that the railway has ceased operation, there may well be some misgivings about the result, for even an approximation of the equivalent of the railway service would be heralded in many quarters as complete success, and the peculiar circumstances which made this possible there would not be taken into account in applying that example to another situation totally different.

Misrepresentation Concerning Accidents Is Harmful

A PROMINENT transit official in New York City recently declared that the greatest danger on the transit lines of the city was that of panic among the passengers. While this danger can never be wholly eliminated where many passengers are closely confined in crowded vehicles, nevertheless the evil would be mitigated if the public were more accurately informed. Newspapers are prone to feature every railway accident. Unfortunately they not only feature but often entirely misrepresent its cause and effect. The horrors and the dangers of electric railway travel are exaggerated to a point where one wonders that the timid dare ride at all. One reads of choking sulphur fumes rising from burning insulation. Sheets of flame are said to leap from end to end of a car when the controller burns up. When a trolley wire drops in the street balls of fire fly in all directions. Such descriptions, while good newspaper copy, are not facts.

The reaction of an electric railway man to misrepresentations of this sort may be only one of amusement. He is familiar with his equipment, and separates the true from the false in the press story. But the reaction upon the general public is far different. The average man knows very little about electricity except that it is a powerful force, and he readily believes the wildest stories concerning its manifestations. Real harm is therefore done by inaccurate newspaper accounts of trifling mishaps. The electric railway impresses the passenger, not as the safest means of urban transportation, which it really is, but as a fearful and wonderful thing. Would it not pay the railway to counteract this tendency by furnishing the newspapers with such complete and accurate information that there would be no excuse for misrepresentation.

Why Jersey Central Traction Has Been Abandoned

WHAT is the true significance of the recent cessation of operation by the Jersey Central Traction Company? A careful study of the situation leads inevitably to the conclusion that the railway failed because it was never really needed. Nearly 40 miles of track were laid to serve a population which in 1910 numbered only 22,350. It was the expectation of the original builders that the territory would develop and the population increase. In 1920, however, the population was only 37,324. That the growth has not been more rapid is due largely to the physical characteristics of the region, the greater part of which is not such as to encourage permanent development.

Due to widespread use of private automobiles, the railway traffic has not even kept pace with this small increase in population. The roadbed was very uneven and poorly maintained. Service was infrequent and comparatively slow. The main line headway during the greater part of the day was one hour which was infrequent considering the short average length of ride. Until recently most of the rolling stock was old in design, dingy in appearance, and badly kept up. Under these circumstances, it is hardly surprising that the riding went largely to private automobiles. Bus competition did not play a very important part in the trouble suffered by the company.

One of the greatest handicaps from which the railway suffered was the low and marshy character of the land. It was extremely difficult to keep the track foundation in good condition and a great deal of trestle work which was necessary entailed heavy maintenance expense.

Thus it appears that the road should never have been built; that the service was such as not to attract the full patronage of the riders available; and that physical conditions worked against low operating costs. In short, the Jersey Central Traction Company was one of those promoters' railroads, the disappearance of which must be expected under present-day conditions. It was founded upon hopes rather than upon facts. Such a road in passing leaves no blemish on those lines which were built to render service, but its passing needs this explanation and interpretation for those who would look upon it as another example of the demise of the railway.

New Cars Make It Easier to Sell Transportation

THE electric railways in Lexington, Ky., and Huntington, W. Va., are completely replacing their present obsolete rolling stock with new cars. The situations are explained in an article by "Spectator" in this issue. These replacements are being made as part of a new effort to place the respective railways on a profitable basis. Experience thus far indicates that they will greatly assist in doing so.

The industry has been through an era of car remodeling in the last few years, and a great deal of this work is still in progress. In many cases it is necessary, but is of doubtful expediency in all cases where the old cars can possibly be discarded and new ones bought. In Lexington, cars remodeled for one-man operation have been in use for some time, but a way has been found to procure a complete new supply of cars in view of their prospective profitableness. An old house, an old shoe, an old automobile or an old electric car is still old, no matter how much it is repaired and painted. It cannot but appear what it is—"patched." When a car becomes run down and out of date, the economic limit of repair is soon reached. Furthermore, an old car has little value as an aid in selling transportation, whereas a new car sells its way.

The increased demand for new cars during the past eighteen months indicates that the truth of the above is being appreciated. Before deciding on that next big car rehabilitation job, would it not be wise to consider all of the advantages of scrapping the old cars and buying brand new ones? In so doing it would seem advisable to give serious consideration to a type of construction designed for a ten year probable life instead of adding weight and cost for the purpose of obtaining a 30 year life, with the prospect of additional future heavy overhaul and remodeling costs to keep the long-life car up to the demands of changing service requirements.

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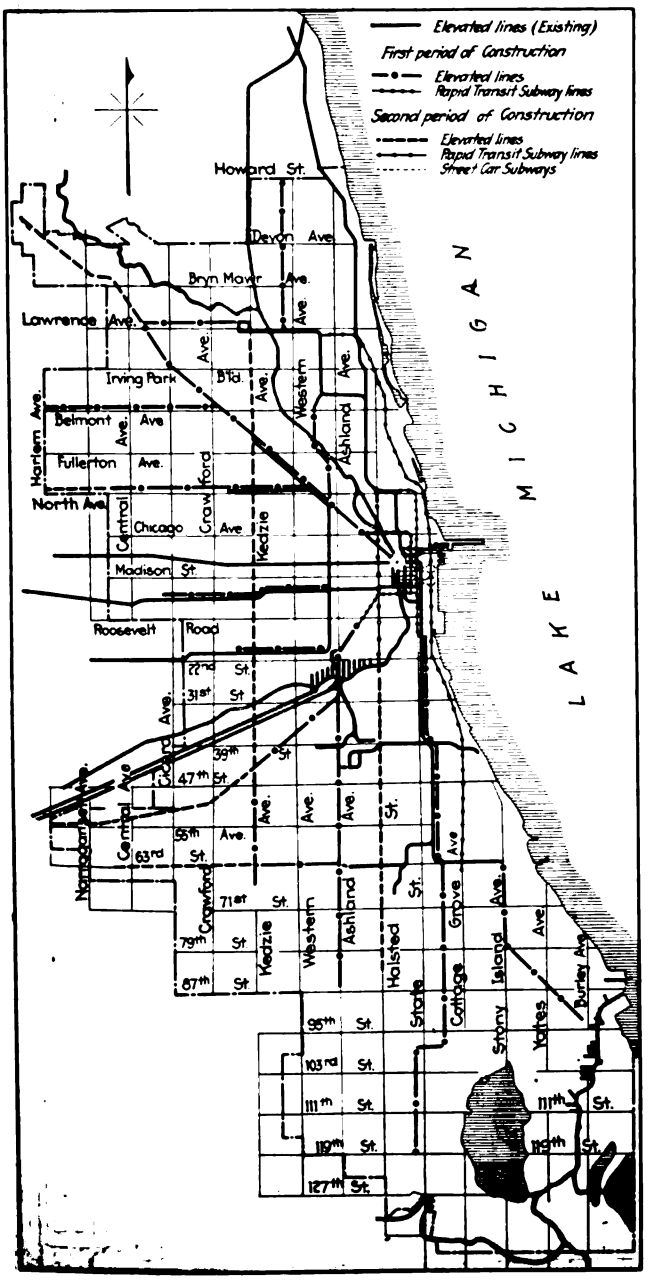
$372,833,000 Construction Proposed for Chicago

Details of the Kelker Report Show Extensions to Rapid Transit and Surface Lines Throughout the City—The Plan Is Divided into Two Periods to Get Benefits Sooner—Time Savings in All Parts of the City Are Shown

THE general outline of plans for a unified transportation system presented to the City Council of Chicago by R. F. Kelker, Jr., its consulting engineer, were given in an article published in this paper July 14. The present article deals with the recommended construction program through which the development of the unified system is to be effective.

While the general appearance of the plan recommended is similar to that proposed by the 1916 Traction and Subway Commission, the layout of the principal routes, and particularly the connections in the central business district, differ in the essential arrangements from that plan. The proposals made by Mr. Kelker provide for a unified system of elevated, subway and surface lines based on forecasts of the growth of population and traffic demands up to 1950, and are considerably more comprehensive.



Rapid Transit Lines at the End of the First and Second Periods

The portions of this plan required immediately have been grouped in the first period of construction, the remaining portions being planned for a second period.

In the opinion of the engineer the construction outlined provides a complete physical plan for the entire city. The wide distribution of population in Chicago requires that great care be used in projecting rapid transit lines, particularly to avoid heavy concentrated investments which can serve but comparatively few car riders. It is obvious that any construction which requires an excessive investment limits the development of the system as a whole and, therefore, limits the number of people served.

The elevated railways now operate over thirteen tracks outside of the central business district, and all of this service is concentrated upon two tracks on the Union Elevated loop. The elevated lines have a latent service capacity which will be available when this restriction is removed. The key to the solution of the elevated terminal problem is found in providing four tracks through the central business district for North Side and South Side trains and by devoting the two tracks of the Union Loop in Van Buren Street, Wabash Avenue and Lake Street to the exclusive use of West Side trains. This will be accomplished by the construction of a high level two-track subway in State Street and North Avenue from a connection with the South Side Elevated near Sixteenth Street to a connection with the Northwestern Elevated near Orleans Street and by the construction of a two-track elevated railroad in Wells and Polk Streets from a connection with the Union Loop at Wells and Van Buren Streets to a connection with the South Side elevated at the alley west of Wabash Avenue.

To secure full track capacity existing crossings on the same level on Wells Street at Lake Street and Van Buren Street will be eliminated. The Lake Street tracks will be elevated over the Wells Street tracks at Lake and Wells Streets, and the Wells Street tracks will be elevated over the Metropolitan Elevated tracks at Wells and Van Buren Streets, thereby separating the grades and removing interference from West Side trains.

FIRST PERIOD OF CONSTRUCTION

The existing surface and elevated lines and also the rapid transit construction (subway and elevated) recommended for the first period of construction are shown in the map on this page. The central portion of the city is shown in greater detail on page 170.

The principal subways proposed are one on State

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Street, which will connect the North Side and the South Side of Chicago, forming with the existing elevated railroad a four-track rapid transit trunk line from Sixty-third Street to Howard Street. This will provide transportation through the area just north of the Chicago River now practically without rapid transit service and also will afford a convenient means of reaching Lincoln Park.

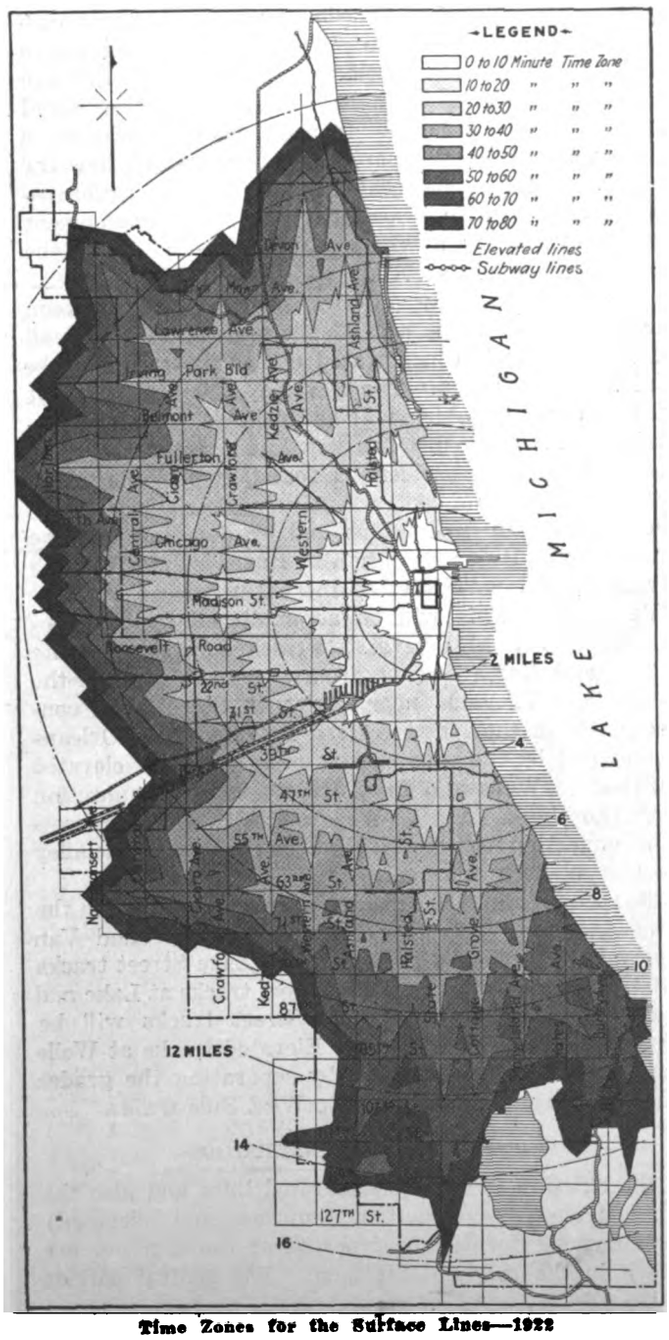
The Clark Street subway will be used to provide maximum transfer facilities by a connection through the central business district, between an elevated line along Milwaukee Avenue to the northwest and one on Blue Island and Archer Avenues to the southwest. This line will consist of two tracks in the outer portion with two additional loading tracks in the subway in Clark Street between Harrison Street and Randolph Street to provide ample facilities in this heavy loading district.

ELEVATED RAILROADS

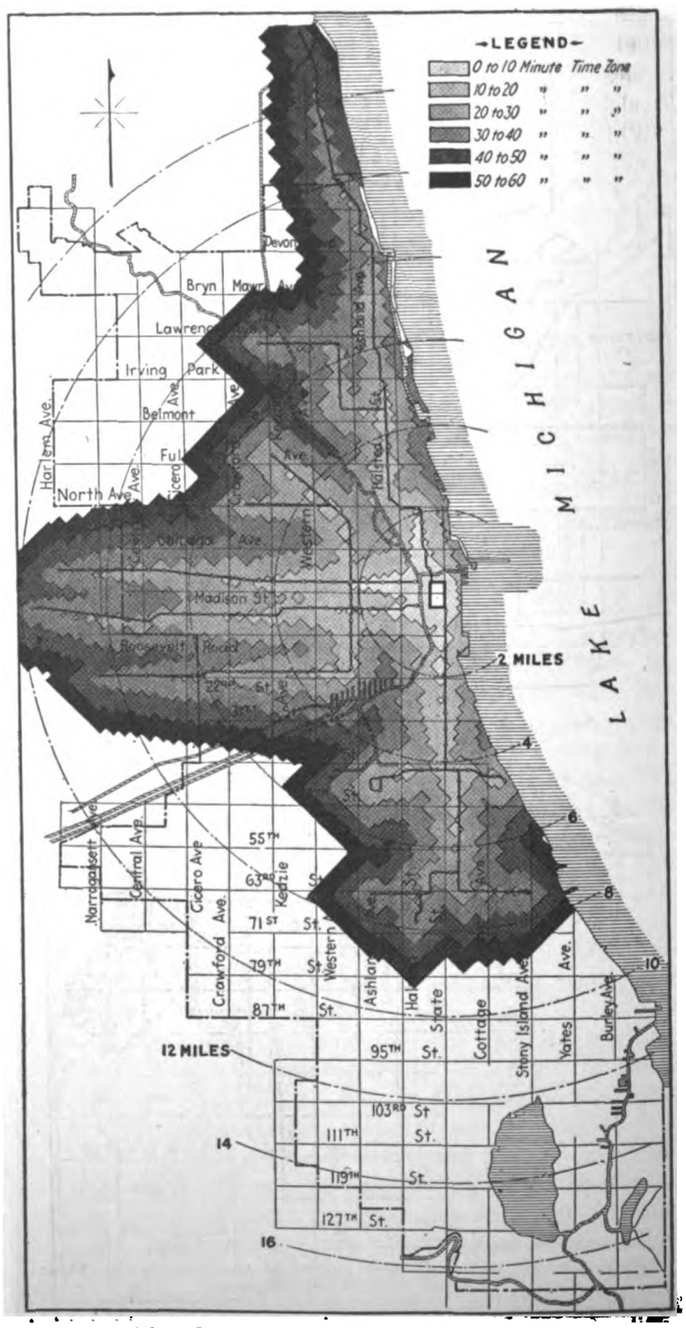
One of the most serious deficiencies of the existing elevated railroad systems, states the engineer, is the lack of a north-and-south trunk line located west of the Chicago river. He concurs in the recommendation of the Chicago Traction and Subway Commission for a line serving Ashland Avenue as a through north-and-south artery of travel, which is designed to divert between 20 and 25 per cent of the Union Loop traffic. This line will intersect and afford transfer facilities with eight rapid transit lines and will also intersect thirty-seven street car lines. It will be a rapid transit elevated railroad extending from Eighty-seventh Street in the southern section of the city to Howard Street in the northern section.

Other important elevated construction recommended for the first period of construction, in addition to the lines on Milwaukee, Blue Island and Archer Avenues, are branches of the Milwaukee Avenue trunk on North and Belmont Avenues, and extensions of the South Side Elevated parallel to State Street as far as Pullman, and along Stony Island and South Chicago Avenues to South Chicago.

The single piece of new elevated construction recom-



Time Zones for the Surface Lines—1922



Time Zones for the Elevated Lines—1922

These charts show the time to reach any part of the city, starting at the center of the Loop, by either of the present independent transportation systems.

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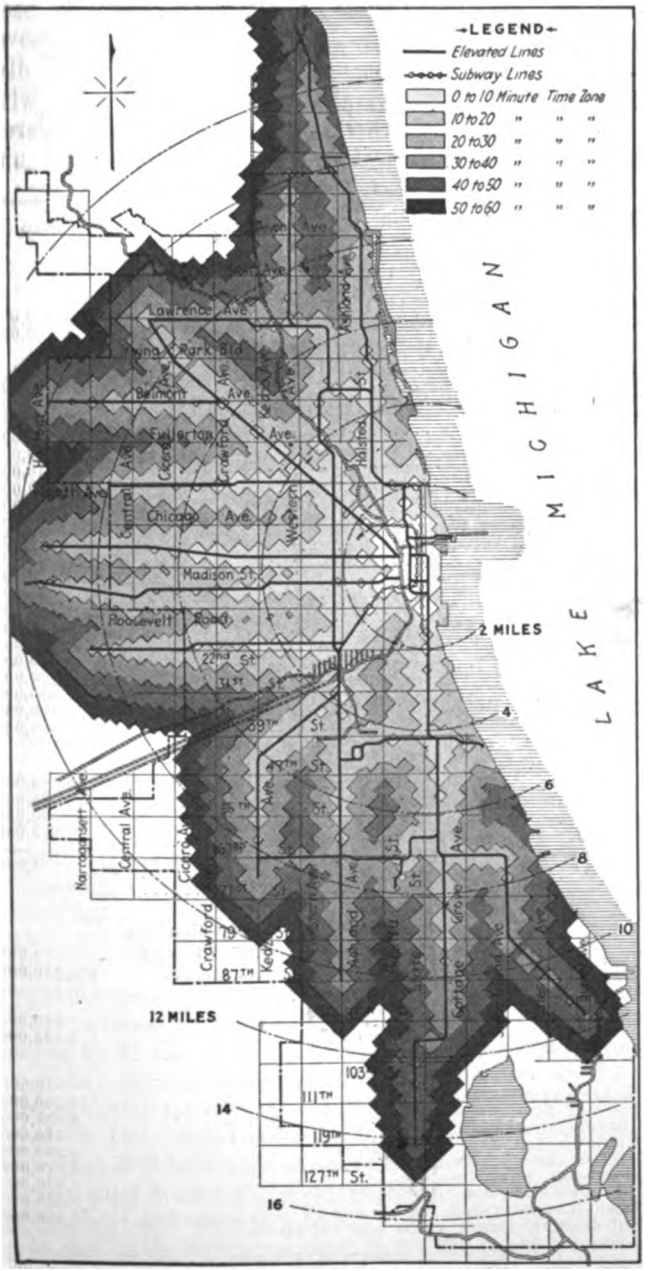
mended in the central business district will be a connecting link, consisting of a four-track rapid transit line for north-and-south service, consisting of three parts: (a) The existing Northwestern Elevated tracks in Wells and Franklin Streets lying between Orleans Street Junction with the State Street subway and Lake Street; (b) the Wells Street track of the Union Loop, lying between Lake Street and Van Buren Street and (c) a two-track elevated railroad in Wells Street from a connection with the Loop at Van Buren Street to Polk Street, and running then easterly in Polk Street to a junction with the Southside Elevated in the alley west of Wabash Avenue.

Tne engineer states that grade crossings on rapid transit lines materially reduce track capacity, and he recommends that the tracks of the branch line be raised over those of the main line at three points: Lake and Wells Streets, Van Buren and Wells Streets, and at the Ravenswood Junction just north of Belmont Avenue.

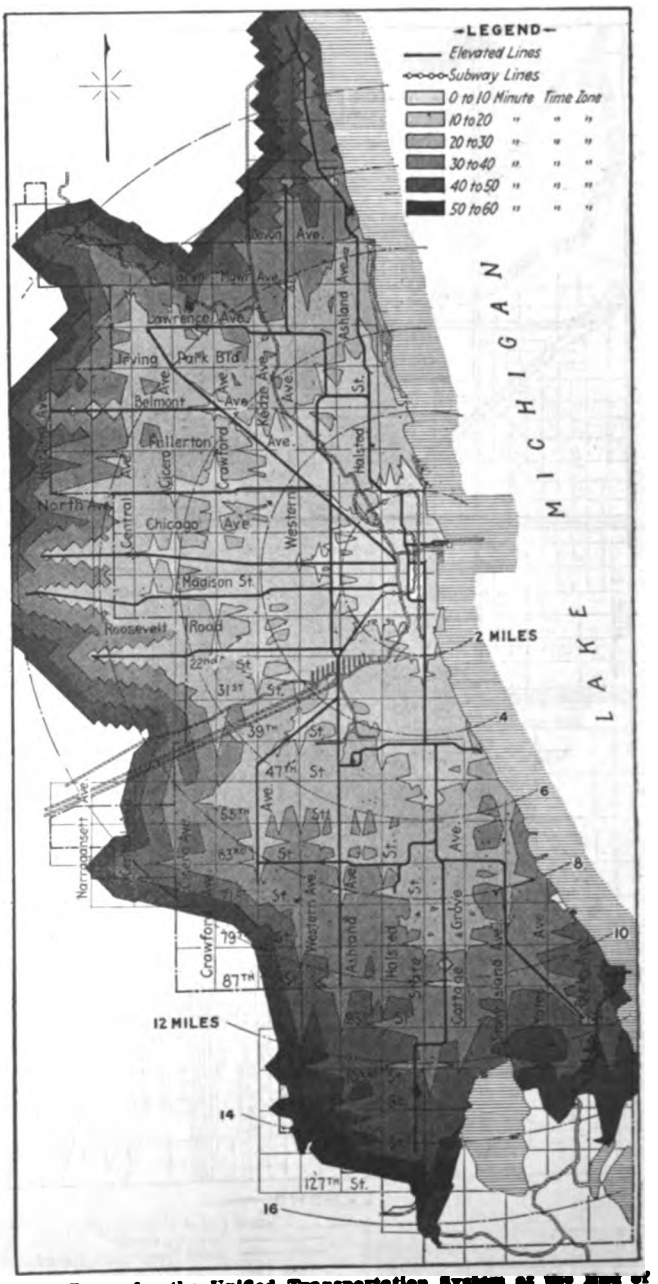
The rapid transit system described has been planned so as permit direct routing and to avoid duplication of service. Tentative schedules of the various routes have been prepared and track layouts designed so that control points or throats which would restrict the full and uniform use of track facilities have been avoided. Through routing of service from one extremity of the system to the other will be the basic principle of operation.

STREET RAILWAYS

The surface lines will be extended during the first period of construction by building 73 miles of double-track extensions and double-tracking 7 miles of existing single-track line. By the construction of these extensions street car service will be furnished in substantially all the built-up area of the city as well as many areas now developing. The engineer states that the proposed plan will reduce the length of the haul



Time Zones for the Rapid Transit Lines at the End of the First Period of Construction



Time Zones for the Unified Transportation System at the End of the First Period of Construction

The reduction in time to reach points in Chicago by adoption of the program will be seen by comparing these diagrams with those on the preceding page. The greater time saving with unification is seen by comparing the two diagrams above.

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and the cost of operation, as it is based upon unification and co-ordination of the elevated railroads and the surface lines. Using the surface lines as collectors and distributors of traffic, and developing a rapid transit network for mass transport with liberal transfer privileges will insure a substantial reduction in the length of haul on the surface lines and a corresponding reduction in cost of operation. Of the extensions recommended the principal ones are on Central Avenue, from Elston Avenue to Roosevelt Road, 8.5 miles of double track and on Western Avenue from Seventy-first Street to 119th Street, 6 miles of double track. These extensions will necessitate the purchase of additional cars. The type recommended will be of the most modern design, and the same general type as, but lighter than, most of the cars now in use on the surface lines.

Second Period of Construction

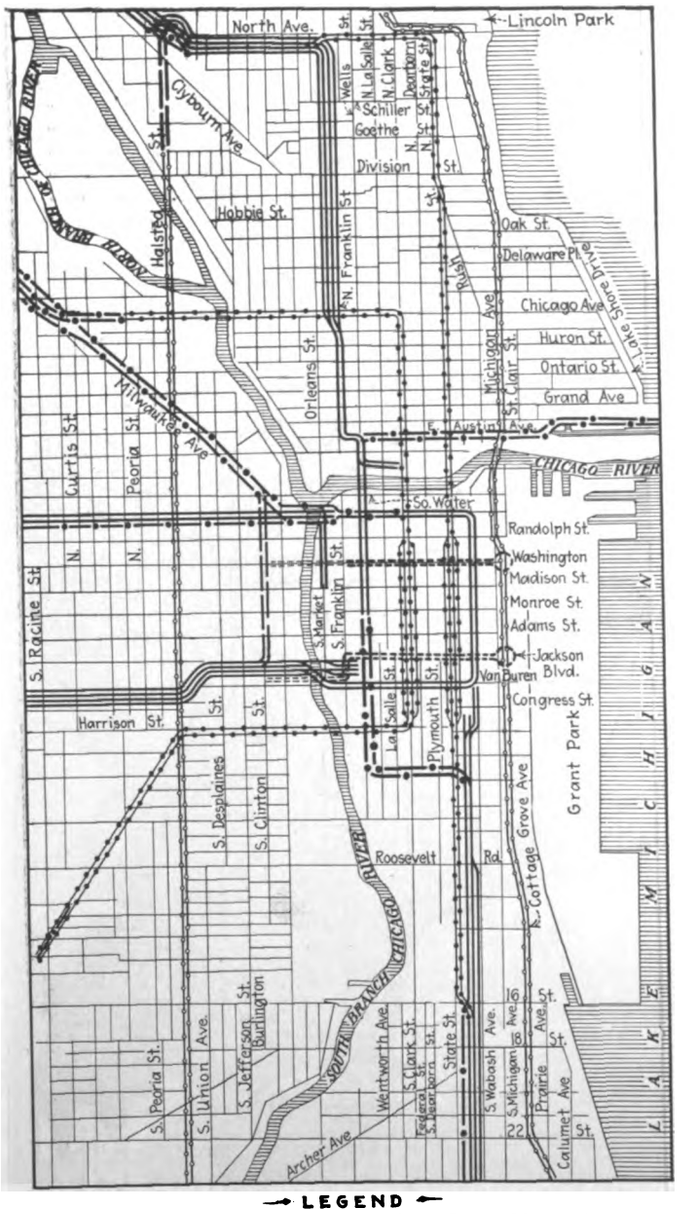
The principal rapid transit subways included in the second period are the Cottage Grove-Broadway Line, and the Halsted Street Line. These will both be high-level subways. The only subways recommended for surface cars are one under Washington Street and one under Jackson Street, both of which will connect with the existing tunnels under the South branch of the Chicago River. These will be low-level subways to pass under the north-and-south rapid transit subways.

Of the elevated construction for the second period the Kedzie Avenue elevated probably will be the most important. This will be built on or near Kedzie Avenue from Sixty-seventh Street to Lawrence Avenue. The Halsted Street elevated and subway route will form a north-and-south rapid transit line between Eighty-fifth Street and North Avenue, where it will connect with the Northwestern Elevated.

The street railway construction recommended for this period consists of 48 miles of double track, principally extensions of lines either existing at present or to be built during the first period.

The Union Elevated Loop

The engineer states that for many years the removal of the Union Elevated Loop structure has been urged. The principal reasons given for its removal are that it prevents the expansion of the business district, interferes with street traffic and also with the lighting of adjacent buildings. Having considered fully these objections, he states that it would be un-



LEGEND

Existing
Elevated Tracks
Street Car Tunnel Tracks
First Period of Construction
Elevated Tracks
Rapid Transit Subway Tracks
Second Period of Construction
Elevated Tracks
Rapid Transit Subway Tracks
Street Car Subway Tracks

Subway and Elevated Tracks in the Central Area at the End of the Second Period of Construction

ESTIMATE OF COST FOR COMPLETE PROGRAM FOR UNIFIED SYSTEM

First Period of Construction

Rapid Transit Subways	
State Street subway	$19,430,000
Clark Street subway	24,900,000
Elevated Railroads	
Mid-City trunk line	14,460,000
Milwaukee Avenue line	8,125,000
Belmont Avenue line	3,850,000
Humboldt Park line	4,099,000
Marquette Park line	6,210,000
Douglas Park line	1,730,000
Polk Street and Wells Street line	940,000
Southside Elevated main line	3,930,000
Roseland line	7,625,000
South Chicago line	3,770,000
Englewood line	2,090,000
Stock Yards line	400,000
Municipal Pier line	1,125,000
Northwestern Elevated main line	300,000
Ravenswood line	3,660,000
Grade separation	1,454,000
Oak Park line	2,555,000
Garfield Park line	2,450,000
Elevated stations	2,400,000
3,000 modern rapid transit cars	69,000,000
Substations, shops, yards and terminals	15,000,000
Street Railways	
73.01 miles of double-track street railway lines	13,142,000
6.98 miles of single-track street railway lines	628,000
250 modern street railway cars	3,750,000
Substations and car stations	820,000
Total	$217,843,000

Second Period of Construction

Rapid Transit Subways	
Cottage Grove-Broadway line	$55,200,000
Halsted Street line	20,610,000
Street Car Subways	
Washington Street subway	3,345,000
Jackson Street subway	3,525,000
Elevated Railroads	
Kedzie Avenue line	10,000,000
Halsted Street line	6,500,000
Clinton Street line	635,000
Englewood line	3,260,000
Archer Avenue line	4,900,000
Humboldt Park line	1,010,000
Milwaukee Avenue line	3,810,000
1,200 modern rapid transit cars	27,600,000
Substations, shops, yards and terminals	6,000,000
Street Railways	
47.75 miles of double-track street railway lines	8,595,000
Total	$154,990,000
Total estimate, first and second periods	$372,833,000

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justifiable at the present time to substitute subways in lieu of this structure, at an expense of many milions of dollars. Undoubtedly the time will come when the congestion of street traffic will be so great as to compel its removal, so accordingly no construction has been recommended which would prevent its ultimate removal.

Estimates of Costs

In order to avoid the expense of computing unit quantities, those which were determined by the Chicago Traction and Subway Commission in 1916 were used in the estimates of costs which were made under the supervision of H. M. Brinckerhoff of the firm of Parsons, Klapp, Brinckerhoff & Douglas.

The accompanying estimates do not include the cost of such real estate as may be necessary for rights of way.

Benefits of the Unified System

In addition to the benefits which will follow from the unification and expansion of existing transportation lines, other important benefits will be secured, according to the engineer. Rapid transit lines provide high speed and non-interrupted operation, which are two highly desirable service factors in transport. Time-zone maps, showing the time required to reach any point in the city from the Union Loop, have been made by the engineer. In preparing these maps the present running time for existing surface and elevated lines was used, and for proposed lines it was estimated. Time for making a transfer, or for reaching the surface from a subway or elevated train was estimated at one minute. The rate of walking was estimated at 3 m.p.h. Those reproduced in the engravings show the time required for existing surface lines, for existing elevated railroads, for the subway and elevated lines operating together at the end of the first period of construction, and for the unified system.

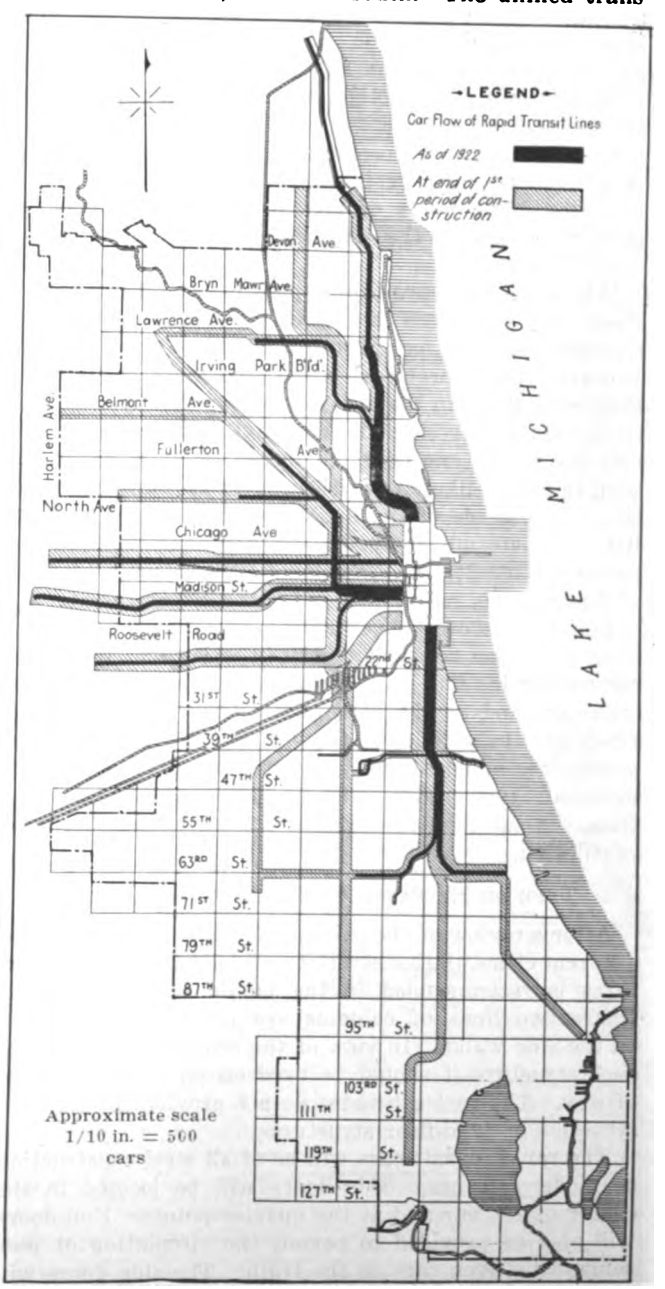
Starting at the Union Loop, points were located at five-minute intervals on every outbound transportation line and also along the intersecting lines to determine time contours. On the map for the surface lines it will be noted that the twenty-thirty-minute zone is approximately centered on the 4-mile arc, while the same zone for the unified transportation system is centered on approximately the 7-mile arc, thus indicating that on the proposed comprehensive system a 7-mile journey can be made in the time now required by a 4-mile trip. All of the time zones will be greatly widened by the adoption of this comprehensive plan. For instance, the twenty-thirty-minute zone shown for the unified system is approximately double the area of the twenty-thirty-minute zone shown for the rapid transit and surface lines separately.

Capacity Will Be Increased

The outbound loading in October, 1922, from the central business district in the maximum hour of the evening rush was 80,101 passengers in 1,048 cars on the surface lines and 80,087 riders in 1,109 cars on the elevated lines, a total of 160,188 passengers. At the end of the first period of construction, subway and elevated lines will have a joint capacity of nearly 400,000, or more than double the total number now carried by the surface and elevated lines. The car flow chart shows the vastly increased capacity of the rapid transit lines of the unified transportation system at the end of the first period of construction, as compared with the capacity of the existing elevated system.

The maximum number of cars that can be operated now on either elevated or surface routes, which terminate in or pass through the central business district, is determined by throats or controlling points in this district. As the present outlets from this congested district are used nearly to their practical limit, the elimination of such controlling points will result in greatly increased capacity throughout the length of such routes.

The operation of the unified transportation system will reduce the number of street cars now required to serve the central business district. No curtailment in this street car service should be made until the rapid transit lines have been equipped to carry the load. The handling of all long-haul passengers on properly designed rapid transit lines will reduce the need for surface cars, and eliminate them to a large extent from the central business district. In the opinion of the engineer adequate transportation will be the most potent factor in causing the central business district to expand to the north, west and south. The unified trans-



Car Flow Diagram of the Rapid Transit Lines at the End of the First Period of Construction and in 1922

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portation system is designed to serve a delivery district of nearly three square miles.

Operating Expenses Will Be Reduced

The average length of ride on the surface lines at the present is over 4.2 miles, which is the longest average ride provided by any street car service in the world. Under the proposed unified system, with transfers, practically all of the long haul traffic will be diverted to the elevated and subway lines, thereby reducing materially the average length of ride on the street car lines. As the operating cost per car mile on rapid transit lines is only 75 per cent of the operating cost per car-mile on surface lines, it follows that the cost per passenger trip will be less than at present.

Design and Construction

The engineer points out that he has not made detailed estimates, but that the essential elements of design are outlined in such a manner as to indicate the various types of construction, upon which the estimates of cost are based. The general design of all the subway lines is similar, structural steel frames on 5-ft. centers forming the skeleton of the subway structure. The side walls and roof are concrete, and all beams and columns are incased in concrete. A concrete partition wall separates adjacent bores except at stations. The floor is of reinforced concrete designed to withstand hydrostatic pressure. The bores of all subways are designed to permit the use of the tunnels by either rapid transit trains or street cars.

Where the subways dip to pass beneath the Chicago River they will reach their greatest depth, and the subaqueous construction problems involved are difficult. However, these problems will be no more complicated than were those in the construction of the river tunnels in La Salle Street and Washington Street. In the opinion of the engineer, no undue or extra-hazardous conditions are likely to arise in river crossing construction. The grade of the under-crossings at the Chicago River is determined by the depth of channel required by the United States Government. A maximum gradient of 3 per cent is recommended for the approaches.

For the purposes of ventilation, partition walls will be placed between adjacent tracks in order that the movement of trains will push the air ahead and out through openings, and at the same time draw in a supply of fresh air. In addition to the ventilation caused by train movement, supplementary ventilating devices will be installed. It may also be advisable to make a connection from the subways to adjacent buildings for additional ventilation.

Type of Elevated Railroad Recommended

After a review of the existing types of construction in different cities, the construction of solid-floor steel structures is recommended in the public streets and that where two lines of columns are used they be placed on the side walks. In view of the economy of the open-deck structure it should be used on all private rights-of-way. The cost estimates do not provide for the construction of solid-floor structures.

The rapid transit cars will be of all steel construction of modern design. Side doors will be located in the center of the car and at the quarter points. End doors will also be provided to permit the circulation of passengers between cars in the train. The side doors will be mechanically operated and electrically controlled so as to facilitate loading and prevent undue delay at stations.

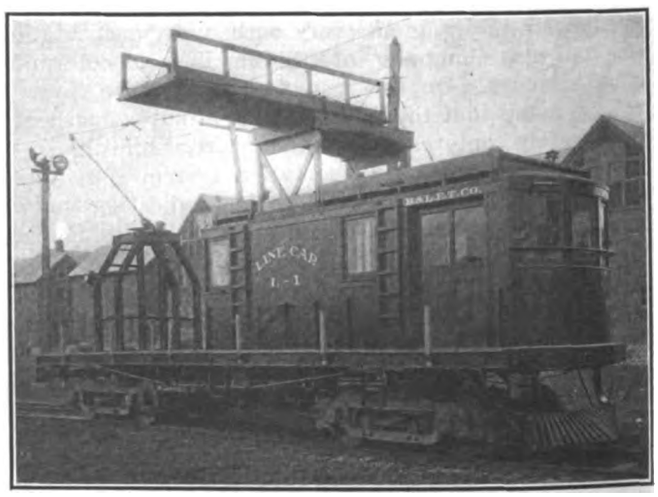
The use of protected third rails is recommended for power distribution throughout the system. Automatic block signals and interlocking plants will be installed to insure safety of operation, and to assist in the efficient spacing and dispatching of trains. All switches under control of interlocking plants will be operated by electro-pneumatic mechanism of approved design.

The estimates of costs for surface lines are based on the continued use of the type of standard track construction used in Chicago since 1907, consisting of 9-in. girder rails supported by treated wood ties laid upon either a 6-in. concrete foundation or an 8-in. rolled stone foundation. The joints are welded and the 16-ft. right-of-way is paved with granite blocks laid on a concrete base and grouted. The paving cost is about 30 per cent of the cost of the entire track construction. Attention is also called to the monolithic track construction now used in Detroit. It is stated that if found suitable for Chicago it should be adopted, as its use would reduce the estimate by more than six million dollars.

Reel Rack on Rear of Line Car

ON A LINE CAR recently built in the shops of the Buffalo & Lake Erie Traction Company the frame supporting the trolley base and pole is used also as a rack for reels of wire. The framework is a double inverted U, made of 6-in. channels and supported by additional vertical members, as shown in the accompanying illustration. A 3-in. axle for carrying two reels of trolley wire rests on this framework.

The car is of sturdy construction throughout, with an over-all length of 42.5 ft. and a width of 8 ft. 8 in. The underframe is of 8-in. I-beams. Standard trucks



Framework of Channel Iron Supports Two Reels of Wire

with steel wheels, four GE-204 motors and K-34 control are used. The height of the car with tower down is 12 ft. 6 in. The mechanism for raising the tower is ordinarily operated by air, although there is a hand mechanism for emergency. A vertical lift of 6 ft. 6 in. is possible, making the maximum height about 19 ft.

P. J. Wood, master mechanic, designed and built the car at the company's own shops. The total cost was less than $5,900, including labor, and the material used was charged for as second hand at current market prices.

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An Analysis of Special Trackwork Loads

The Effect of Impact Is the Most Serious Factor and the Analysis Shows the Location of the Points Where This Is Greatest—Special Examples Show Where Excessive Wear and Impact Take Place

By M. Bernard
New York, N. Y.

THERE have appeared in the ELECTRIC RAILWAY JOURNAL from time to time articles describing some deviation from the accepted standards of special trackwork construction. These can be divided into two general groups: One in which the purpose is to lessen the wear and pounding on special work by providing flange bearing of the wheel on the rail, and the other by the use of metal of different composition from the manganese steel so familiar to electric railway engineers. In the former, flange bearing is provided throughout the limits of the special work to decrease to a minimum the shock at the intersections of the flangeways. In the latter, the shock resisting qualities of the special work are increased by the use of alloy steel, such as chrome nickel or other alloys.

Although various methods for embodying the above have been proposed at various times, yet fundamental principles descriptive of the various influence lines of the loads involved, such as are so common in any study of steel structures, have not been given. As is well known, it is the general practice to use the same design of frogs without regard to their particular location in a special-work layout. This is rather arbitrary if we consider that no other engineering structure is designed without regard to the various effects of the different loads.

In order to determine whether the present practice of special-work design conforms to the particular requirement imposed by different loads and shocks, the accompanying diagram has been made to show how loads are received and transmitted at intersection points. A double-track crossing with the tracks lettered *A*, *B*, *C* and *D* is shown. The direction of traffic is denoted by arrows. Where wear alone results by the cars on the respective tracks, the corresponding wearing points are given capital letters corresponding to the track over which the cars operate (*A*, *B*, *C*, *D*). Where impact results the capital letters are shown with an affix *I* (*AI*, *BI*, *CI*, *DI*). In order to group the frogs with the same relative effects, small letters, *a*, *b*, *c* and *d*, are used. Frogs with the same letter receive the same wear and impact, and each small letter represents a group of four frogs.

Let us analyze this diagram for three different volumes of traffic, namely: (1) where the traffic on tracks *A* and *B* is practically the same as on tracks *C* and *D*; (2) where the traffic on tracks *A* and *B* is greater than on tracks *C* and *D* and (3) where the traffic on tracks *A* and *B* is less than on tracks *C* and *D*.

To give a concrete example let us ascribe to (1) an annual traffic of 150,000 car passes, to condition (2) an annual traffic of 200,000 car passes for each of tracks *A* and *B* and of 100,000 car passes for each of tracks *C* and *D*, and under conditions (3) an annual traffic of 100,000 car passes for each of tracks *A* and *B* and 200,000 car passes for each of tracks *C* and *D*.

The resultant load action is shown in the accompanying table: This gives figures for traffic over crossing of tracks *A* and *D* only. Corresponding values are the same for the other three crossings.

A comparison of these shows the following:

Frog *a* under any of the three conditions is subjected to practically double the loading effect of any other frog and naturally this frog fails prematurely as compared to the rest of the layout. It would seem that it is not quite logical arbitrarily to specify a comparatively costly alloy steel for a whole crossing if only a small proportion of it requires this material.

It will be noted also from the table that joints should not be located arbitrarily but the distribution of the loads should be considered. The practice of locating joints on the track with the least traffic is not always correct. If possible it would seem to be more logical

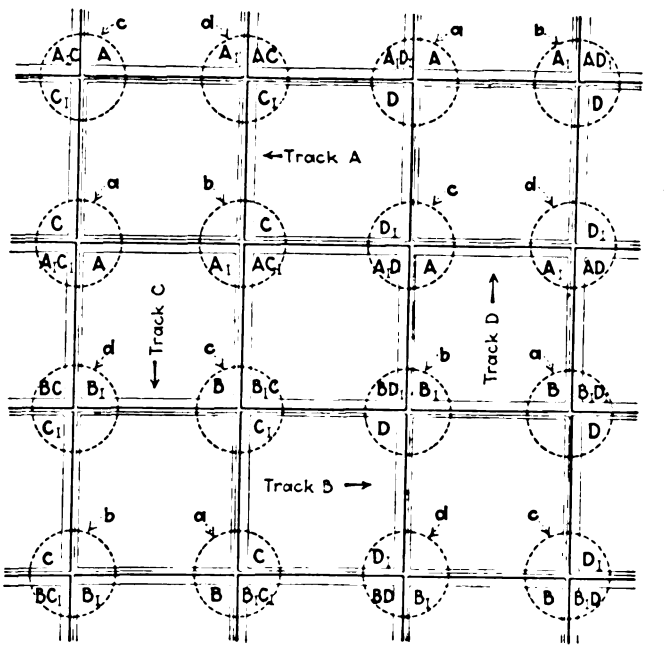

Diagram of Loads and Impact Received and Transmitted on Double-Track Crossings

LOAD ACTION, WEAR AND IMPACT, FOR DOUBLE TRACK CROSSING

Group	a			b			c			d		
Frogs Tracks *A* and *D*	*A*	*AI, DI*	*D*	*D*	*A, DI*	*AI*	*DI*	*AI, D*	*A*	*AI*	*A, D*	*DI*
Wear Case 1	150,000		150,000	150,000	150,000			150,000	150,000		300,000	
Impact Case 1		300,000			150,000	150,000	150,000	150,000		150,000		150,000
Wear Case 2	200,000		100,000	100,000	200,000			100,000	200,000		300,000	
Impact Case 2		300,000			100,000	200,000	100,000	200,000		200,000		100,000
Wear Case 3	100,000		200,000	200,000	100,000			200,000	100,000		300,000	
Impact Case 3		300,000			200,000	100,000	200,000	100,000		100,000		200,000

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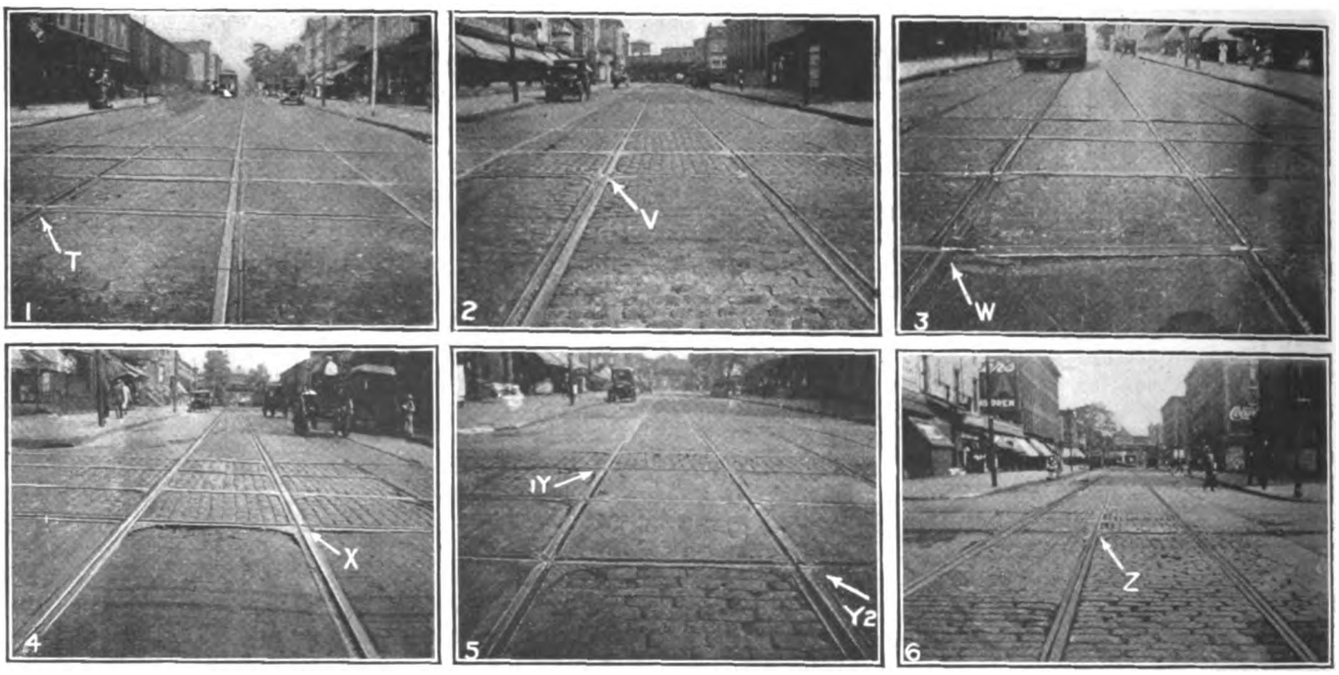

Some Crossing Frogs Wear Out While Others Remain in Good Condition

to pair frogs as much as possible according to their carrying like or similar loads.

At the points where wear alone results, the presence of steel harder than the abutting rail results generally in a pounding at the edge of the center. Instances can be cited where unbroken main-line hard-center frogs failed as a result of the pounding caused by unequal wearing qualities of the abutting pieces.

A study of the table also shows that indiscriminate use of arc welding is not justified. In many cases grinding the points of frogs to a uniform level gives better results. An analysis of the diagram seems to show the reason. It will be noted that due to double impact the points *A1*, *D1* must in time be pounded to a lower level than *A* and *D* which further increases the pounding effect of the wheels on *A1*, *D1*. Under most conditions the grinding to a uniform level will give better results than building up *A1*, *D1* with the arc welder. The reason for this is that the metal added by welding will not withstand pounding as well as the original metal would. Grinding of the welded portion to a uniform level is seldom obtained. Special work as a general rule is hardly ever renewed due to breaking down of the component parts between the frog points whether the construction be built up, hard center or solid.

From a study of the diagram the weakest points for any given service are easily determined, and the design should be made with due consideration to them. Thus in the examples taken frog *a* is the weakest point. Only about 6 per cent of the points of contact at intersections receive a greater wheel load action than normal. The conclusion, therefore, is that it is hardly justified economically to make the rest of the crossing the same as is required for this 6 per cent. A suggested design is one in which this 6 per cent can be renewed as required until such times as the limit of life is reached in the rest of the crossing. At present when special work is renewed the pieces other than the intersection points are comparatively little worn except, of course, curved special work with sharp radii.

The fact that certain frogs of a crossing wear out while others remain in good condition is further illustrated in the six half-tones shown. In No. 1 the frog at *T* is badly pounded while other parts are in good condition. It will be noted that *T* corresponds to *a* in the accompanying analysis. In illustration No. 2 the frog *V* begins to show effects of pounding, in No. 3 the frog *W* needs repairs, in No. 4 the frog *X* is showing effects of hard service, in No. 5 both *Y1* and *Y2* require attention, and in No. 6 it is *Z* that shows excessive wear. In all cases the frogs corresponding to *a* in the analysis show excessive wear.

Boston Elevated Spent $17,000,000 on Plant Improvements

THE recent report of the trustees of the Boston Elevated Railway shows that approximately $17,000,000 was spent upon road and equipment, either for entirely new property or for the replacement of worn-out property during the period from July 1, 1918, to Dec. 31, 1922. The following sources supplied this amount for the improvement: $2,000,000, part of proceeds of preferred stock to which the stockholders were compelled to subscribe before the public control act could take effect; $4,787,000, part of the proceeds from the sale of the Cambridge Subway, which has already been appropriated for additions and improvements; $9,018,000, available from the depreciation charge taken out of the cost of service July 1, 1918, to Dec. 31, 1922; $700,000, approximate amount received from insurance and from the sale of real estate properties; $1,800,000, floating debt as of Dec. 31, 1922, which later was to be covered by a bond issue. These sources total $18,305,000.

A total of $17,146,119 has been expended to provide facilities necessary for efficient and economical operation. These facilities include: Cars, $8,404,924; carhouses and shops, $1,836,282; power houses and transmission of electricity, $2,679,264; surface lines, $3,041,625; elevated structures and appurtenances, $871,840; miscellaneous improvements, $312,184.

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The County-City Building Which Houses the Offices of Seattle's Street Railway Department and Other Municipal Activities

Four Years of Municipal Railway Ownership in Seattle

By P. M. Fogg
Formerly Secretary Seattle Civil Service Commission

The Lines Were Acquired Because of War Conditions—After an Operating Deficit in 1919 Fares Were Raised to 10 Cents in July, 1920—A New Mayor Reduced Them to 5 Cents on March 1, 1923, but the City Council, Overriding the Mayor's Veto, Compelled a Return to 10 Cents Cash Fare

THE city of Seattle has now experienced a trifle more than four years as owner of an extensive street railway system. Three mayors have successively occupied the chief executive's chair during this period, and changes of policy have been numerous. Twice have rates of fare been raised, only to be lowered, and again increased. Legislation covering this latest change fixed July 5 as the effective date. Traffic, on the other hand, has materially decreased in volume since the system was acquired, and politics has played a vigorous part in the colorful drama of the transportation lines. The history of this case is one of peculiar interest, as it becomes increasingly evident that the city, having found no solution for its pressing railway problems, is in fact completely puzzled to know what to do with the property which it finds on its hands.

The lines were acquired as a result of the acute conditions brought about by the war. Shipbuilders were operating under full pressure from the war bureaus, and the car service rendered by the Puget Sound Traction, Light & Power Company was grossly inadequate, especially on lines feeding to those yards. Repeated requests by the city authorities for improvement did not bring results satisfactory to the government's local representatives, who were operating free steam trains for the shipyard workers.

Negotiations for the purchase of the electric railways by the city were thereupon opened on Sept. 5, 1918, and an agreement having speedily been reached, the matter was favorably decided by a vote of the people two months later; the ratio being three and a half to one. According to the terms of the contract then, the entire property, including about 195 miles of track, together with rolling stock, carhouses, shops and real estate, passed into possession of the city of Seattle on April 1, 1919. The city issued and tendered in payment $15,000,000 in 5 per cent utility bonds, to be retired in eighteen equal annual installments, beginning March 1, 1922. The contract further stipulated in this connection that a rate of fare must be maintained at all times, high enough to provide sufficient revenue for the payment of both principal and interest.

The superintendent of public utilities immediately took control and proceeded to effect certain economies and improvements in the service. With a few exceptions, all of the employees of the traction company, approximately 2,000 in number, were transferred in a body to the payroll of the municipality, arrangements having been made by the Civil Service Commission to this effect. Two lines, totaling 23 miles in length, which the city had previously owned and operated for five years at an average annual loss of $35,000, were consolidated with the system. Free rides for police and firemen were abolished, and as the ending of the war had fortunately eliminated the problem of abnormal service to the shipyards, it appeared that an opportunity for municipal ownership to assert itself had arrived.

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At this time, a 5-cent fare was still in force, it having been established in 1917. But during the first eight months of operation only 92,061,302 passengers were carried, and at the close of 1919 the railway department showed a loss, including bond interest and depreciation, of $517,173. The wage increase, granted to all city employees in October, 1919, automatically included the trainmen, and this of course added to the cost of operation.

In the spring of 1920, a newly-elected mayor replaced the former superintendent of public utilities with an appointee of his own choice, and it soon became evident that the rate of car fare would be raised, in an effort to improve the system's financial condition. The 10-cent cash fare, with four tokens for 25 cents, and free transfers, became effective in July. There was considerable plain talk from the chief executive who intimated that Seattle had bought its lines at an exorbitant figure, under terms of a contract impossible of fulfillment, and experts were called into consultation, but without resulting action. The difficulties were not overcome by the increased fare, for the year 1920 closed with a net loss of $986,327, and an unsatisfactory record of public patronage of the lines.

Employees Were Paid by "Warrants"

Apparently convinced that a larger dose of the "fare raising remedy" was required, the City Council again increased rates in January, 1921. Tokens were thereafter sold at three for a quarter, with the cash fare remaining as before, and transfers free. In March, the first installment of interest on the $15,000,000 bond issue became due, and for the first time the railway department, finding itself unable to finance its payrolls, hoisted the signal of distress. "Warrants" unsupported by funds were therefore issued to the employees, accepted by local banks, and later redeemed by the treasurer when monies became available; a device which has been resorted to on several subsequent occasions.

Jitneys were legislated off the streets in September, 1921, as a measure of protection, but regardless of this and of the unprofitable operation of two lines of auto buses as feeders, the number of passengers carried during the year decreased by more than 20 per cent from the record for 1920. Nevertheless the high fare, together with greater economy in operation had created a margin of profit in 1921 amounting to $363,952.

SEATTLE MUNICIPAL STREET RAILWAY SYSTEM
OPERATION AND MAINTENANCE

	1919*	1920	1921	1922
Ways and structures	$282,992	$455,864	$427,964	$382,805
Equipment	528,507	734,017	579,305	569,563
Power	558,528	683,934	659,748	613,677
Conducting transportation	1,950,460	2,644,291	2,435,899	2,040,453
Traffic, general and miscellaneous	247,377	365,820	300,995	339,895
Depreciation	499,173	677,179	680,629	685,114
Loss on auto bus lines	904	10,738	14,873	(b)
Bond interest and discount (a)	607,424	865,660	866,847	835,533
Total revenues	4,158,153	5,451,175	6,347,175	6,228,130
Net loss (c)	517,173	986,327	.....	.....
Net profit (c)	.....	.....	363,952	710,084
Car-miles operated	.....	.....	15,260,399	15,205,297
Number of passengers	.....	122,866,577	97,519,213	96,406,775
Miles of electric track operated	.....	.....	.....	226.75
Miles of cable track operated	.....	.....	.....	8.32
Number of cars in operating condition	.....	.....	.....	595
Wages of common labor	.....	.....	.....	(d)$4.50 to $5.00
Wages of trainmen	.....	(d)$4.75 to 5.25	.....	(e)$135 to $155

* For 1919, the data includes nine months for the purchased lines, and twelve months in the case of lines previously operated by the city.
(a) Does not include amortization of principal on funded debt.
(b) In 1922 there was also a loss on the bus lines but the bus accounts were not segregated.
(c) For an explanation of these sums, see text.
(d) per day; (e) per month.

In the spring of 1922, the voters decisively defeated a proposition which would have thrown the general tax fund of the city wide open for the use of the railway department. The present Mayor, Dr. E. J. Brown, was elected on a 5-cent fare issue, and in June, 1922, promised the citizens that this boon would be theirs "within ninety days." Just how he planned to bring about a sound and speedy readjustment of the railway's finances in order to render this measure practicable was left largely to the imagination. He proceeded, however, to install his new superintendent of public utilities, and the situation became more prominent than ever. It had been aggravated by reason of the fact that on March 1, 1922, the first installment of the principal of the purchase bonds, $833,000, became due and was paid, together with the outstanding interest; an accomplishment attended with considerable embarrassment.

Court decisions resulting from a suit brought by a group of taxpayers now revealed the legal inability of the city to use its general tax fund for the assistance of the transportation lines. This finding was a disap-

First Avenue, Seattle, Is in the Older Business Section of the City. Forty per Cent of the Electric Lines Are Routed Past This Corner

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pointment to those who had hoped that the taxpayers, as owners of the system, could be levied on in support of its unstable foundation.

Numerous delays occurred before the fulfillment of the Mayor's campaign promise for a lower fare, but on March 1, 1923, the 5-cent rate became an accomplished fact. A token, sold at the rate of four for 25 cents (or seven cents in cash), carried full transfer privileges. Seattle held its breath and watched for the results of the plunge. Nor had it long to wait before they became manifest. In 1922, the books had shown a profit of $710,084, but this provided for no bond redemption fund. Thus the financial status was by no means a cause for undue jubilation as yet.

Daily losses of from $4,000 to $5,000 were at once encountered during March, although patronage showed a slight increase over the record for the corresponding month of 1922. The net loss for the month was $138,-725; a result which created a state of consternation in the City Council.

April brought talk of a return to the previous schedule of fares, it having become apparent that the 5-cent rate would not even meet the requirements for operation and maintenance. This move was opposed by Mayor Brown, who apparently unperturbed, remarked, "I gave the people a 5-cent fare, but if they would rather ride in automobiles than patronize their street cars, I can't help it."

Ten-Cent Cash Fare Restored

As pointing the way toward possible relief, negotiations have been opened with the bondholders, looking toward a rewriting of the purchase contract and an extension of the time for redemption of the securities. These overtures are still in their initial stage, but in order to check the losses resulting from the fare reduction, the Council passed an ordinance on May 14, providing for a return of the cash fare to its previous status of 10 cents, with tokens at three for a quarter, and transfers free. This was in line with an opinion submitted by the superintendent of public utilities, who saw only disaster in the continuance of the low fare. The Mayor vetoed the ordinance. But the Council on June 4 repassed it over the veto, and the restored rates in consequence became effective on June 16. The trainmen and shopmen have recently filed a formal request for a substantial increase in pay for 1924, which, if granted, will add considerably to the operation costs.

Should the riding public be expected to provide a profit sufficient to pay for its street railways in eighteen years? Or is it the function of a municipally owned transportation system to furnish service at cost, leaving the financing of the purchase to be met by the taxpayers as a whole? Both theories have ardent supporters, regardless of the court decisions, and the end of the struggle cannot be foretold.

Meantime, the management is capably endeavoring to provide reasonable service. An increased use of small one-man cars has effected a considerable saving during the past few years, and many cars of the older type have been converted, and are in use successfully. All cars are provided with safety gates or doors. At present, power for operation of the street railways is purchased from the Puget Sound Power & Light Company, but upon completion of the Skagit River hydroelectric development, now under construction by the city, energy will be furnished from there for this and other purposes.

George F. Russell, superintendent of public utilities, exercises supervision over the activities of the municipal railway system, and D. W. Henderson is the railway superintendent in immediate charge.

Popularize the Industry

By E. C. Spring
General Superintendent Lehigh Valley Transit Company

IN REVIEWING the many thoughts and suggestions for getting new business, such as merchandising transportation and other similar schemes that have been presented from time to time, it appears that they can all be crystallized into the single word "popularize." It is a fact that the progress made in creating new railway business has not been satisfactory, many companies showing but slight increases in revenue over a year ago. With the increasing number of other attractive modes of transportation the electric railway is confronted with a problem of no small proportions, but which can be met by intelligent, up-to-date action.

We cannot become inactive and expect the business to come to us. We must go after the business, and like the Jew salesman, find the customer that buys for cash. Let us popularize our individual properties.

Webster, in his definition of the word "popular," gives us the key to possible success. He defines popular as "pertaining to, suitable for, or pleasing to the common people." The combination of these points gives us a solid foundation upon which to build. Our industry from its beginning has been primarily for the common people. So far as "pertaining to the common people" is concerned, the electric railway is popular.

But is the service that we are rendering to the common people suitable and pleasing? This is a question which every manager must ask himself. Is your company and its service popular in its community? Are you personally popular? Are your employees popular? These questions must be answered, and if they cannot be answered in the affirmative something is wrong.

Any commercial article that is a big seller has been made popular in some way by the producer. Any successful man or woman carries with him, or her, a certain degree of popularity. The success of a large corporation is based upon its popularity with the masses. We can go down the line with successes of all kinds and we will find invariably that success and popularity go hand in hand.

How to go about popularizing his own property is a question for the individual manager to work out. The reason that we are not receiving the revenues which belong to us by our vested rights is that other means of transportation are more popular than ours. We must get busy and offset their progress or submit to heavy losses.

One thought that we must not lose sight of, however, is that any mode of transportation teaches the public to ride, and we can benefit by the other fellow's advertising. When the electric railway came into the transportation field it was the cry that the steam railroads were doomed. The electric railways, however, not only demonstrated that they had their own field for operation, but also that they were immense feeders for the steam roads. Instead of losing revenue, the receipts of the latter increased materially. They had the advantage of the advertising done by the electric railways. The same thing, I believe, will hold true in a measure today. Our industry cannot but be benefited by the other transportation activities.

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Mid-Western Railway Executives Suggest Ways to Stimulate Summer Riding

PICNICS, parks and publicity are the most promising methods of building up passenger traffic during the summer months, according to the opinion of a number of mid-Western electric railway executives. A diplomatic campaign against the private automobile may accomplish something in this direction, according to some, and others think that the only satisfactory way to make the railway service more popular is to improve its quality.

In the advertising of the Des Moines City Railway, the picnic idea plays an important part. The company calls the attention of its riders to the various places of amusement and interest which can be reached by its lines, suggesting from time to time the advantages of being carried on clean, cool, comfortable street cars to the various parks and picnic grounds rather than having to bother with automobiles and parking troubles. In this connection the difference in cost between riding on the street railway and using private automobiles is emphasized. It is felt, according to E. L. Marriage, assistant to the president, that real progress is being made by this method.

In St. Louis the United Railways makes it a practice to call attention to special amusements by the use of light box signs. No special emphasis is placed upon such activities by B. W. Frauenthal, general traffic agent, because it is thought that most people visiting the various amusement resorts in and near St. Louis ride on the street cars anyway. Display signs calling attention to the zoo, the botanical gardens, horse shows, and exhibitions at the art museum, have been used with some success. The company makes it a rule to advertise only such events as are free to the public.

The Hutchinson Interurban Railway has tried many ways to increase its passenger revenue, but according to J. E. Humbert, general manager, the schooling of the trainmen has borne more fruit than any other scheme. The company is building an attractive picnic park at Carey Lake, but no great increase in riding is expected to result from this. The best way to stimulate traffic, according to Mr. Humbert, is to provide a service which will really attract the people. He believes that the practice of waiting for passengers who are a trifle late to catch a car is worth while on lines with long headways. Near the end of the route, the trainmen make it a practice in inclement weather to pick up inbound passengers on the outbound trip and carry them free to the end of the line, rather than keep these people standing until the car reaches the end of the line and returns.

In Topeka the railway keeps in close touch with various clubs, lodges, Sunday schools, etc., with a view to promoting summer trolley picnics. Field days, outings, band concerts and other open-air attractions are promoted by the railway. These plans have been quite successful, according to A. M. Patten, assistant general manager. At the same time the company calls the attention of motorists to the damage done to tires and exterior finish of automobiles by allowing the machines to stand on hot summer days for a long time in the open. Mention is made also of the fact that the frequent rain showers are a source of expense to motorists by necessitating frequent washing of cars and lubrication of squeaky springs.

Good service is emphasized by R. V. Miller, general manager the Oklahoma Union Railway, as the most effective means of increasing summer riding. It is important to have the cars clean and well ventilated. Passengers like to ride the cars in the summer time when they can get plenty of air. If possible there should be some way of raising the front windows or opening the front door of the car so that there will be plenty of ventilation. The side windows by themselves are hardly sufficient for proper ventilation, according to Mr. Miller.

Originality Marks Publicity of East St. Louis & Suburban Railway

A RATHER remarkable series of advertisements was published in the *East St. Louis Daily Journal* during the year 1922 by the local railway company. The keynote of this publicity campaign may be judged from one of the earlier advertisements in which the company says "In the final analysis men are judged by what they do, rather than by their intentions, but we want you to know what our intentions are, so that if you agree with our policy we may all co-operate for mutual benefit to secure the best results."

Courtesy toward the public is one of the chief points which the company sought to advertise during this campaign. "We have not all of us always been courteous, but we know we particularly desire to be courteous and believe that we have succeeded more than fairly well," is a statement made.

Safety is another point upon which emphasis was placed. The company showed that the number of street car accidents decreased 27 per cent in 1921, compared with 1920. It showed also that there was a reduction in the number of accidents in which automobiles were involved from 237 in 1920 to 220 in 1921. At the same time accidents of all kinds were reduced from 661 to 471, or approximately 35 per cent.

The railway declares its intention, first, to provide a seat in the non-rush hours for every car rider who travels any appreciable distance, and second, in the rush hour to provide sufficient capacity so that the number of standees shall be no larger than the number of passengers seated.

An amusing method of determining the relative cleanliness of different cars was tried by the railway, and this provided copy for several advertisements. One of the good housewives of East St. Louis was asked by the company to ride all the cars she could during several days, and at the end of that time to report to the president of the company the five cars on which the greatest effort toward cleanliness had been made by the motorman or conductor. The company boasts that there were so many clean cars that it was almost impossible for her to decide upon the five cleanest. However, nine operators received special commendation from W. H. Sawyer, president of the company, for their good work in this direction. An unusual feature of the commendation and one that appealed particularly to the platform men was the fact that it was accompanied in each case by a $5 bill.

In another advertisement the public was asked to report to the company any habitual overloading. The financial end was touched upon in statements to the effect that the public is entitled to good service and the company is entitled to a fair return. The outstanding feature of all of these advertisements was a spirit of genuine sincerity and friendliness to the public.

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Two Southern Cities to Have Entirely New Rolling Stock

To Demonstrate the Belief that Modern Cars Will Bring Paying Traffic, Old-Type Cars Are Being Replaced with Forty New Double-Truck Cars in Huntington, W. Va., and with Twenty-seven New Single-Truck Cars in Lexington, Ky.

By "Spectator"

IT WAS a great satisfaction for me, on a recent visit to note the unmistakable signs of prosperity in Huntington, W. Va., and Lexington, Ky. In this prosperity the railways in these thriving cities are having their share.

Huntington is making rapid strides as a manufacturing center. The industries are of such character as to require large amounts of power as compared with the number of workers involved. Hence the Consolidated Power & Light Company, of which the Ohio Valley Electric Railway forms a part, is being called upon to furnish increased power without commensurate increases in railway business. The local utility system is one of the most profitable subsidiaries of the Consolidated Electric Power Company (formerly the American Railway), and until recently it held the record for low operating ratio, but has now been passed by the Altoona property. Its railway business is about one-fifth of the total, or say $700,000 out of $3,500,000.

This Substation at Huntington Is Typical of the New Construction by the Local Utility Company

The electric railway mileage in Huntington is small for the area of the city and the population. In the opinion of W. R. Power, general manager of the local property, this mileage is not likely to be increased greatly in the near future, unless such increases are financed by the communities benefited. The transportation problem in the city is rather unique, due to the way in which the city was laid out and to its natural topographical characteristics. The city was founded about fifty years ago by Collis P. Huntington, the steam railroad magnate, and his colleagues. The site was selected with great care and the city plan was developed in the light of the best engineering knowledge of the time. While the founders apparently did not visualize a city as large as the present one, provisions were made for almost unlimited growth. This growth, however, must be largely in a longitudinal direction because the city stretches along the Ohio River between it and a range of hills too steep for general residence purposes. The plan provided for wide longitudinal avenues, and reasonably wide cross streets with extra wide ones at intervals. Where the original plan has been adhered to the results have been excellent. The city now has a length of about 10 miles and a width of from 1 to 2 miles.

From the electric railway standpoint it is evident that with this long narrow form of the city, the transportation requirements are largely parallel with the river, and few lines are needed to cover the city sufficiently. Crosstown traffic is obviously of relatively little importance.

Another important factor is this: Huntington is a young city, comparatively, and its greatest growth has been in recent years. During the boom days of the electric railway, say from 1890 to 1905, the city needed little mileage and promoters of the day did not see much chance for profit in extending the lines out into the country. When the active growth began it was too late, the electric railways of the country having settled down to intensive development of what they had, rather than further extension.

The local situation has also been strongly affected by the automobile. The wide streets, beautiful surroundings and industrial prosperity have combined to induce large use of this vehicle. I was told that there were at least 7,000 machines in the city, with the number increasing rapidly. Based on a recent school census, and allowing four and one-half inhabitants per school pupil, the population of the city is now about 75,000. Hence there is nearly one automobile for each two families of five persons each. Not only do the Huntingtonians have automobiles, but they use them, because the streets afford liberal parking space.

With conditions so favorable for automobile competition the railway has been hard put to furnish profitable service. From the standpoint of profit it has been fortunate that the electric railway mileage was not more than it is. The company has realized, however, that something must be done to improve the service

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radically and has arranged with the parent company for an entirely new outfit of city cars, numbering forty. Mr. Power had hoped to secure fifty, but it was decided that ten of the old-type cars could well be retained to serve as "extras." The new cars are light, double-truck cars, arranged for either one-man or two-man operation. Their weight is about 23,000 lb. and they are provided with all of the comforts and conveniences of the modern-type car designed to attract patronage. They are being constructed at the Brill works.

The parent company is giving the Huntington management an opportunity to demonstrate what can be done by giving the public the best service that modern practice affords. The matter has, therefore, more than local significance.

The Consolidated Power & Light Company is doing more than furnishing Huntington with new cars and improved railway service. It is spending $1,000,000 on its power plant at Kenova, near by. Further expenditure is anticipated when the present improvements are completed. The power plant is being enlarged to meet the unprecedented demand for power service. The increased capacity is being absorbed as rapidly as provided. One new customer this year will furnish $500,000 worth of business per annum. The present power plant is the result of gradual evolution and hence contains assorted equipment. Part of the improvement will be gradually to modernize the station. The present work will constitute a long step in that direction. Substation design and construction are also receiving attention.

An integral part of the Huntington property is the railway and power utility in the nearby city of Ashland, Ky. The two cities are connected by an interurban line belonging to the company and crossing the Big Sandy River. Ashland has many of the characteristics of Huntington, with broad streets and attractive surroundings. It is also an industrial center, having a population about one-fifth that of Huntington.

Lexington Will Have New Cars Also

Lexington, Ky., is a city about two-thirds the size of Huntington. The two cities are comparable as far as size and character of population are concerned, but they present many contrasts in other respects. They have this in common, however, that they are both being re-outfitted with new cars of advanced design.

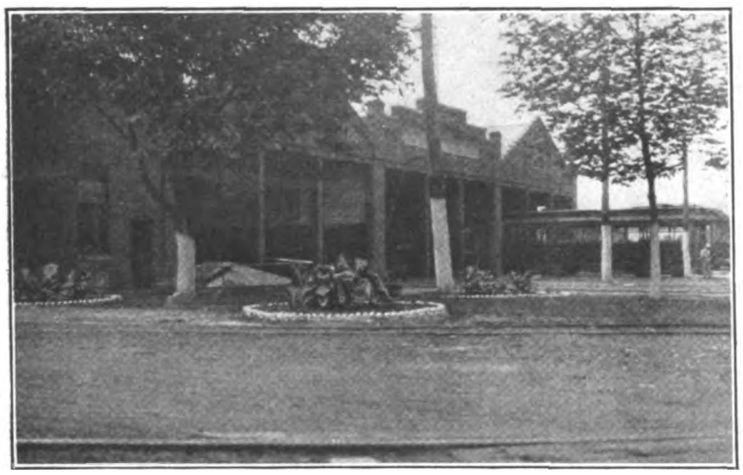
There is practically no manufacturing in Lexington, its prosperity coming from the fact that it is the center of a rich farming country. It is surrounded with small thriving cities between which and Lexington the local railway, operated by the Kentucky Traction & Terminal Company, furnishes admirable interurban service.

The transportation situation in Lexington must be considered in connection with the interurban business. The local traffic is not dense enough to support service with large two-man cars, and some years ago the company remodeled a number of single-truck cars and put them into service under one-man operation. They were recognized as a makeshift, pending the time when modern types of cars could be afforded. This time has now arrived, and, encouraged by its success with more than a year of one-man operation of its light interurban cars, the company is discarding all of the present city cars, replacing them with new safety cars.

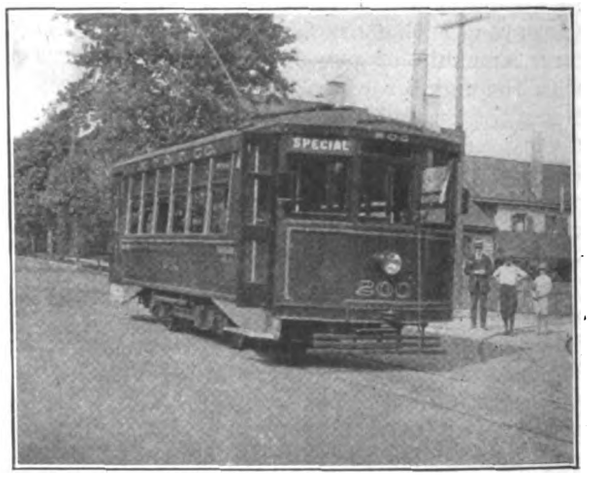
The new cars are being built by the Cincinnati Car Company and equipped with the safety apparatus devised by John Sutherland of Davenport, Iowa. Every practicable feature has been incorporated to render the service attractive. For example, the seats are furnished with plush-covered spring cushions and backs; the seats are spaced so as to give liberal knee room, which is further increased by the recessing of the rear of the seat backs; stanchions are provided at convenient points for the convenience of standing passengers, and the body is trimmed and painted to give a pleasing effect. A unique feature of the car is that it is operated front-entrance, rear-exit. There is no turnstile or other device at the rear to prevent passengers from boarding, but trouble from fraud in this direction is not anticipated. The city has a predominately native population, and experience with over-riding on the interurban lines indicates that little loss is to be expected on the new city cars from dishonesty. The motorman has separate control of the rear door and is provided with outside and inside mirrors so that he can readily supervise the use of the rear door for exit purposes.

The general manager of the company, J. P. Pope, is confident that many of the elements which have made the interurban service such a success will act also in the case of the new city service.

More than a year of service with the lightweight interurban cars has demonstrated that, under such conditions as exist around Lexington at least, a one-man



Flower Beds Are Not Considered Inconsistent with Good Maintenance at the Huntington Shops



A Snapshot of One of the New City Cars Taken Near the Paris Interurban Terminal

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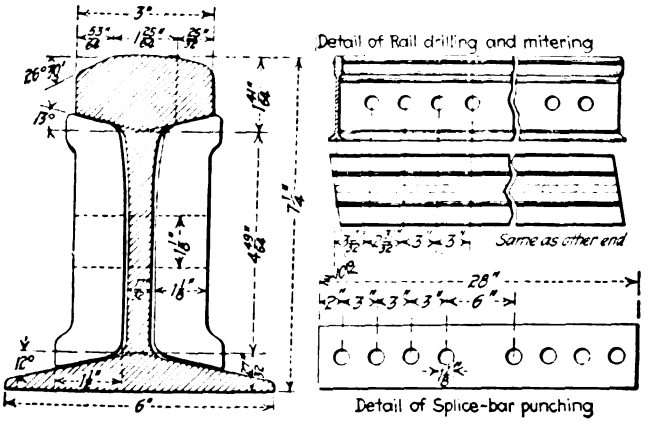
double-truck car is well adapted to reasonably high-speed interurban transportation. Data for the first year's operation show a doubling of the net revenues from the interurban lines and material reduction in practically all elements of operating cost.

The complete elimination of bus competition was a notable victory for the new interurban cars. Hourly service is given, with a schedule speed of between 19 and 20 m.p.h. The car leaving Lexington on the hour reaches Nicholasville, 12 1/16 miles away, forty minutes later, making five stops between. From Lexington to Georgetown, 12 3/16 miles away, the time is forty-five minutes, with six stops between. Paris, 17 5/16 miles from Lexington, is reached in fifty-five minutes, with four intermediate stops. Frankfort, the State capital, 14 1/2 miles away, is reached in forty minutes, with three intermediate stops between. These interurban lines cover the noted blue-grass country and in good weather riding is popular for recreation, while the interurban traffic is good in all seasons.

As in the case of Huntington, the Lexington company does a considerable power business, not so large, however, in proportion to the total. A profitable side line is the manufacture of ice which is distributed as well as made by the company. The company owns and operates Blue Grass Park, located a few miles from the city on one of the interurban lines. While this park attracts considerable patronage it is not a particularly profitable side line for the company.

Mitered Rail Joints in Cleveland

FOR the past year the Cleveland Railway has been using mitered joints for its city tracks, and the connection made is so good that it is very difficult in most places to tell by observation where the joints are in the track. The mitering is on an angle of 10 deg. Besides being mitered, the ends of the rails are undercut 3/32 of an inch. For this extra work of mitering and undercutting on the ends of the rail, the company pays 50 cents extra per ton. A section of the standard rail used is shown in the accompanying drawing. The method of making the joint is as follows:



Standard Cleveland Rail (L. S. 102-516) with Splice Bar Used with a 10-Deg. Mitered Joint

After the rails are butted close together and the splice bars are laid out, a drift pin is set in through the bolt hole in each rail nearest to the joint. These holes are 3 3/32 in. from the end of the rail, as shown in the drawing, while in the splice bar the two holes are only 6 in. apart. This allows a 1/8 in. draw and closes the joint when the drift pins are driven in.

Before the drift pins are driven in place, the splice bars are bolted up, but as the holes in the splice bar are not exactly opposite the holes in the rail, 1-in. bolts are used in the 1 1/8-in. holes. The drift pins are then driven in. If there should then be any space between the ends of the rails, the drift pins are taken out, a shim is inserted, and the drift pins are again driven in place. The next step is to take out the 1-in. bolts one by one and the drift pins and insert 1 1/8-in. rivets. Then the splice bar is seam welded to the rail and the rail to the base plate.

In this process the seam weld is carried all the way across on the top of the splice bar, but in the bottom seam a 3-in. gap is left in the welding around the joints to take up any little give that might occur at that point.

This joint was developed by Charles H. Clark, engineer maintenance of way of the company. The undercutting of the rail and the drift pin method of making the joint have been used for a number of years, but mitering was introduced, as mentioned, in 1922.

Price Changes in German Railway Materials

A TABULATION is made in a recent issue of *Verkehrstechnik* showing the comparative price of various materials used by railways in Germany before the war and the price as of June 29, 1923 for the same articles. The figures make us smile, but for the German it is tragic. Perhaps we can console ourselves by looking at these figures, when we reflect on what a dollar used to buy.

Material	Measure	Price Before the War, Marks	Price June 29, 1923, Marks	Percentage, Increase
Coal briquettes ...	Ton	12.50	966,900	7,735,000
Lump coal..	Ton	12	698,100	5,817,500
Wrought iron	Ton	93.50	5,200,000	5,561,500
Rolled forms.	Ton	107	6,300,000	5,887,800
Electrolytic copper ...	Kilogram	1.34	51,570	3,848,500
Lead	Kilogram	.39	18,750	4,807,700
Zinc	Kilogram	.45	20,750	4,611,100
Tin	Kilogram	3.27	141,500	4,327,200
Machine oil.	Kilogram	.26	13,000	5,000,000
Petroleum ..	Kilogram	.26	6,100	2,346,000

In the meantime street railway fares have increased from one-tenth of a mark to 1,200 marks—an increase of 120,000 per cent. The article mentions also the increased price of foodstuffs. These figures in general show a smaller proportion of increase than the price of electric railway material. It is interesting to note that the price of beer has advanced in the same ratio as the average street railway fares in Germany.

Eliminating Sludge in Turbine Lubrication

FOR some months researches have been under way in the laboratory of the Carnegie Institute of Technology at Pittsburgh to determine the factors causing sludge to form in the lubricating system of turbines and to determine methods for eliminating the sludge. The preliminary experiments showed that all of the sludge compounds examined contained fatty acids, proving that the hydrocarbons of the mineral oils had been oxidized. These fatty acids were usually present in the form of metallic soaps. Examination of the sludges led to the belief that these soaps form the greases which comprise the major portion of most of the sludges.

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Association News & Discussions

Wired Wireless Over Power Lines*

High Frequency Automatic Telephony as Applied to Railway and Central Station Service Has Practical Possibilities in Load Dispatching

BY C. A. BODDIE,
Radio Engineer, Westinghouse Electric & Mfg. Co.

HIGH frequency telephony has now been developed to the point where it can be used successfully for communication over high tension power lines. Companies in the past have had difficulty in maintaining satisfactory communication over their private telephone lines when carried on the same poles as the power line. Telephone lines directly exposed to such high voltage are invariably noisy. The power line affords a dependable medium of communication superior in mechanical strength to any telephone line which can be constructed. This new method has demonstrated its superiority over the wire telephone during storms.

Super-position is the fundamental principle on which high-frequency telephony is based. The equipment used is substantially the same as that used in radio. The superimposed high frequency currents are introduced into the power line by an antenna wire carried on the same pole. Separate antennæ are used for transmitting and receiving, with the former preferably above the latter. By this means high frequency currents are induced in the transmission line.

For this class of work frequencies between 30,000 cycles and 150,000 cycles are the most desirable. The lower frequencies are best suited to long distance communications, while the higher frequencies do well for short distances. The system is duplex, that is, it provides for simultaneous talking and listening, as with the usual wire telephone. In this respect it is superior to radio, as it is impossible to send and receive simultaneously with the latter.

In striking contrast to wire telephone communication with its relatively high efficiency, only an infinitesimal part of the transmitter output of radio apparatus ever reaches the desired receiver. The efficiency of a power line for the transmission of high frequency current is somewhat better than ordinary radio, but still inferior to the wire telephone.

Each station is provided with an automatic telephone desk set, including an automatic call dial, a bell, megaphone and receiver. The operation of calling is accomplished by dialing the desired number on the automatic dial exactly as is done with the ordinary telephone of an automatic wire exchange. The use of a selector which closes only after receiving the proper impulse, makes it possible to call any particular party along the power line to the exclusion of all other parties. By the installation of an extra selector at each station provision may be made for a general call. This is a feature of considerable value to a load dispatcher.

Two wave lengths are ordinarily used, one for transmitting and one for receiving. The dispatcher may transmit at 50,000-cycles and all his stations are tuned to receive at this frequency. The latter are then arranged to transmit at 60,000-cycles, so that the dispatcher by means of his selective calling system can communicate with any station, but the outlying stations cannot communicate with each other. Since they all transit at 60,000-cycles and none are tuned to receive it, this makes it necessary for all stations to clear through the dispatcher, which is the normal and desirable method of operating a dispatching system. If, however, it is desired to permit the outlying stations to communicate between themselves, this can be done by changing the wave length adjustment of the calling station to agree with that assigned normally to the dispatcher.

*Abstract of a Paper Presented Before the Central Electric Railway Association at Cedar Point, Ohio, July 20.

New England Men Take Outing, Enjoy Day at Canobie Lake

NEW ENGLAND street railway men to a number of about 300, took a day off on July 26 to celebrate their annual outing, which was held this year at Canobie Lake Park, the pleasure resort of the Massachusetts Northeastern Street Railway. An extensive and pleasurable program had been drafted by the committee on arrangements, of which R. D. Hood, president of the club and vice-president and general manager of the Massachusetts Northeastern Street Railway, was chairman. The attendance mentioned, 300, is said to be larger than at any previous outing of the club.

People came by automobiles, electric cars and buses. The morning and afternoon were given over to various athletic contests, of which the outstanding event was the annual ball game between the railway men and the supply men. Edward Dana was manager of the railway team and Charles Wood of the supply team, and the costumes worn were weird. The railway men won by a score of four runs to three in a game of four innings. Those who wished to play golf had an opportunity to play at the Merrimac Valley Country Club.

The meeting ended with a chicken and lobster dinner in the dining room.

The committee on arrangements, besides President Hood, who acted as chairman, was David A. Belden, reception; Howard Fritch, attendance; H. B. Potter, transportation; F. E. Webster, lunch and dinner; E. H. Wilkinson, sports and prizes; J. W. Belling, secretary.

Maryland Utilities Organize

Initial Meeting Instigated by Public Service Commission and Delegates Are Guests of the Governor

TO PERFECT the organization of the Maryland Public Utilities Association, representatives of fifty-three utility companies met with the State Public Service Commission, July 26, in the chamber of the House of Delegates, at Annapolis, Md. In that room where so many of the State's laws are made, the officials of the Maryland public utilities, having the hearty co-operation of the men who represent the public in their affairs and regulate rates, wrote a new chapter in the moral laws of the State. And this new law, all the more stringent because of its origin, is the crystallization of sentiment of those who manage Maryland's public utilities today, as embodied in the word —service.

In his address to the members of the association, Governor Albert C. Ritchie, spoke of that "Service." In fact, he suggested that the Association should substitute the name "Service" for "Utilities" in its corporate title so that the Association's very name would bespeak the aims of the officials and employees of the companies composing the Association.

Service, said the Governor, meant the realization by officials of public utilities that they are servants of the public or quasi-public officials. Their duties to the public are as high as, and even more intimate than, the duties of public officials duly elected by the people. People today depend so much in the daily routine of their lives upon the water, gas, electricity and railway companies that the service these corporations render must be of the right kind; it should be constant, honest and courteous. The Governor declared that the meeting was one of the most progressive steps the State had taken in years and he urged upon the representatives

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present that they take the people more and more into their confidence.

Emory L. Coblentz, president of the association and president Potomac Service Company, Frederick, Md., emphasized the value of co-operation with the public and showed the pleasure he felt because of the interest aroused. "Through our organization," he said, "every utility in the State may gather lessons which other organizations have learned through hard experience. The Public Service Commission, which really started the move, will have its work lightened when it works with an organization whose sole aim is service. We can now adjust many of our minor troubles, and, what is more important, we may avoid many of them."

Excoriating the "public-be-damned" policy which unfortunately appeared to be the attitude of a good many public utility companies until recently, Charles M. Cohn, vice-president of the Consolidated Gas, Electric Light and Power Company, Baltimore, spoke of the rapid progress that could be made through co-operation. "The public-be-damned spirit of our forefathers is antique and not wise in our day," Mr. Cohn said. "I have seen this tried. Our lines of business will never run with any smoothness until we have learned a lesson in common courtesy and have forced our employees to follow our example. We cannot successfully disregard our customers' feelings any more than a merchant in a highly competitive business can."

Among other speakers were: C. D. Emmons, president United Railways & Electric Company, Baltimore, and president American Electric Railway Association; Labert St. Clair, director advertising section, American Electric Railway Association, and George W. Oxley, National Electric Light Association, and representatives of the gas, telephone and electric light companies.

The matter of dues was settled upon to run from $10 to $700 a year per company, in proportion to gross earnings ranging from less than $10,000 to more than $5,000,000.

Permanent headquarters for the organization were chosen at the Engineers' Club, Baltimore. Governor Ritchie entertained the entire delegation at a luncheon held in the Executive Mansion.

Three-wire Distribution for Electric Railways

IN A paper presented before the Winnipeg branch of the Engineering Institute of Canada Feb. 15, 1923, W. Nelson Smith, consulting electrical engineer Winnipeg Electric Railway, discussed the three-wire system of distribution. This has been applied for the mitigation of electrolysis on electric railways where the installation of the other recognized methods of mitigation, such as increase in the frequency of substations and the negative drainage system, is prohibitive on account of the cost.

In the paper the writer reviews the theoretical study made by E. R. Shepard of the United States Bureau of Standards. The method of sectionalizing the trolley is favored to limit the flow of current in the neutral. In Winnipeg, which has very light track rails, weighing in many cases only 60 to 70 lb. per yard, the sections are between 800 ft. and 2,700 ft. in the central portion of the city. Automatic reverse-current switches are installed in the neutral so that when the drainage current reverses so as to draw stray current from the underground structures the circuit is opened. By this means the drainage of underground pipe systems has been entirely avoided in the Winnipeg installation.

The paper has been printed in full in the *Engineering Journal* for May and in the *Sibley Journal of Engineering* for May and June.

American Association News

Engineering Association Nominations

THE committee on nominations of the Engineering Association, consisting of F. R. Phillips, chairman, C. A. Greenidge, C. S. Kimball, F. H. Miller and S. Withington, has submitted the following names for the offices to be filled:

For president, H. A. Johnson, assistant to general manager Metropolitan West Side Elevated Railway, Chicago.

For first vice-president, C. H. Clark, engineer maintenance of way, Cleveland Railway.

For second vice-president, R. C. Cram, engineer surface roadway, Brooklyn-Manhattan Transit Corporation.

For third vice-president, C. R. Harte, construction engineer The Connecticut Company.

For secretary, J. W. Welsh, executive secretary American Electric Railway Association.

Members for executive committee: Daniel Durie, general superintendent West Penn Railways, Connellsville, Pa.; R. H. Dalgleish, chief engineer Capital Traction Company, Washington, D. C.; E. H. Scofield, engineer power and equipment, Twin City Rapid Transit Company, Minneapolis, Minn., M. B. Rosevear, superintendent of distribution, Public Service Railway, Newark, N. J.

Insurance Committee

THE Insurance Committee of the American Electric Railway Association met in Cleveland on July 12. The report which is to be presented at the convention in October was completed and sent to the executive committee for approval. Those present at the meeting were John T. Staub, chairman; Granville H. Bourne, N. H. Daniels and John H. Moran.

Special Taxes

THE committee on special taxes of the American Association was held in New York City on July 31. Those present were W. H. Maltbie, chairman; A. G. Neal and F. W. Doolittle, representing Edwin Gruhl. The tentative report of the committee was read and discussed. A questionnaire had been sent out to get information covering the various kinds of taxation levied, and to some extent the total amount of such taxes in the United States, to show the burden carried by the industry. The report contains a discussion of the federal income and excess profit taxes, the conflict between state and Federal regulations on depreciation in connection with taxation, problems of state and local taxation, and special imposts for particular purposes such as paving, etc.

Standard Classification of Accounts

THE Accountants' Association committee on standard classification of accounts met in New York on July 17. Members present were R. N. Wallis, chairman; M. W. Glover, H. L. Wilson and M. R. Boylan for P. S. Young.

Mr. Glover had previously prepared and presented for the consideration of the committee a standard classification of accounts for motor vehicle operation, which was based to some extent on the accounting systems used by motor bus companies, while it also followed the general trend of electric railway classification of accounts. The committee discussed this proposed classification of accounts and proposed a number of revisions. It was felt that it would be desirable, so far as possible, to adhere to the arrangement of items in the electric railway accounts, modifying such items as necessary to apply to vehicle operation. Mr. Boylan agreed to revise the proposed classification in line with the discussion, and to submit it to committee members for further comment and criticism.

Cost of Highways

THE committee of the American Association on cost of construction and maintenance of highways, W. J. Harvie, chairman, held a meeting at association headquarters on July 25. A tentative report was drafted for presentation at the October convention. Data has been collected by the committee covering the costs of highways in various states through the co-operation of member companies, although on account of the incomplete methods of keeping records in some states the list does not cover some of the states. What information is available will be included in the report.

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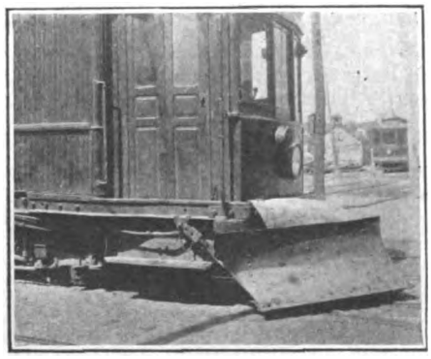
Maintenance of Equipment

Fan Ventilator in Hartford

THE machine shop in the repair shops of the Connecticut Company at Hartford was installed some years ago when belting and shafting were used to a much greater extent than at present. A number of the machines are motor driven, but the fact that there is an overhead shaft has enabled the company to put in a simple overhead fan for keeping the air moving. It consists of a kind of paddle wheel, made up of wooden hub with two arms, each about 2½ ft. long, with a wide paddle on the end of arm. These keep the air moving, and as the hub is split and bolted to the shaft, the fan can be removed in winter.

Demountable Nose for Emergency Car

DURING stormy weather when an emergency car is needed, it is very important that the car reach its destination promptly. In order to provide for clearing its own track and also to serve in snow removal as needed, the Easton division of the Lehigh Valley Transit Company has designed a snow nose for its emergency car, which can be attached and detached in three minutes.



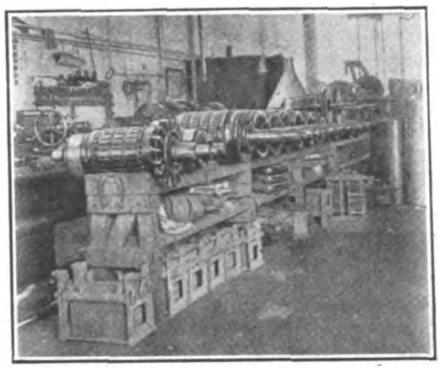
Nose on Emergency Car

The nose is made of sheet steel and shaped so as to throw the snow clear of the running rail. An angle-iron framework gives strength and has provision for support. The nose is held in position by threaded rods with turnbuckles. There are three of these, one in the center and one at each end. The front end of the emergency car has been strengthened with a T-rail, and the turnbuckles with their rods are fastened to this, forming a strong support. In order to prevent snow from getting in over the top of the nose a sheet iron protection is provided.

Storing Repaired Armatures on a Level Bench

AFTER careful study of all methods of storing repaired armatures, the Virginia Railway & Power Company has concluded that horizontal storage is the most convenient in its shop at Norfolk.

As shown in the illustration below, a long, stout bench is provided in the commodious armature section of the shop. This is of a height to bring the shaft of the motor to about 3 ft. above the floor, a height which facilitates the fitting of bearings to the journals. In fact, one of the chief advantages of this method of storage is that bearings may be fitted to any journals of armatures on the bench, without disturbing others. The arrangement also makes it easy to pick up any armature by means of the gib cranes and trolley-bar hoists, with which the shop is liberally equipped.



The Men in the Electric Railway Shop at Norfolk Prefer to Store Their Armatures on a Bench About 3 Ft. Above the Floor

While the bench described above is primarily for armatures, the space below the table is by no means wasted. Shelves fitted between the legs at proper height are convenient for storing field coils, resistors, etc.

The horseshoe nailed to the near end of the bench is symbolic of the atmosphere of this cheerful shop.

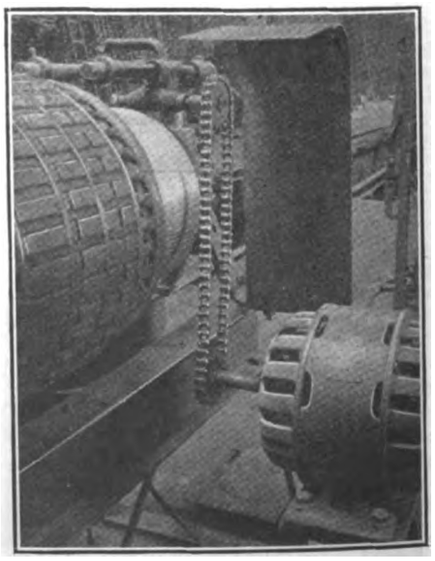
Commutator Slotter with Chain Drive

A MACHINE for undercutting commutators of electric railway motors which is giving good results in the shops of the Terre Haute Traction & Light Company is driven by an electric motor through a bicycle chain.

In this device a 1¼-in. saw is mounted on one end of an arbor which carries on the other end a pinion with the same number of teeth as that on the motor shaft. The arbor is carried in a long bearing which forms part of a carriage sliding on two round rods. These rods are in turn supported from a substantial pedestal bolted to two I-beams which form from the bed of the machine. A handle is cast together with the carriage for the convenience of the operator. Stop collars on the rods limit the stroke of the saw. A sheet-iron housing is placed over the chain on the side toward the operator.

Provision is made for adjustment of the saw arbor to accommodate commutators of different diameters, by an adjusting screw which is mounted under the motor table. This permits it to be raised and lowered. One chain therefore serves for all commutator diameters.

The saw is run in such a direction



A Commutator Slotter Which Is Giving Good Results in Terre Haute

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that the chips are lifted out of the slot, that is, the advance side of the saw travels upward. This minimizes the danger of leaving chips in the slot.

Reel for Transfer Table

For an inside flush transfer table, serving only a few tracks, a more convenient source of current supply than an overhead wire is desirable in many cases. When power is taken from above, the longitudinal wires in the carhouse have to be cut to provide for the transfer table wire at right angles to them, or else there must be a right-angle frog in each wire. Again the trolley pole has to be turned every time that the direction of the transfer table is reversed.

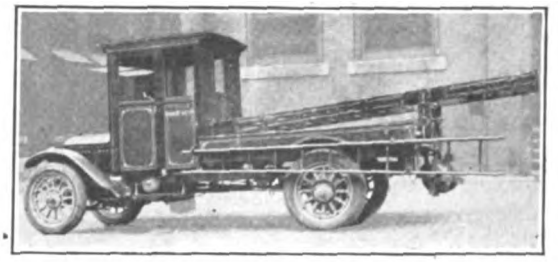
All these objections are overcome by a method used in the Grand Avenue carhouse of the Connecticut Company in New Haven. Here the cable supplying power to the transfer table motor is coiled on a reel close to the ceiling at one end of the transfer table run, and the cable between this reel and the transfer table is kept taut by means of a weight operating over a reel on the same shaft as the cable reel but smaller in diameter.

The other end of the cable is attached to a post on the transfer table, the post being about 7 ft. high, so as to clear the head of any operator working the table. The runway is about 40 ft., so that only about this amount of cable is required for operating the table.

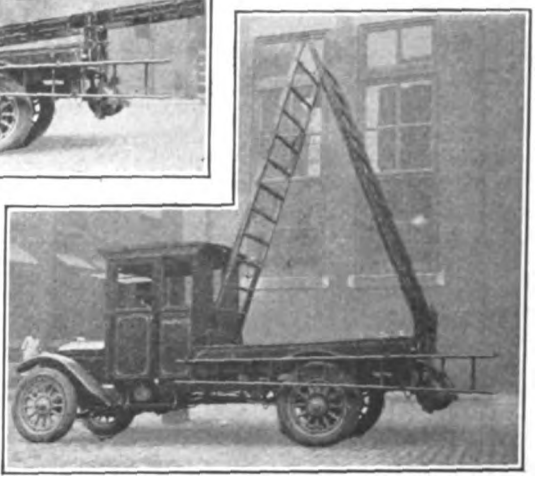
The device has been in use for many years at the Grand Avenue carhouse, and has proved very satisfactory.

A Quick-Action Ladder Truck

ALWAYS standing near the operating headquarters of the Nashville Railway & Light Company, when not out on the line, is an emergency ladder truck, which combines effectiveness and simplicity. The truck comprises a light wagon body with an inclosed cab for the driver. On the body is a pair of 12-ft. ladders, so mounted that they can be folded together and laid lengthwise over the body without taking up any of the useful space therein.



This Ladder Truck Is a Time Saver in Nashville. When Folded the Ladders Occupy Practically No Useful Space on the Truck



The Ladders Are Hinged at the Top and One at the Bottom Front End

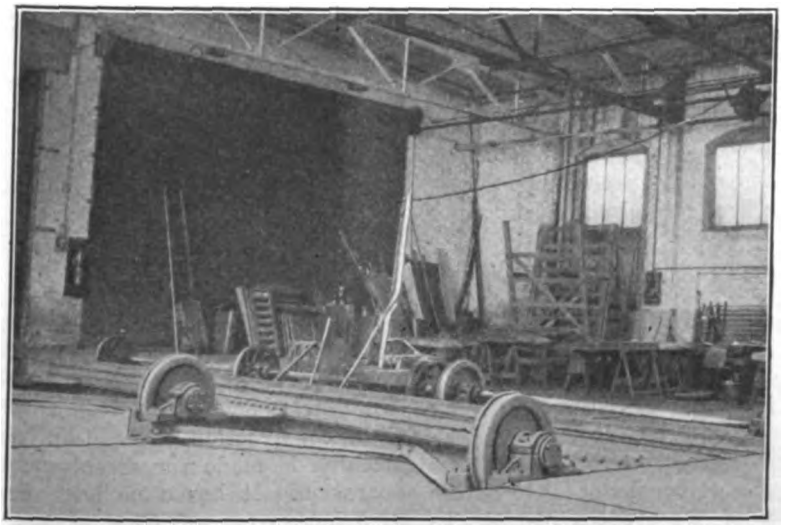
Referring to the illustration at the right, which shows the truck, it will be noted that the ladders are hinged together at the top and the lower end of one is hinged at the front of the body and about 6 in. above the side boards. The lower end of the other ladder is hooked onto a crossbar supported by steel straps at the rear of the side boards.

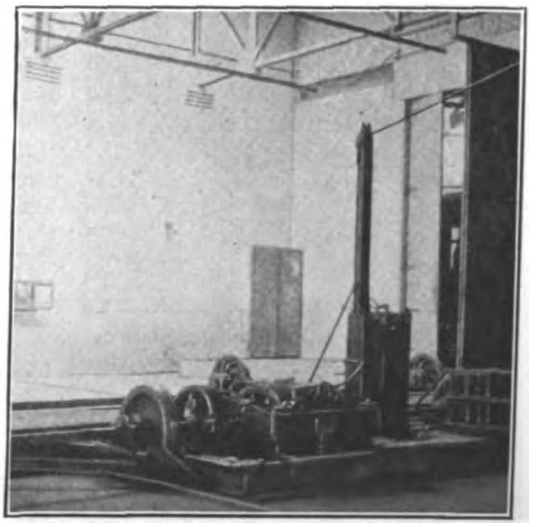
To fold and lower the ladders, all that is necessary is to unhook the bottom of the rear section and shove it forward. The folded pair then rests on the same crossbar which serves to support the rear one when the ladders are raised. The operation of raising or lowering occupies but a few seconds.

As a supplement to the inverted-V ladder, a light auxiliary ladder is carried on hooks on the side of the body.

Ratchet Socket Wrenches Facilitate Repair Work

THE West Penn Railways, Connellsville, Pa., has found that socket wrenches of the ordinary type are quite difficult to handle in restricted places. To overcome this, Daniel Durie, general superintendent, has designed a ratchet socket wrench which is being made standard for the company. This consists of a standard ratchet wrench, to which is attached by a through bolt a socket wrench of the ordinary type. Wrenches of this type have been provided for various sized nuts and of





Power for This Transfer Table Is Supplied By a Cable Coiled on a Reel

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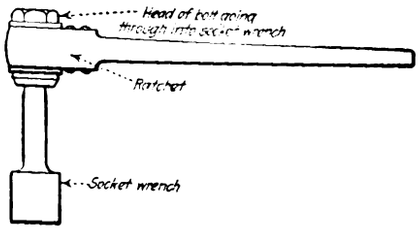
various lengths covering all of the different work done in the shop. The wrenches are kept on a wall board so that the workmen have little difficulty in selecting the correct wrench for any particular job.

The great advantage of the ratchet

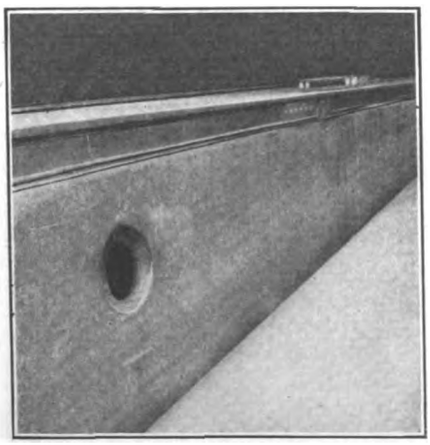


A Socket Wrench Is Combined with a Standard Ratchet used for Drilling

wrench is that a very small movement of the handle will enable the ratchet to move forward one notch so that the bolts can be tightened or loosened in places where it would be entirely impossible to work with the ordinary hexagonal or square socket wrench.

Warm Air Is Useful in the Pit

AN INGENIOUS method of heating the overhauling shop is that used by the Consolidated Electric Light, Heat & Power Company (Ohio Valley Electric Railway) in Huntington, W. Va. Warm air is delivered by a ventilating fan through 15-in. tile ducts laid in the spaces between the pits in the shop; branching from the large ducts are 12-in. tile ducts which open into the pits about 25 ft. apart. Warm air thus delivered is well distributed through the shop, and if a car comes in wet



In Huntington Railway Rolling Stock Is Heated with Air Forced Out Through 12-In. Outlets in the Pit Walls

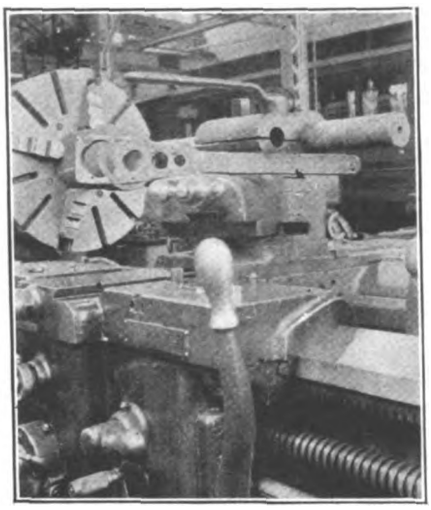
or covered with snow and ice, it will be quickly dried out if it is stopped over one of the duct outlets.

A feature of the heating and ventilating system in this shop is the reuse of the air from the shop rather than the drawing in of fresh air from outside. This economy is said to save an appreciable amount of coal each year.

A Substantial Carrier for the Boring Bar

IN THE machine shop of the Knoxville Power & Light Company, a number of ingenious devices have been adapted to the excellent machine tools with which this shop is equipped. These devices are due to collaboration between J. M. Kingston, master mechanic, and W. C. Duggan, foreman of the machine shop.

Among these devices is a boring-



Four Sizes of Boring Bars Can Be Used with This Clamping Device

bar holder which fits into the lathe carriage in place of the tool post. It consists of three principal parts, a plate grooved out at the two upper corners to fit into the groove in the carriage, and two clamping blocks bored to accommodate the largest two boring bars to be used. When a boring bar is placed between the clamps, it is held securely in position and the clamp is drawn down tight on the carriage by means of two bolts passing through the clamp and into the grooved plate first mentioned.

The bars used in connection with this holder are threaded on one end and nuts slotted to hold the tools are tightened against the end of the bars by means of a special wrench, which is visible in the picture lying in front of the clamps. This wrench is bored to fit all of the boring bars used and a diagonal slot is cut across the face of the wrench through the center of each circle. When this wrench is slipped over the nuts, the cutters are engaged with the groove so that the nut can be tightened, clamping the cutters firmly in position.

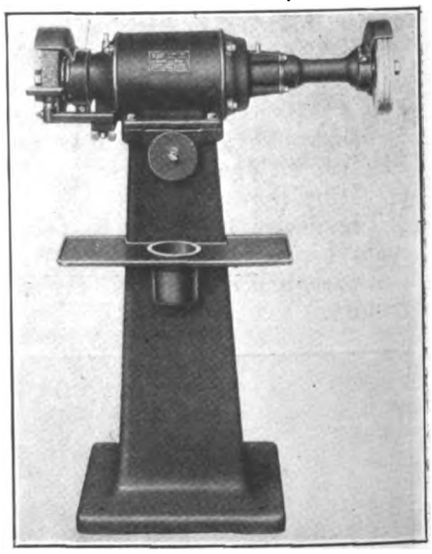
As the holes in the wrench indicate, four sizes of bars are used with this device. Because the boring bar holder is arranged to clamp but two different sizes, when the smaller two bars are used the holes in the clamp are bushed.

These boring bars are used for boring gears, pinions, bearings or anything else that can be bored out in the chuck of a lathe.

New Equipment Available

Combination Grinder and Buffer

A NEW design of machine for grinding and buffing is being marketed by the Hisey-Wolf Co., of Cincinnati, Ohio. This machine is particularly useful for a large variety of work requiring the use of a grinding wheel, buffing wheel, wire brush wheel or rotary wire rasp



New Design Machine for Grinding and Buffing

wheel. The spindle extension is a separate unit and is connected to the motor armature shaft by a clutch. The shaft unit is supported by two ball bearings which provide a very rigid construction. The 1-hp. size machine is made for direct-current operation. It has a no load speed of 3,200 r.p.m. and uses an 8-in. x ½-in. grinding or buffing wheel.

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The News of the Industry

Transit Funds to Be Merged

Proposal to Be Voted Upon in Philadelphia Sept. 18—Arch Street Loop Contract Let

The City Council of Philadelphia on July 27 passed the referendum ordinance which provides for the submission to the people at the primaries on Sept. 18 the question whether the funds hitherto authorized by the people for various transit programs should be merged in the project designated as "Step 1." Although the vote was sixteen to one Richard Weglein, president of the Council, said that he had hoped the vote would be unanimous, that the Council had now taken all measures possible to give relief to the car riders who had been complaining for a long time. Further he hoped that the engineers would get together in the near future to make an early start on the great work as soon as the people had expressed their will in the matter.

All Funds Consolidated

The ordinance which the Council approved will combine all the available separate funds heretofore authorized for transit purposes into one for the construction of "Step 1" of the high-speed transit program. That step includes the construction of the Broad Street subway, the delivery loop down Ridge Avenue and around Eighth Street, and then out Walnut and Chestnut Streets to Forty-second Street and Woodland Avenue where it would become an elevated structure to Darby. These funds total about $42,000,000.

In presenting the bill President Weglein briefly told about the creation of the commission and its subsequent activities for the adoption of the so-called "Step 1" of the transit program. He emphasized the fact that the ordinance had nothing to do with the suggested Chestnut Street surface-subway project.

Included in the referendum is the $7,500,000 previously authorized for a Parkway subway—Twenty-ninth Street-Roxborough elevated line. He said that this $7,500,000 was again incorporated in the referendum for the Northwest lines with a change which will enable a subway to be built in whole or in part where an elevated was at present authorized. This suggestion was made by him because he believed that while elevated roads were cheaper in their initial cost, their upkeep was more expensive and their life more limited than a subway. Further, the plans for the line in Forty-second Street were changed from an elevated to a subway in recognition of the fact that property owners protested that elevated roads depreciated strictly residential neighborhoods without corresponding compensation.

The Council will meet on Aug. 7 to receive Mayor Moore's decision on the referendum ordinance. It is anticipated that he will veto the measure.

While the Council was acting on the comprehensive transit program, Mayor Moore awarded a contract for the building of the Arch Street loop for $1,199,555 to the Keystone State Construction Company. The loop is not a part of "Step 1" of the transit plans as approved by the Councilmanic Transit Commission.

Scarcely had Mayor Moore finished signing the contract for the construction of the proposed Arch Street subway when a taxpayer's suit was filed blocking all work on the project until Aug. 6. The suit is based upon the allegation that the Keystone State Construction Company, which received the contract, was not the low bidder and that the firm making the lowest figure had been ignored.

Chicago Elevated Pay Increased Three Cents

Employees of the Chicago Elevated Railroads will receive an increase in wages of 3 cents an hour for the year ending June 30, 1924, and an additional 2 cents an hour increase for the twelve months period after that date.

This wage award was made by the arbitration board, which settled the wage dispute between the employees and the railroad. The rate of pay increase is the same as fixed recently for employees of the Chicago Surface Lines.

The new 1923 scale in cents per hour for trainmen on the Elevated was fixed as follows: Motormen, 75 cents; conductors, 70 cents; guards, 68 cents; extra guards, 67 cents.

This award is retroactive and the back pay, due from June 1, 1922, will be paid on the pay day for the second half of August. The new rate will be paid on the pay day for the first half of August.

On the basis of 250 hours per month, average put in by trainmen (extra guards excepted) the men will have $7.50 extra in their envelopes for the second half of August, a similar addition each month for the coming year and an additional $5 a month beginning June 1, 1924.

The men asked for an increase of 10 cents an hour, which would have put their pay back at the figure they attained in 1920 and which was reduced a year ago.

$84,000,000 Program

28 Miles of Long Island Railroad to Be Electrified as First Step in Vast Improvements

The Long Island Railroad will extend its electric zone from Jamaica to Babylon on the Montauk Division by July, 1924. This means about 28 miles of double-track electrification. This statement was recently made by George Le Boutillier, vice-president of the Long Island Railroad, at a "get together" meeting of the Long Island Press Association, the Long Island Association and the Long Island Railroad at Patchogue. He said that the company had mapped out a ten-year improvement program which called for the expenditure of upward of $84,000,000. This is more than the railroad's present total investment in road and equipment. He believes that the money will be forthcoming as he claims the railroad is earning a profit and its credit has been restored.

Mr. Le Boutillier reviewed the history of the Long Island Railroad from the time when Ralph Peters took charge of this "summer excursion line" to the present day, when it has become one of the "greatest passenger-carrying trunk line railroads in the United States, if not in the world." The population of the territory served has accordingly increased until today it is greater than the combined population of eight states.

He said that the railroad enjoyed the distinction of being the first suburban railroad to electrify and is still the most extensive installation for multiple-unit electric operation in the United States. Electric train service was first started in 1905 between the Flatbush Avenue terminal, Brooklyn, and Rockaway Park. Since that date electrification has been extended until now there are 227.2 miles of electrified track in operation on the Long Island system.

How both traffic and freight have increased is shown by the fact that in 1901 the Long Island carried 14,520 218 passengers and in 1922 79,656,891 passengers, while freight to the amount of 1,642,937 tons was hauled in 1901 compared with 6,027,860 tons in 1922. In 1903 the company had 5,400 employees, who received $3,065,000 in wages, and in 1922 the employees numbered 8,585, who were paid $14,702,000. The gross earnings in 1901 were $4,862,347, compared with $30,951,540 in 1922. Although the net income from operation in 1922 was more than $2,000,000, improvements already under way call for the expenditure of nearly $7,000,000 in 1923.

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"Say It with Shovels"

Petitions Aplenty But Subways Scarce in New York—Merchants Act —Mayor Counters

The Merchants' Association of New York is backing the Citizens' Committee of One Thousand, which has recently been formed to try to secure transit relief in the city. The committee has already begun its work of securing signatures to a petition to be presented to the Board of Estimate, urging the immediate construction of new subways. The chairman of the committee is Frank D. Waterman, president of the Waterman Pen Company. The slogan of the committee is "Say It With Shovels."

Crowding Intolerable

Mr. Waterman issued a statement calling upon every subway rider to voice his approval to the plan for the immediate digging for new subway lines. He said that a lot of debating had been going on for about ten years on the subject of construction, but that a new subway had not been authorized since 1913. Further, that no other town or city in the country would put up with the crowding that New Yorkers are forced to face twice a day in the subways.

The petition is addressed to the members of the Board of Estimate and asks them to take steps at once for the construction of the proposed new Brooklyn crosstown subway and Washington Heights subway in Manhattan. The petition refers to the agreement existing between the Transit Commission and the Board of Estimate on the construction of the two lines above mentioned, but states that differences of opinion have caused the board to withhold approval. The question of the municipal operation of the subways can be decided while the two lines are being built, according to the petition.

The Committee of One Thousand has pointed out that the population of the city is increasing at the rate of 160,000 a year; that no trunk line subways have been built in ten years, and that it will take five years to build a new trunk line subway. In the meantime, the congestion will grow worse.

Mayor Attacks Movement

Mayor Hylan attacked the movement of the Committee of One Thousand and stated that he refused to be driven by Mr. Pierson through the instrumentality of a specious petition, or otherwise, to accede to the demands of the traction interests. He said that no more franchises, and particularly the $50,000,000 bus franchises, are going to be wrested from the people of this city, so long as he had the official power "to prevent such a robbery."

A counter-offensive was started by the Mayor directing the circulation of petitions appealing to the Governor and the Legislature for legislation to empower the city to establish the Mayor's proposed $25,000,000 bus system, to remove the Transit Commission and to provide for referendums on the questions of the city ending its transit partnerships with private corporations and the city's turning over bus franchises to transit corporations.

Burden of Paving Cost Lifted from Municipal Railway

The recommendation of the utilities committee of the City Council that the Seattle Municipal Railway be relieved of the burden of paying for paving between tracks has been concurred in by the City Council finance committee, and the burden will be transferred to the general fund, to come out of taxes or be assessed against abutting property, depending upon the circumstances in each case. E. L. Blaine, chairman of the finance committee, presented the only opposition to the plan, declaring that the "general fund has all it can do now." Councilmen indicated that the future policy probably will be to assess abutting property in the downtown streets for the strips of pavement between the tracks, and to contribute from the general fund in the residence district.

Council Rejects Plan Claiming Monopoly for Railway

The City Council at Toledo has practically rejected both the plan of Engineer E. O. Mills, working for Harland Bartholomew, city plan expert, and the modified plan proposed by the board of control of the street railways for rerouting, extensions and added bus lines and feeders to provide crosstown and additional service. The Council, sitting as a committee of the whole, voted nine to eight to reject the proposed plans largely because it would give the Community Traction Company, if carried out, a monopoly of all transportation in the city.

A substitute provision adopted at the meeting favored city-owned bus lines to compete with and operate independently of the traction lines.

It is believed, however, that when the Council meets again a compromise or substitute ordinance will be adopted. Aug. 1 was the limit for such request under the ordinance and two and one-half years are allowed to carry out the plan.

Municipal System Construction Up to Voters

Rapid transit for the city of Detroit appears a step nearer realization with the request by the acting Mayor that the Corporation Counsel draft two amendments to the city charter to permit the construction of a municipal rapid transit system. The amendments, one to permit the city to build its own rapid transit system, and the other, to conform with the new state bonding law for municipalities, are to be submitted to the voters at the primary election on Oct. 9. It is anticipated that the report of the rapid transit commission will be ready for submission to the voters before the October election.

Chicago Survey Suggested

Regional Plan Committee Wants Plan Developed for Co-ordinating Facilities for City of 6,000,000

Recommendations have been submitted by the Chicago Regional Plan Committee on (a) the extent of territory to be included in the metropolitan district of Chicago; (b) the features that should be studied in drawing up such a plan; (c) the best method for undertaking and financing such a plan.

The committee in its report states that the population of the city has increased 23.6 per cent during the last decade, while that within 10 miles outside the city limits has increased 76.3 per cent; and that all indications point to a more rapid growth during the next ten or twenty-five years. It seemed clear that the territory to be studied and planned should be that within a radius of at least 50 miles from the center of Chicago. The utilities are preparing for rapid increases of population, the telephone company estimating a population in the city of 4,000,000 by 1940, which means at least 6,000,000 within the metropolitan district by 1950.

All about the larger city are evidences of undirected and uncontrolled growth. There are not proper zoning and housing regulations. There is no comprehensive plan for extending transit facilities to the outlying cities and villages, and the lack of a co-ordinated and radiating highway system is known to all.

Physical Survey Planned

It is recommended by the committee that (a) a physical survey be made of the highways, waterways, steam and street railways, etc.; population, lands available for future development, and a study of the needs for public services; (b) an industrial survey analyzing factories and the influences affecting their distribution, and problems of rail and water facilities as terminals; (c) a health and housing survey covering problems of sanitation, zoning, and housing conditions; (d) an educational and recreational survey; (e) a survey of the various governmental organizations in the metropolitan area and of existing and needed legislation in so far as they affect the regional plan and its adoption.

After a discussion of various methods of financing and carrying on this work, the committee recommends the organization of "The Chicago Regional Planning Association," composed of voluntary individual members paying suitable dues. This association would draw to it more and more financial support and also the support of public opinion.

The Chicago Regional Plan Committee was appointed at a conference called by the City Club to consider the advisability of preparing a regional plan for the entire metropolitan district of Chicago. The chairman of the committee is Dwight H. Perkins.

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More Wage Conferences

Detroit Railway Commission Opposed to Closed Shop—Men Deny Such Demand Has Been Made

Another conference has been arranged at Detroit in an effort to reach a working agreement between the City Street Railway Department and the platform employees of the Municipal Railway. The meeting will be attended by Frank D. Eaman, arbitrator for the Street Railway Commission; Judge Edward J. Jeffries, arbitrator for the railway employees; Ross Schram, assistant general manager of the Municipal Railway; Mayor Doremus and members of the Street Railway Commission.

Previous to this latest announcement it had been stated by G. Ogden Ellis, president of the Detroit Street Railway Commission, that the department had withdrawn from arbitration proceedings because union officers had made certain demands that the city could not entertain. On the other hand William B. Fitzgerald, first international vice-president of the Amalgamated Association, denied that recognition of the union and a closed shop had been demanded.

According to a statement by the Mayor, the city will not consider any agreement calling for the recognition of the union or the closed shop. The union has asked that a third arbitrator be appointed. Union officers were empowered to take a strike vote, it was announced, in event the third arbitrator was not appointed by Aug. 4.

The break in the arbitration proceedings came after the details of the pay agreement had practically been arranged. In the memorandum summing up the demands, the men included what the commission's representative considered a rigid organized labor contract calling for a closed shop. The Street Railway Commission has no power to recognize the union or institute the closed shop because of charter limitations. Moreover, city officials believe such a course to be against public policy.

A report by the commission, after a meeting between Judge Jeffries for the men and Mr. Eaman for the commission, stated that the men would not consent to the imposition of any conditions not incorporated in a contract with the union. The closed shop was not conceded as a matter for arbitration by the commission, that matter having been brought up last September when the former wage parley was held. Mr. Ellis said that the people of Detroit have voted many times not to grant any franchises and that the union really was asking a franchise in the street railway department, in which any citizen has a right to seek a job without joining any particular organization.

In denying the claim that recognition of the union and recognition of the closed shop were at issue in the controversy, the union's vice-president stated that the union officials are only interested in an increased scale of wages and in shortening working hours. Mr. Fitzgerald further stated that the negotiations as to wages and working conditions have been dragging along since March, when the men asked for an increase in wages of 20 per cent and a minimum working day. One source of objection now on the part of the men is that too many of them are now called upon to work intermittently through fifteen or sixteen hours.

Local No. 17 of the International Brotherhood of Electrical Workers, consisting of linemen and trouble men, has also asked for an increase in wages. The personnel of this department includes about forty men.

New Jersey Men on Strike

All Railway Lines Shut Down—Resumption of Service Unlikely for Some Time—Augmented Jitney Service Handling Traffic Expeditiously in Most Places

MORE than 2,500,000 people in the territory served by the lines of the Public Service Railway in New Jersey are depending for their local transportation on the jitneys and private automobiles. The trainmen in the employ of the company went out on strike on the morning of Aug. 1. Thomas N. McCarter, president of the railway, made a last-minute offer of an additional 5 per cent increase in pay to the men, but they rejected the proposal. This offer from the company was declared to be fully as much as the probable net receipts of the company under the most favorable estimates. The men had asked a 30 per cent increase. Through their representatives the men said they would come down to 60 cents an hour. This would have amounted to a 20 per cent increase. The men said they did not question the accuracy of the company's figures as to its receipts, but announced that they felt the financial condition of the company should not determine the question of wages.

No Agreement to Arbitrate Wages

On the Public Service Railway new men start at 46 cents, at the end of nine months they receive 48 cents, and at the end of the year 50 cents, but men on one-man cars, in addition to these rates, receive 5 cents extra an hour. The routine reports of the company to the Public Service Commission show that the average wage earned by all men of the system has been between $22 and $22.50 per week. The platform men earn considerably more than this as they get 75 cents an hour for overtime, and the average wage of the platform men has been $5.21 a day.

There was nothing in the agreement with the men as to arbitration except as to matters not specifically mentioned in the agreement. Thus working conditions not mentioned in the agreement were to be settled by arbitration. Wages were specifically mentioned in the agreement so were not to be settled by arbitration.

Mr. McCarter's attitude on the question of wages was that if the matter were to go to arbitration a member of the Public Utility Commission should sit on the board. He took the stand that if an increase in wages was granted to the men beyond the probable power of the company to pay it, means should be provided for the company to secure additional revenue either from an increase in fare or through stricter regulation of jitney operation. An arbitration board composed entirely of members whose responsibility would have ended with their decision of the wage matter would, of course, not have been in a position to do more than suggest relief to the company.

As for the company itself Mr. McCarter has previously pointed out its serious financial condition. He has officially announced that it will not use strike breakers. The cars have all been run into the carhouses. Where cars are stored in the open the company has removed the fare boxes and the control handles. Since the strike was called the company has been laying off some employees among the clerical forces, supervisory forces, traffic department and the inspection department. The services of these men are, of course, no longer needed. Several hundred employees will probably be included in this action. Apparently, the company is determined to see the matter through.

There is no need here to review the steps in the negotiations leading up to the final offer of the company to the men. The record of the recent moves has all been set down before. As matters stand now indications point to a prolonged suspension of service. On the other hand, however, there is the possibility of the governing authorities finding a way to provide means of additional revenue for the company, or of the men being prevailed upon from sources outside the company to return to work under a compromise promising relief to the company in the future. One such suggestion advanced is that the men go back at the old rates and that the company resume operation of all its principal lines, allowing the palpably unprofitable ones to remain idle. There is also talk of a possible receivership. This, however, comes from sources outside of company circles.

The situation in New Jersey with respect to handling the public in the present emergency is quite different from that which has prevailed in connection with most other strikes. In the ordinary strike an entirely new service has had to be improvised over night, but in the New Jersey case a transportation system by bus exists which in the ten principal cities in which the company operates carried 141,326,123 passengers in 1922 as compared with 325,265,180 pay passengers handled by the railway in the same year. The bus system of New Jersey, according to the

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latest state survey available for reference, include 174 routes for a total length of 1,300 miles over which there were 1,722 motor vehicles in service. With this as a nucleus the service has been expanded to bounds the extent of which can only be guessed. It is an open field now in Jersey for the auto operator because the Public Utility Commission, recognizing the present emergency, on Aug. 1 removed all restrictions pending the continuance of the strike. It is a hazard at best to attempt to say to what extent the regular jitney or bus service has been augmented, but it is estimated that at least 100 buses have been added to the 414 previously licensed in Newark. Mayor Hylan of New York, a good union man, has permitted thirty or more buses to be withdrawn from service in New York City presumably "to help break the strike for the men." In Camden there are 140 buses normally, but a count on Wednesday evening showed there were about 180 vehicles in service.

Quality of Transportation Poor

During the non-rush hours in Newark the buses have been carrying about 50 per cent of the entire business, but have been operating on the heavy traffic lines, and avoiding the lines less well patronized. They carry very much less than 50 per cent of the total in rush hours. The fare by bus in Newark is 5 cents within the city and 10 cents to the Oranges. During the non-rush hours the buses make about the same speed as the trolley cars. During rush hours they make slightly better speed. The fare on the railway is 8 cents cash with four tokens for 30 cents and 1 cent for a transfer. This rate is being charged under an order from the court on appeal from a finding of the State Utility Commission fixing the rate as of Aug. 4, 1921, at 7 cents cash with 2 cents for a transfer. The contention of the company has been for the right to a return on a valuation of $200,898,906 as opposed to a value of $125,000,000 fixed by engineers for the state under a special act of the Legislature and a valuation of $82,000,000 set by the Public Utility Commission.

Observations made in Newark on the evening of Aug. 2 showed the quality of transportation to be poorer than when trolleys were operated, and the cost generally higher in spite of a so-called 5-cent fare on the buses. It is usually necessary to take more than one 5-cent ride to reach the desired destination. Whereas the trolleys operated through routes across the business centers in all the principal municipalities, or gave transfers, the jitney lines nearly all terminate in the heart of the city. The number of foreign buses is about one-fifth of the normal number operating in the city. There are about the same number of old buses revived for the occasion and there are a very few improvised vehicles, making altogether an increase of somewhat less than 50 per cent in the total number of buses. Except during the afternoon rush hour there seems to be no worse overcrowding of the buses than usual. Between 5 and 6 p.m. all the buses run very full. The present is of course an emergency and as yet little attention has been paid to the character of the service. The total volume of traffic in Newark proper on Aug. 1 and 2 seemed to be considerably below normal. Traffic congestion in the streets appeared if anything less than when the cars were operated.

It would appear from the standpoint of the public that the determining factors which will bring about the return of the trolley cars will be the need for service to the suburbs rather than congestion in the center of Newark. The present emergency transportaton service is not intolerable. In Jersey City and Camden it would appear probable that the return of car service on some lines will be demanded, but in Paterson, Elizabeth and New Brunswick it would seem that the buses could continue to do all the business indefinitely without serious inconvenience to the traveling public.

There are a few political angles to the situation, but they are similar to those which arise in connection with every other similar suspension of service. Thus the Mayor of Newark says that the company abrogated its franchise rights when it raised the fare despite the limitations imposed in its franchise, and he has threatened to proceed to tear up the tracks.

All sorts of motives have been attributed to the company from outside for shutting down. Many contend that the strike really involves more than the question of wages. Like every other railway the company is not lacking in vilifiers. They profess to see in the strike a deep laid plan of the company:

1. To restrict jitney competition by keeping its cars idle until it can force the Public Utilities Commission or the Legislature to take action against the jitneys.

2. To get a 10-cent fare on the plea that it cannot pay higher wages on the present 8-cent fare.

3. To go into receivership, reorganize and get rid of unprofitable lines:

As for the company it made public on Aug. 2 its answer to the demands of the men which precipitated the strike. It is a communication from President Thomas N. McCarter to the members of the Amalgamated Association. He assures the workers that if they really knew the economic and financial distress of the company they would not be so selfish and heedless of their own welfare as to seek to force the company to pay higher wages. The letter contains a scientific discussion of the application of the varying cost of living of the last six years to street car wages and assures the workers that the existing wages are 23 per cent higher than demanded by the cost of living—notwithstanding high rents, which are acknowledged—at the moment. This statement is based on the long letter of July 17 to the men.

Many patrons and customers of the Public Service Corporation are stockholders in the company under its recent campaign to extend the idea of customer ownership among the residents of the territory served by it. In a letter to the stockholders Mr. McCarter said:

It is my duty to inform you that the employees of Public Service Railway Company, one of the four principal subsidiaries of your corporation, have gone out upon strike as a result of a demand for increased wages which is not justified by the cost of living and which the railway company was without funds to meet. After the failure of negotiation, the railway company offered to submit the matter in dispute to the arbitration of the Board of Public Utility Commissioners of the State of New Jersey, the only body having any power to furnish the railway company with the additional revenue to meet any substantial raise in wages, either through the elimination of jitneys or by an increase in fare. This proposition the men declined to accept.

As a last resort, to prevent the inconvenience to the public of a strike, the railway company offered a 5 per cent increase in pay to the man which, if accepted, would have exhausted the railway company's treasury. This the men declined but insisted upon an increase involving a total annual additional expenditure of approximately $2,500,000, which the railway company was unable to meet.

As, however, the corporation has received no dividends from the railway company for the last five years, the strike and consequent interruption of service, while most unfortunate, will not substantially disturb the finances of the Public Service Corporation of New Jersey nor should it in any way interfere with the corporation's dividend policy, as the three remaining subsidiaries of the corporation are all carrying on a successful business.

Reverting to the matter of the air of gusto with which Mayor Hylan said he will lend aid to the people of New Jersey one of the striking trainmen is reported to have said:

Fine union man. He is bus-crazy anyway, and to make a point in his New York argument he sends fifty strike-breaking buses to Newark, out of his own State, where there are no votes to be swung against him and so he sacrifices us, as good union men as ever he was, to his New York ambitions.

This expression of lament is reported to have come from another former railway employee:

We thought we were striking for ourselves. I'm beginning to think we have been striking for the benefit of the bus owners and the bus drivers. So far as our interests are concerned they are just as effectively strikebreakers as though they were on car platforms. They are not union men. The nickels out of which our wages were paid are going to the bus owners and the bus drivers are getting the wages.

Strike Threat Again in Chicago

Another threat of a street car strike in Chicago bobbed up this week. Laborers and mechanics employed by the Chicago Surface Lines threatened to walk out unless they were granted more than the 3 cents an hour increase offered by the company. Conferences between the company officials and international union officials were being held when this issue of the ELECTRIC RAILWAY JOURNAL went to press, in an effort to reach a settlement. Union officials are said, however, to have agreed not to strike until Mayor Dever returns from a vacation of ten days.

Assurance was given late in the week that motormen and conductors would not support the shopmen and other employees in case of a strike. William Quinlan, president of the street car men, who have accepted an increase of 3 cents an hour said, "Our men will operate the street cars. We have to live up to our contract."

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News Notes

Checks for Safety Records Distributed.—Bonus checks totaling $188 were distributed to trainmen of the Wisconsin Public Service Corporation, Green Bay, in appreciation of their work in avoiding accidents during the second quarter of the year. Twenty-six men had no accidents.

Will Talk Railways Over Radio. — Harry L. Brown, editor of ELECTRIC RAILWAY JOURNAL, is scheduled to talk on Saturday evening, Aug. 11, from 7:45 to 8 p.m. from WJZ, Aeolian Hall, New York, to a radio audience. His subject will be: "Is the Electric Railway a Back Number and Can the Bus Replace It?"

Opawa News Appears.—The Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, started in July the publication of a pamphlet entitled *The Opawa News*. Number 1 of Vol. I gives a talk to the employees on loyalty and tells about the company's policy and management with respect to supplying service to the public.

$940,000 Paid in Benefits.—The Employees' Benefit Association of the Brooklyn Rapid Transit Company was twenty-one years old on June 1 last. In this period from June 1, 1902, to May 31, 1923, inclusive, association members and their designated beneficiaries have received a total of $940,875 in sick and death benefits.

Resolution Advocates Public Ownership.—Public ownership of all public utilities in the state was advocated in a resolution adopted at the annual meeting of the Municipal League of Georgia, held recently in Atlanta. The league is composed of city and town officials throughout the state, and other persons interested in the policies for which the league stands.

Hearing Adjourned.—The Public Service Commission on July 24 adjourned until sometime after Sept. 10, to consider Mayor Akin's complaint against the Fonda, Johnstown & Gloversville Railroad, asking that it be compelled to fulfill a franchise obligation to extend the Amsterdam trolley line into the southern part of that city. The adjournment was at the joint request of Corporation Counsel Fitzjames, representing the city and Wesley Maider of Gloversville representing the railroad.

Approval Almost Unanimous. — The signatures of 99.9 per cent of all the employees of the Philadelphia Rapid Transit Company were submitted as indicating their approval to the protecting of the co-operative wage dividend. The one-tenth of 1 per cent who did not sign are conscientious objectors, principally members of those religous cults which consider participation in co-operative activities as expressing doubt in their church. Thomas E. Mitten expressed satisfaction over the approval of the employees and in writing to President Nyman said that the readiness with which the employees signed over their wage to insure the continued purchase of the company's stock as originally planned, denoted a settled purpose and a recognition of responsibility which was most encouraging.

Boston Men Get Increase.—An increase of 3½ cents an hour, or approximately 6 per cent over the old basic scale in effect, was awarded to the employees of the Eastern Massachusetts Street Railway on Aug. 1. The award was made by Henry C. Attwill, Chairman of the State Department of Public Utilities, as the neutral member and Chairman of an arbitration board. Fred A. Cummings, representing the Public Trustees of the road, concurred in the report and James H. Vahey, representing the employes, dissented. About 3,000 men are affected. The award is retroactive to May 2, and will be in effect until May 1, 1924.

Approves Vote on Municipal Ownership.—Councilman John Hirschberg recently appeared before the Council committee on ordinances to advocate a resolution providing for a special election to pass upon the question of municipal ownership of railway lines in Richmond, Va. After considerable discussion it was determined to table the resolution until "facts and figures" could be presented by Mr. Hirschberg, who promised to have them at an early date. Mr. Hirschberg said that he did not know whether municipal ownership would be a good thing, but that he wanted the people to have the opportunity to express themselves at the polls at this subject.

Seeks Franchise Extension. — The Portland Railway, Light & Power Company, has applied to the City Council of Vancouver, Wash., for a fifty-year extension of its franchise in that city. The company plans to spend $80,000 in improvements there within the next three years. The ordinance extending the franchise will come up for final passage on Aug. 8, before the City Council. One of the provisions of the extension ordinance provides for the repeal of the one which gave J. R. Harvey the power and light franchise in Vancouver many years ago. The Portland Railway, Light & Power Company took over Mr. Harvey's franchise, and is now furnishing both power and light to Vancouver.

Employees Have Outing.—The Connecticut Company employees held their annual outing at Momauguin, New Haven, on July 26. Special cars left New Haven at 9:15 a.m. and upon arrival at the shore, the preliminary baseball games were played. Clam chowder was served at 11:30 a.m. and then the field sports took place. Later 386 Connecticut Company men and guests sat down to an old-fashioned sheep roast, served out of doors on long tables, with plenty of other good things to go with it. After dinner the winners of the preliminary ball games played for the Connecticut Company championship. It resulted in New Haven taking the prize with a score of 13 against 1 for Hartford. This ended the events at the 1923 outing. The Connecticut Company band furnished a fine program of music. It made a hit with the new uniforms.

Operation By City Resumed.—The city of Amarillo, Tex., has again resumed operation of its street railway. The line has been operated by the city under lease from the owners for the last three years because the owners, unable to pay operating costs, proposed junking the property. The city recently gave notice that it did not care to renew the lease. The owners also signified their intention of not attempting to operate the property and it appeared that the city would be without car facilities. Property owners and business men then stepped into the breach and a compromise was reached by which the city will continue operating the property, charging a 5-cent fare instead of 10 cents. The result is that business is picking up and it appears that the property can be made to pay operating costs.

Rejects Company's Proposal. — The strike committee representing the members of International Brotherhood of Electrical Workers, who several weeks ago declared a strike against the Monongahela West Penn Public Service Company, Fairmont, W. Va., at the expiration of a contract agreement, has announced that it has rejected the latest proposal of the company made on July 20. One of the principal features of the proposed agreement suggested by the traction company to which the strike committee objected was an arbitration agreement with a non-strike clause. The chairman of the strike committee in a statement said that the union was willing to submit an arbitration proposal that would be so braced as practically to make the non-strike provision unnecessary, but that it should be in the agreement as a last resort.

Talk of an Important Canadian-American Line.—Reports from Aroostook, Me., say that negotiations between the Canadian Government Railway and Arthur R. Gould, president of the Aroostook Valley Railroad, have reached a point which makes the proposed Quebec extension electric line across the northern part of this state seem a practical certainty. The project is to connect the two roads by a line between Washburn and La Fontaine, Que. Mr. Gould and his associates are to build a railroad from Washburn to a point on the Quebec border above Ludwig Pond, while the Canadian road will construct a branch from La Fontaine to this point. The American line will be 100 miles in length and the Canadian about 20. The approximate cost of the construction may reach $4,000,000 at present-day figures. The Aroostook Valley line, of which Mr. Gould is the head, is a 40-mile electric road.

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Foreign News

Safety Glass Car Windows

The motormen's compartments on the new cars for the London Underground Railways will be fitted with "triplex" glass windows, which glass is claimed to be unsplinterable. Thus in case of the windows being smashed through collision or any other cause, the risk of injury through flying splinters of glass is eliminated. There are two sheets of glass with a thin sheet of transparent celluloid between.

Car Building Municipalities

Declining to follow the lead of some British municipalities, the Edinburgh Town Council has accepted the decision of its tramways committee not to enter into municipal trading by building its own tramcars. The town clerk, who was consulted on the legal aspect of the question, said that there was a direct prohibition against the Council's manufacturing motor omnibuses, but there was no such prohibition in regard to tramcars. Building cars, he pointed out, was different from repairs and reconstruction. The Council agreed to invite tenders for eight additional cars.

Coolness on Underground Railways

During the tropical heat which began in London in July attention was again directed to the coolness of the atmosphere on the deep-level tube railways of the metropolis. When the maximum shade temperature out-of-doors ranges round about 90 deg. F., the drop to about 60 deg. experienced on taking a tube train is very noticeable. The temperature in these deep tunnels is about 60 deg. all the year round, no matter how hot or how cold it may be outside. Powerful ventilating fans and ozonizing apparatus are constantly at work. On all these railways about 30,000,000 cu.ft. of air are drawn in daily, and of course a similar quantity ejected. On the other hand during hard frost in wintertime, entering a tube railway feels like going into a warm room.

Maintenance of Permanent Way in Britain

The subject of the cost of maintaining tramway permanent way has been considered by the Council of the Municipal Tramways Association, with special reference to its bearing on the relation of municipalities to the Roads Fund (a national fund derived from automobile vehicle taxation), and the financial consequences of grants in aid in respect of track maintenance. The Council came to the opinion that such a scheme would have the effect of diminishing the total sum now receivable out of the Roads Fund by members of the Association as local authorities. It was accordingly resolved that the Association was not prepared to take any steps which would affect adversely the financial position as a whole of local authorities, and that therefore the subject be not further pursued.

London to Southend Electrification

In the House of Commons, on June 14, a promise was given as to the electrification of the London, Midland & Scottish Railway's line from London to Southend-on-Sea, Essex, a distance of about 40 miles. Parliamentary authority for the work was obtained in 1912 but owing to the war and other causes nothing has been done. The railway has a bill for various purposes now before Parliament, and it came on for second reading on June 14. Threatened opposition to it was withdrawn on a statement being made that as soon as the board of the amalgamated company was constituted it would address itself to the problems involved, and endeavor to bring a satisfactory scheme to maturity at the earliest possible moment. Before the railway amalgamations which came into force on Jan. 1 last the London to Southend line belonged to the Midland Railway, which is one of the companies absorbed in the London, Midland & Scottish Railway.

Automatic Ticket Machines on London Railways

With a view to accelerating the booking of passengers during the rush hours, at Victoria Station, (District Railway, London), the underground companies a short time ago placed a "battery" of twelve ticket machines in the circulating area as an auxiliary to the usual booking office facilities. These machines are now issuing tickets at the rate of 2,500,000 per annum or approximately 30 per cent of the total bookings at this station. In booking halls of restricted size it is of great importance that quick booking facilities should be provided. It is impracticable to add to the size of the booking offices, but ticket machines overcome this difficulty and the public appear to appreciate this method of getting their tickets. The success of the scheme at Victoria has led to the establishment of similar "batteries" at Waterloo, Elephant, Bank and Mansion House and a further batch of fifty now on order will provide the same facilities at Westminster, Paddington, Liverpool Street and Leicester Square in the future.

Consideration is being given to equipping a warning bell to be rung in the booking office when the stocks of tickets are running low. An electrical device now fitted causes the machines to reject passengers' money if they are out of order.

An interesting feature in connection with the Victoria Station batteries will shortly be introduced when the metal front of one of the machines will be replaced by plate glass, thus revealing to the passenger the clever mechanism of these electric machines and enabling him to watch the progress of his coin from the moment of inserting it into the slot until the delivery of the ticket.

Whilst these improvements are being made, the rate of ticket issues from the booking offices also has been speeded up by the provision of "rolltic and automaticket" machines, of which fifty-one have now been installed at the busiest traffic centers. Recent rush period tests have shown that both types of machines have an output of well over 1,000 tickets an hour, this including the giving of change. In both machines the tickets are kept in rolls of 1,000, which are easily replaced, thus saving precious seconds and speeding the passengers' journey from booking hall to platform.

Recent Orders for Railway Equipment

The Lombardy Electric Traction Company, operating in the City of Milan, Italy, has ordered from the Milano Mechanical Works, formerly Miani, Silvestri & Company, twelve double-truck all steel electric trailer cars to be 7 ft. 9 in. wide, about 48 ft. long and to weigh approximately 10½ tons. These cars will be equipped with red plush seats, bronze trimmings, etc. They will be used in the company's interurban limited service between Milan and Monza. Twelve composite steel and wood motor cars ordered from the Breda Locomotive & Car Works of Milan are also nearing completion. These cars are arranged for "pay-within" operation. They will be used for local runs on the Milan-Gorla and other short one or two zone suburban lines.

Plans Electrification

The Lombardy Road Railways, Ltd., formerly British owned, but now a part of the Milan Edison system, contemplates electrifying its Milan-Carate line from Milan to Desio, Italy, 12 miles. The financing of the scheme has been arranged through the Milano & Lombard Provinces Savings Bank with the full approval of the Ministry of Public Works (Railway and Transportation Inspection Bureau). Another subsidiary of the Milan Edison Company, a former Belgian company known as the Interprovincial Tramways, is planning to extend its electrification on the Milano Crescenzago line to Cascina Gobba (about 6 miles) in order that all trains from its northern lines may enter Milan under electrical operation. Since about April of this year a heavy four-wheel motor car (13 tons, 120 hp.) has been equipped with Svenska Kullager Fabriks ball bearings, instead of journal brasses. This is the first serious experiment of this kind in Italy and, up to date, seems to give satisfactory results both in power and lubrication saving.

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Financial and Corporate

City's Expert Fixes Minneapolis Valuation at $11,000,000

Vol. 1 has been issued of the report by Delos F. Wilcox on the Minneapolis Street Railway appraisal. This volume includes the general conclusions of Mr. Wilcox and selected tables from the voluminous report filed on June 5 with the City Council and with the Railroad & Warehouse Commission of Minnesota. Mr. Wilcox terms the volume a "report upon the value of the street railway property of the Minneapolis Street Railway and the operating conditions and expenses of the company, based upon an inventory of the property as of Jan. 1, 1922; an investigation of the company's books, accounts and records, and an appraisal of the property as an operating system, all pursuant to the provision in chapter 278, laws of Minnesota, 1921, entitled 'An Act Relating to Street Railways.'"

In his summary of conclusions, Mr. Wilcox says that the actual cost new of the company's property, used, useful and reasonably necessary for street railway purposes within the city of Minneapolis, as of Jan. 1, 1922, the date of the inventory, was $15,939,918. The reproduction costs new of the property included in the inventory, based upon normal or historical unit costs, with 15 per cent allowed for general overhead expenses, was $17,457,362 according to Mr. Wilcox. He places the normal or historical reproduction costs new, less straight line depreciation, at $10,030,508. He recommends that the fair value for rate purposes of the company's street railway property used, useful and reasonably necessary for street railway purposes in the city of Minneapolis be fixed at $11,000,000 as of the date of the inventory. He further recommends that the annual rate of return to be allowed on the rate base be fixed at 6½ per cent. As he sees it, the annual return upon the investment, therefore, should be 6½ per cent on $11,000,000, or $715,000.

It is his opinion that the excess of the company's operating income for the year 1923, based upon proper adjustment of its 1922 income, over a reasonable return upon the fair value of the property of the company as determined by him, will be approximately $1,686,418. Since Aug. 16, 1920, the company has been charging a straight 6-cent fare with free transfers. Mr. Wilcox recommends that the rate of fare be fixed at 5 cents with free transfers. According to his estimate, this gives the company a leeway for surplus and reserve of $355,170 over and above a reasonable return on its investment. He says that even if it should be held that the value of the leases there must be included, the method of valuation used by Cappelen, Pillsbury and A. L. Drum & Company is fundamentally unsound.

Mr. Wilcox says that the principal difficulties arising with respect to the inventory, aside from the difficulties always incurred in making an accurate description of a complex property such as a street railway system, were the result of differences in theory as to the propriety of excluding or including certain items in the list of used and useful property and differences arising with respect to the allocation of jointly-owned property.

Net Income Decreases in Detroit

The earnings of the Department of Street Railways in Detroit, in June were $62,139. Although the revenue from transportation increased there was also an increase in operating expenses. The total revenue from transportation was $1,694,664. This was in excess of the revenue for June, 1922, but the net profit was cut down by decreases in rentals and increased costs of operation.

To meet increased traffic demands the department furnished 507,347 additional car-miles. Miles operated last month were 4,371,504 as compared with 3,864,157 in June a year ago. The cost of operating each car per mile increased from 28 cents to 30.42 cents. This increase is reported as being principally due to the higher wages paid the employees. The number of passengers carried in June was 41,730 246, as compared with 36,715,466 in June, 1922.

In order to meet principal and interest on notes payable, sinking fund and interest charges and bond requirements, the sum of $353,532 was set aside during the month.

Jersey Central Traction Suspends

Service on the 40 miles of track of the Jersey Central Traction Company was suspended at midnight, July 28, the necessary approval of the Public Utility Commission having been granted earlier in the month. The Jersey Central line served about 30,000 people in the Perth Amboy-Atlantic Highlands district of New Jersey. A steady decrease in patronage and the resultant loss of money were given as the cause for suspension. An account of the hearing on the company's application for permission to discontinue, appeared in the ELECTRIC RAILWAY JOURNAL for July 7, page 33, July 21, page 116.

Jitney buses have been serving the district since July 28. Under the state laws, no certificate of convenience is necessary for owners of buses operating along streets where there is no trolley track. It has been assumed that no certificate is necessary for operation along the tracks of the defunct railway, so there is no way of determining the number of buses serving the district, but the present service by the buses is said to be adequate.

Reproduction Cost Not the Controlling Factor

Reproduction cost of public utility properties in Wisconsin cannot be considered as the controlling factor or even as a considerable factor in fixing the valuation of such properties for rate-making purposes by the State Railroad Commission. Judge M. B. Rosenberry of the Wisconsin Supreme Court has so held in the case of the Waukesha Gas & Electric Company against the Railroad Commission of Wisconsin. His decision upholds the power of the commission to fix rates for public utilities and justifies the commission in disregarding to a large extent the claim of replacement values made by utility companies in resisting demands for lower rates.

The decision by the State Supreme Court was rendered in affirming the recent decision of the Circuit Court of Dane County which restrained the company from increasing its electric rates on the basis of a revised valuation of its properties. The latest ruling is regarded as practically stabilizing the valuation of utility companies for rate-making purposes and doing away with expensive revaluations and rate hearings.

The court points out that the United States Supreme Court, in three cases decided in May and June of this year, has not entirely clarified the situation as none of them contains a statement as to what weight should be accorded to the cost of reproduction new, less depreciation. One of these was the Southwestern Bell Telephone Company case from Missouri, which was interpreted at the time as upholding the reproduction cost theory of valuation.

Stating that it does not attempt to lay down a formula for valuing public utilities, the Wisconsin court says if it were to accord rank to the various factors to be considered in accordance with the weight to be given each in determining present fair value for establishing a rate base, such formula would be this:

1. Actual cost of plant when the investment has been prudently made.
2. Under normal conditions, cost of reproduction new, less depreciation. (When conditions are abnormal, cost of reproduction new, less depreciation, should be fourth.)
3. Going concern value.
4. Working capital.
5. Other elements of value which may be presented in a particular case.

Seeks Approval of Seneca Lake Abandonment

The Elmira, Water, Light & Railroad Company, Elmira, N. Y., recently applied to the Public Service Commission for approval of a declaration of abandonment of its Seneca Lake division, running from Horseheads through Veteran, Montour and Dix. The railroad says that although every expedient known to the management has been tried to increase the gross revenue, the revenue has not been sufficient to pay operating expenses, and that to keep it in operation under present conditions was unfair to the security holders.

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Receivership of Staten Island Line Lifted

John J. Kuhn, receiver for the Richmond Light & Railroad Company, Staten Island, N. Y., for the last three years, was discharged on July 31 when the receivership was ended by United States District Court Judge Edward L. Garvan. The court acted on the application of the Staten Island Edison Company and the Richmond Railroad, formed to take over the Richmond Light & Railroad Company.

The latter company for years enjoyed a monopoly of street and commercial lighting on Staten Island, a large proportion of the stock in the company being owned by H. H. Rogers. Upon his death the interest passed to his estate. The company long carried on a profitable business in commercial lighting, but during the war-time period it became impossible to operate the railway profitably at a 5-cent fare.

The directors of the company applied to the New York city administration for permission to increase fares to 8 cents and were met with a flat refusal. On April 28, 1920, a receiver was appointed on the application of the Westinghouse Electric & Manufacturing Company, one of the creditors.

Later Judge Chatfield, in Brooklyn, granted an 8-cent fare. Since that time, it was said, the railway has been operated upon a profitable basis.

On Oct. 8, 1922, the J. G. White Management Company purchased the interest in the company held by the estate of H. H. Rogers. As pointed out in the ELECTRIC RAILWAY JOURNAL for July 28 the White interests organized and incorporated the Staten Island Edison Company and the Richmond Railroad. It was upon the application of the White Company to the court that the receivership was discharged. J. H. Pardee is president of both companies, which for the most part retain the personnel of the Richmond Light & Railroad Company.

Miami Traction Company Dissolves

The Miami Traction Company organized about nine years ago by the Tatum interests, recently passed out of existence by the signing of an order by Judge Atkinson in the Circuit Court. The Tatum interests built the present car system of Miami.

The company operated for several years with storage battery cars. It was unable to compete with jitneys and when the company's carhouses were destroyed by fire, service was suspended. Afterward, the tracks were purchased by the city of Miami, and a lease was signed between the city and the Miami Beach Electric Company, organized by Carl G. Fisher, to furnish street car service between Miami and Miami Beach and at Miami Beach, whereby that company was to operate the city's lines.

Several weeks ago a petition was filed by the Miami Traction Company, asking permission to dissolve the corporation on the ground that it was no longer in business. It was on this petition that Judge Atkinson acted when he signed a decree dissolving the Miami Traction Company as a corporation.

$259,526 Surplus for Northern States Power

The report of Northern States Power Company, Chicago, Ill., for the year ended Dec. 31, 1922, shows net income of $2,594,660, after taxes, interest, depreciation, amortization, etc., eqquivalent after preferred dividends to $12.20 a share earned on the $6,170,000 outstanding common stock. This compares with $2,111,861, or $8.27 a share on common.. The consolidated income account for 1922 compares as follows:

	1922	1921
Gross receipts	$13,881,919	$12,963,922
Net after taxes	5,781,092	5,207,543
Interest	2,311,432	2,295,682
Depreciation, etc	875,000	800,000
Balance	$2,594,660	$2,111,861
Preferred dividends	1,841,534	1,601,164
Common dividends	493,600	246,800
Surplus	$259,526	$263,897

Quebec Power Announces Terms of Merger With Railway

Following a joint meeting of the directors of the Quebec Railway, Light, Heat & Power Company and the Quebec Power Company the directors of the former company sent a letter to the shareholders advising them that their best interests would be served by their acceptance of the offer of the Quebec Power Company. Secretary Wilson in announcing to their Quebec Railway shareholders the directors' unanimous decision stated that it was evident that only through such co-ordination of interests and the grouping together of the power resources of the two companies could the necessary economies of operation be brought about.

To the holders of the common shares of the Quebec Railway the following offer was made:

Quebec Power Company will purchase and acquire the whole or any part of the common shares of the Quebec Railway, Light, Heat & Power Company, Limited, of an aggregate par value of $10,000,000 by giving in exchange therefor common shares of Quebec Power Company of the par value of $100 each on the basis of $25 par value of such common shares for each $100 par value of the common shares of Quebec Railway, Light, Heat & Power Company, Limited. The common shares so offered in exchange form a part of an authorized issue of $6,000,000, of which $1,600,000 have been issued and are presently outstanding.

To the holders of the 5 per cent thirty-year income bonds of the Quebec Railway the offer was as follows:

Quebec Power Company will purchase and acquire the whole or any part of the income bonds of the Quebec Railway, Light, Heat & Power Company, Limited, of the issue above mentioned, by giving in exchange therefor 7 per cent preference shares of the par value of $100 each of Quebec Power Company on the basis of $30 par value of such preference shares for each $100 par value of such income bonds. The preference shares so offered in exchange form part of an authorized issue of $4,000,000, of which $1,410,000 have been issued and are presently outstanding. Or, at the option of the holder, the Quebec Power Company will pay $27 in cash for each $100 par value of such income bonds.

Financial Authority Optimistic About Grand Rapids

Dividend prospects of the Grand Rapids Railway appear to be good, according to the *Wall Street Journal*. That paper says that while no official statement has been made regarding payment of back dividends, it is expected that some plan beneficial to stockholders will be worked out after arrangements are completed to refund the $2,500,000 first 6s and $1,200,000 general 6s outstanding. Only the first 6s are in the hands of the public. These latter are selling in unlisted securities market around 99½, to yield 6.50 at maturity. The stock is quoted at the present time at $38 a share.

As indicated in the ELECTRIC RAILWAY JOURNAL for July 28 the company in June ran slightly behind the 8 per cent return guaranteed to it under the terms of the recently revised franchise, but the *Wall Street Journal* says that the net earnings for twelve months ended May 31, 1923, were $553,962, the largest for any corresponding period since the company's organization in 1900. While its gross revenues during the five-year period noted showed improvement from year to year, conditions imposed by the war and the post-war periods made heavy inroads on net income and deficits after depreciation continued to pile up until 1922, when the road was able to show net profits a little in excess of $6,000.

The company's original franchise expired in April, 1921. An agreement was then made with the city by which lines continued to operate and experiments were made with various rates of fare to note their effect upon traffic and a fair return to company. The result of these experiments was that in April, 1922, a service-at-cost franchise was agreed upon between city and company. The voters ratified this grant in September, 1922, effective at once. It provided for initial valuation for rate-making purposes of $5,500,000, plus cost of additions from time to time, and for a graduated rate of return depending on fare charged. Initial return was fixed at 8 per cent with 10-cent cash fares, or seven tickets for 50 cents and free transfers. During nine months subsequent to September, 1922, company came within $15,000 of earning full return to which it was entitled. Jitney competition has been eliminated by agreement, giving the company an opportunity to develop its own system, and it has recently installed six buses of the Fifth Avenue coach type to reach parts of the city not covered by car lines.

The Grand Rapids Railway is a subsidiary of the Commonwealth Power, Railway & Light Company. All the common stock of the Grand Rapids company and $500,000 of $2,000,000 of 5 per cent preferred is owned by Commonwealth company. Dividends were paid on preferred from 1900 to November, 1918. Since then there have been accumulated dividends aggregating 23 per cent.

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Wage Increase and Heavy Maintenance Bring Expenses Above Revenue

A decline in passenger travel and a marked increase in operating expenses due to high maintenance layout and increased wages brought a deficit of $26,748 in the operations of the Community Traction Company, at Toledo in June, according to the report of the Street Railway Commissioner to the board of control at its meeting on July 18.

The 10 per cent wage increase to all employees and the maintenance program, which has increased the force of workmen by about 100 men, boosted the payroll expense about $34,000 over June last year.

Additional maintenance funds set up amounted to $20,000 for a total of $60,000 and the expenditures during the month reached more than $72,000 for the highest maintenance for one month in the history of the company.

Operating costs resulted in a ratio of operating expense to gross income reaching the high figure of 80.57 per cent. The commissioner commented on this by saying that to break even an operating ratio of not more than 70 per cent should be maintained.

Riding has decreased from an average of 187,539 revenue passengers a day in March to 172,467 in June and present indications are that the average for July will not exceed 168,000. The increased use of private automobiles is the reason given for the big drop in summer.

Bus feeders continued to fail to break even, although the Oak Street line showed a slight betterment.

Hudson & Manhattan Making Good Record

The declaration of the initial 2½ per cent dividend on the preferred stock of the Hudson & Manhattan Railroad, New York, referred to briefly in the ELECTRIC RAILWAY JOURNAL for July 28, page 158, has attracted much attention in railway and financial circles. The position of the company with respect to earnings has been improving over a long period now. The *Evening Sun* recently stated the matter as follows:

This is the first disbursement on the issue since the company's consolidation with the New York & New Jersey Railroad in 1906. The issue is non-cumulative. During the world war the company was permitted to increase its fares by the Interstate Commerce Commission, and earnings at the present time are double those of 1916. Much of the increase is accounted for in the movement of New York city residents to own homes in New Jersey. At the same time operating expenses were kept at a minimum

In 1913 the capitalization was readjusted with an assessment of $8.50 on each common and preferred share. In April of this year the company cleared up its back interest payments on the 5 per cent adjustment income bonds. This action paved the way for the declaration of the dividend.

The June report reflects the company's improvement. Surplus, after full adjustment on the income 5s, was given as $90,524, as compared with $29,372 in the same month last year. For the first half of the current year surplus after all charges amounted to $600,426, against $407,968 in 1922. A majority of the common stock is owned by the Hudson Companies.

Net Income Increases.—The net income of the Twin City Rapid Transit Company and subsidiaries for the first six months of 1923 was $929,075 against $793,870 for the same period a year ago.

Sale Held. — The bondholders' committee bid in the Portsmouth, Dover & York Street Railway, Portsmouth, N. H., at a sale in Boston on June 30. The trustee under the indenture securing the bonds is the State Street Trust Company of Boston.

Railway Service to Be Continued.—Railway service will be continued in Waupaca, Wis., following the vote of the City Council which was seven to one in favor of keeping the service furnished by the Waupaca Electric Service & Railway Company. A controversy had existed between the company and the city over paving of the company's track zone on Fulton Street.

New Issues Explained. — William Hughes Clarke, investment bonds and stocks, Chicago, has prepared a bulletin presenting the divisional earnings of the separate companies of the Chicago Elevated Railways, which will be of interest to holders of the old elevated securities. The new issues proposed in the reorganization are also explained in the bulletin.

Increase in Net Income.—The Brooklyn City Railroad, Brooklyn, New York, for the year ending June 30, 1923, reports a passenger revenue of $11,715,964 against $11,413,651 for the year ending June 30, 1922. The net corporate income for the year ended June 30, 1923, was $2,256,025. For the year ended June 30, 1922, the net corporate income was $1,765,528.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons on Aug. 1 there were sold $4,000 of Southwestern Gas & Electric Company general 6 per cent bonds, due 1957, interest May and November, 77½ per cent; and $2,000 of the Union Traction Company of Indiana first general 6 per cent bonds, due 1932, interest January and July, 64¾ per cent.

Balance Shows Increase.—The net earnings of the Virginia Railway & Power Company for the first six months of the year were $1,953,840, against $1,431,295 for the same period in 1922. After consideration of the depreciation and renewal reserve, the balance for the first six months of the current year was $686,017, an increase of $499,885 over the period from January to June, 1922.

Two-Year Notes Offered.—Stone & Webster are offering $1,000,000 of the Savannah Electric & Power Company's two year 6½ per cent gold notes at 99½ and interest, to yield 6¾ per cent. The notes are dated July 2, 1923, and mature July 1, 1925. The Public Service Commission of Georgia has approved this issue of $1,000,000 notes to provide funds for the purchase of the property formerly owned by the Savannah Lighting Company, which has done a portion of the electric lighting and power business in Savannah. The unified operation of the properties will furnish better service to customers and permit substantial economies.

Surplus Earnings Increase. — The United Light & Railways Company, Grand Rapids, Mich., for the twelve months ended June 30, 1923, reports gross earnings of $12,400,250 against $11,243,413 for the same period a year ago. The surplus earnings available for depreciation, debt discount and common stock dividends was $1,235,545 for the year ending June 30, 1923, which represented an increase of $298,895 over the surplus earnings for the year ending June 30, 1922.

Offer Gold Bonds.—Halsey, Stuart & Company, Inc., are offering at 91½ and interest, yielding about 6.70 per cent, $7,192,000 of Interstate Public Service Company first mortgage and refunding 6 per cent gold bonds, known as series "A." The bonds are due Feb. 1, 1948. The company, of which Harry Reid is president, comprises 24 miles of electric railway, and 122 miles of interurban lines, with modern switching, signalling and substation equipment. The interurban line from Seymour to Indianapolis is operated under a 999-year lease, completing the line from Indianapolis to Louisville, reaching more than 750,000 people. The proceeds from the sale of these bonds will be used for refunding purposes and for other corporate uses.

Sporting Arena to Replace Carhouse.—Tex Rickard, John Ringling and associates, under the name of the New Madison Square Garden Corporation, expect to acquire title to nearly the whole block at Fiftieth Street and Seventh Avenue, New York, now occupied by the carhouse of the Broadway & Seventh Avenue Railroad, included in the New York Railways, to build the "largest indoor arena in the world." The contention of the minority stockholders is that the price to be paid for the site is sufficient for the Broadway & Seventh Avenue Railroad to make a profit for its shareholders if the company can be separated from the New York Railways. They have sought the advice of the court on the matter.

Freight Business Increases.—A decrease in passenger traffic revenue and increase in income from freight business is recorded in the report of the Indiana, Columbus & Eastern Traction Company, for the first five months of 1923. The report was made public on June 30 at the company's headquarters in Springfield, Ohio. The report shows that while the average mileage was 4 per cent greater than for the same period in 1922, there was considerable greater decrease in the volume of passenger business. This was attributed in the company's report to competitive bus lines. Nearly 100 per cent increase was noted in the freight business for the period over the corresponding five months in 1922. This, the company believes, was due both to a betterment of industrial conditions general in Ohio, and to the campaign which has been conducted among shippers to route their shipments over the traction line.

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Traffic and Transportation

Guards Hear What To Do in Emergency

A circular entitled "What Interborough employees are to do when an accident occurs on the subway" was recently issued by Frank Hedley, president and general manager of the Interborough, and distributed among the employees. Complaints have been sent to the subway management as the result of failure on the part of the employees to follow out strictly the rules "adopted for their guidance in emergency cases." Accordingly, Mr. Hedley said the circular was prepared for ready reference to some of the more important rules in emergency cases.

The employees are first of all reminded that the safety of passengers is the first consideration and that the understanding of the emergency control devices and the emergency alarm system is absolutely essential.

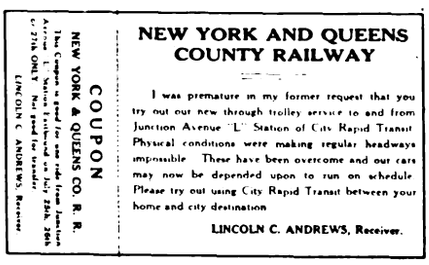
Besides the handling of the car the employees (conductors and guards) must also know how to take care of the passengers. Mr. Hedley says that in the event of a blockade passengers will want to know "What is the matter?" and "How long are we likely to be detained?" These questions must be answered at once according to company rules, and if the guard is without facts he must secure the information as soon as possible (by telephone from trainmaster or the nearest dispatcher). Copies of the circular of instructions to the employees were sent to the metropolitan newspapers which published extracts from it. In this way it was brought forcefully to the attention of the riding public just what information it might expect in the future whenever an emergency arose in connection with the operation of the transit lines under the management of the Interborough.

Buses in the Plan for Better Service in Greensboro

According to R. J. Hole, second vice-president and general manager of the North Carolina Public Service Company, Greensboro, his company contemplates installing buses to certain sections not touched by the railway line. This decision was reached after Mr. Hole had received an engineering report from an independent authority on the traffic situation in Greensboro, and after Mr. Hole had made a personal study of the matter to ascertain what success the gasoline buses are having. As a result of his investigation Mr. Hole feels that it is well worth the time and money of the company to install the buses, and he accordingly informed the director of the road of his plans. The plans now contemplated call for an expenditure of $50,000. The cost of the buses is estimated at $8,000 each. In addition to the bus plan, the company expects to better its railway service. Just now the grade crossing problem makes it practically impossible to keep cars close to the schedules.

Offers Sample Rides to Patrons

A sample ride is the latest stunt of the New York & Queens County Railway. On the assumption that a trial ride will be so good that you'll want more, Receiver Lincoln C. Andrews recently sent the accompanying postcard to approximately 6,000 residents of the communities affected by the through trolley service from the Corona Elevated line to Flushing, College Point and Jamaica with a coupon attached "good for one ride from Junction Avenue 'L' station eastbound on July 25, 26 or 27 only. Not good for transfer." In addressing the residents General Andrews stated that he had been premature in his former request urging a try-out of the new through trolley service as physical conditions had made regular headways impossible. But since these difficulties were overcome and hence cars could be depended upon to run on schedule, he was asking for a tryout of the service.


NEW YORK AND QUEENS COUNTY RAILWAY

I was premature in my former request that you try out our new through trolley service to and from Junction Avenue "L" Station of City Rapid Transit. Physical conditions were making regular headways impossible. These have been overcome and our cars may now be depended upon to run on schedule. Please try out using City Rapid Transit between your home and city destination.

LINCOLN C. ANDREWS, Receiver.

COUPON

NEW YORK & QUEENS CO. R. R.

This Coupon is good for one ride from Junction Avenue L Station Eastbound on July 25th, 26th & 27th ONLY. Not good for transfer.

LINCOLN C. ANDREWS, Receiver

Invitation to Ride Free Sent to Patrons

The reaction from the postcard was very good, some suggestions coming in from patrons which showed a very friendly spirit and indicating that they would be glad to use the service if it was made dependable—a condition which has not prevailed in the past but which the General is making a determined effort to correct.

Houston Fare Issue Postponed

The hearing on the Houston Electric Company's petition for an increase in fare from 6¼ cents to 9 cents has been postponed until Sept. 24. The extension has been granted to enable the company to revise its depreciation figures and to enable the city to study the valuation claims of the company.

The fare is now 7 cents cash with a ticket rate of four for 25 cents. The number of jitneys operating at present has been limited to 150, being reduced about a year ago from 300. They largely duplicate the car service except to Harrisburg where a 10-cent fare is charged on the jitneys, and they operate one half mile beyond the end of the car line. A recent referendum election voted the continuance of the jitney operation.

John A. Beeler has been engaged by the city of Houston to make a traffic routing and operating survey in order to determine the extent and value of all practical operating economies. He will also investigate the jitney situation in the city.

Jitney Hearing Set for Aug. 4

The question of whether jitneys are operating in Schenectady legally or illegally remains deadlocked because of the reluctance of Supreme Court Justice Henry V. Borst of Amsterdam to entertain a motion which would lead to a decision as to the legal status of the jitney injunction. The entire question will be held in abeyance at least until Aug. 4, to which time the hearing held before Justice Borst on July 28 was adjourned. Meanwhile jitneys are operating with renewed vigor.

The Schenectady Railway sought in special term before Justice Borst to have the order of County Judge John J. McMullen of Schenectady vacating the injunction of Justice Angell restraining jitney operation set aside on the ground that the county judge was without authority to issue such order.

Justice Borst shifted the responsibility, claiming it was a matter in which Justice Edward M. Angell of Glens Falls should have jurisdiction because it was Judge Angell who issued the original injunction at the request of the Schenectady Railway restraining the jitneys.

The legality of the vacating order seems from the course the argument took to hinge largely upon whether the vacating order was that of the county court or of the county judge.

Judge Naylor, who appeared for the railway contended that it was a county court order and as such was improperly issued, in that the county court was without jurisdiction. Asked as to whether the vacating order would be legal if construed as an order of the county judge, Judge Naylor said that the company would not admit this, holding that the action of Judge McMullen in vacating the order was not proper in any circumstance.

Judge Borst, following the discussion, said that inasmuch as it was a matter which intimately concerned Justice Angell, he would prefer the question be heard and passed upon by Justice Angell. He explained that a supreme court judge did not make a practice of passing upon an order either vacating, amending or interfering in any way with such an order of another justice of the supreme court.

It is an interesting situation. If Justice Angell decides the matter, the possibility exists that as an outcome County Judge McMullen would be declared in contempt and this is the situation which apparently the justices do not wish to entertain.

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New Traffic Regulations in Effect in Ohio

A new uniform state traffic code went into effect in Ohio on July 26. This code incorporates many of the provisions of the model traffic code of the American Electric Railway Association, and the incorporation of these provisions in the new Ohio code is due to the interest and activity of Paul E. Wilson, secretary of the Cleveland Railway. For example, the definition of the word "vehicle" in Ohio's new code is exactly that given by the model code of the A.E.R.A. Under Ohio's new code, all streets and roads used by electric railways are designated as main thoroughfares, and vehicles and street cars using such thoroughfares have the right-of-way over those going on intersections.

A few of the interesting section's of Ohio's new traffic code are:

Pedestrians shall not step into or upon a public road or highway without looking in both directions to see what is approaching. The penalty for infraction of this is a fine of between $25 and $100.

Vehicles shall keep to the right side of the road or highway except when necessary to turn to the left in crossing the road or highway or in overtaking and passing another vehicle; provided that in passing a vehicle going in the same direction, such passing shall be made as close to the right hand side of the road or highway as practical.

Before backing, drivers of vehicles shall give ample warning, and while backing, vigilance shall be exercised not to injure those behind.

Drivers of vehicles, before turning, stopping or changing their course, shall make sure such movement can be made in safety and shall cause signals to be made of their intention, in a way visible outside the vehicle.

The operator of a vehicle shall yield the right-of-way at the intersection of its path and the path of another vehicle to the vehicle approaching from the right.

Speed limits are fixed at 15 m.ph., in the business or closely built up portions of municipal corporations, 25 m.ph. in other portions of municipal corporations and 35 m.ph. outside of municipalities.

Motor vehicle drivers are subject to fines of between $10 and $100 for first offenses against the new traffic code, and for second offenses, fines of between $25 and $100 together with imprisonment for not more than ten days.

Bus Operators Will Go to Supreme Court

Jitney drivers in Fort Worth, and operators of motor buses and service cars carrying passengers between Dallas and Fort Worth, have joined issue with the city of Fort Worth in its effort to legislate these jitneys and motor bus lines out of business. The City Commission at Fort Worth recently passed an ordinance prohibiting the jitneys and inter-city service cars and motor buses from using any street in the down-town business district except Fourth Street. Traffic officers were placed on the Dallas-Fort Worth pike at the city limits to stop intercity service cars, and extra traffic officers were placed on duty downtown to keep jitneys and service cars off these streets.

The effect of this legislation, if enforced to the letter, would be to put the intercity service cars and buses operating between Dallas and Fort Worth out of business, as they would be unable to find an entrance into the city. The legislation would also put out of business those jitneys now operating from the business district to several outlying additions to the city not served by street car lines.

The jitney drivers and service car owners went into court as soon as the ordinance was passed and were granted a temporary injunction restraining the city of Fort Worth from enforcing the ordinance. This temporary order has been set for hearing and upon the outcome of that hearing depends the fate of the intercity jitneys and motor buses. The bus operators have declared that they will carry their fight to the Supreme Court if they lose in the state courts.

Dallas Railway Files Acceptance of Fare Extension

The Dallas Railway, as was reported in the ELECTRIC RAILWAY JOURNAL issue of July 28, recently filed its formal acceptance of the proposal made by the City Commission known as the Everman Plan No. 2, under which the city agreed to extend the 6-cent fare grant for eighteen months on condition that the traction company spend $705,915 during the eighteen months that the increased fare is in effect in extensions and betterments and in purchase of thirty new modern cars. The agreement constitutes a compromise between the city officials and the traction company and was negotiated by John W. Everman, supervisor of public utilities for the city. The increased fare grant extends to Dec. 27, 1924.

With the acceptance of the ordinance that had been passed several days previous by the City Commission, the traction problems involving the city of Dallas and the Dallas Railway are solved for a period of eighteen months, and officials of both city and traction company are going ahead planning for the expected development of the city during this time.

The new franchise grants an extension of the 6-cent fare to Dec. 27, 1924. The improvements and extensions will not be required until after the completion of improvements in the Everman plan No. 1, of last year, which gave the company eight months for completion of the program. Nor will the railway company be required to act on the Trinity Heights situation immediately, the agreement stipulating that the line must be taken over during the eighteen months.

Seeks Higher Fare in Ogdensburg

James E. Kelly, receiver of the Ogdensburg Street Railway, Ogdensburg, N. Y., on July 26, petitioned the Public Service Commission for authority to charge an 8-cent fare, strip tickets, five for 35 cents, and a 5-cent cash fare for school children under sixteen years, between 8 a.m. and 5 p.m. on school days.

The company's revenues in 1922, the receiver alleges, was $45,033. There was paid out by him in operating expenses $40,376 and in taxes $2,965, leaving $1,692.

Based on its operations in 1922 the receiver estimates that the proposed new fares, if allowed, will yield the company $54,000 or about $9,000 more than the amount received in fares in 1922.

Bus Line in New Castle.—A bus line is being operated by the Pennsylvania-Ohio Coach Lines Company, a subsidiary of the Pennsylvania-Ohio Electric Company, between the center of New Castle and Mahoningtown. This section was formerly served by the electric railway cars.

Bus May Replace Railway.—If the Public Service Commission authorizes the abandonment of the Seneca Lake division of the Elmira Water, Light & Railroad Company it is likely that a bus line will be started. It is expected that the trolley and bus petition hearings will be held on the same date.

Paying Damages. — The Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., started on July 30 paying some of the damage claim of the Malbone Street tunnel disaster which occurred in November, 1918. The claims amount to $2,200,000. Owing to the legal entanglements at least two weeks will be required to make the payments.

May Use Buses in Malden. — The Boston Elevated Railway is negotiating with the city government in Malden to put in a loop in that city as a terminus for its cars from the Everett terminal. In that case certain outlying tracks would be abandoned and a bus service substituted therefor. Should the proposed plan go through, about twenty-five buses will be required.

Regulation of Buses Rejected.—Regulation of motor buses by the Wisconsin Railroad Commission has been defeated in the Assembly. This bill if placed in effect would have given the commission power to determine the necessity for the operation of buses. Proponents of the bill said that it would protect the railways operating in the State. A bill containing similar provisions was vetoed by Governor Blaine two years ago.

College Men Employed by Railway.—Trainmen employed by the Dallas Railway are of a high class, according to C. J. Crampton, superintendent of safety and in charge of employment. Mr. Crampton recently addressed the Co-operative Club and took as the text of his address "Save the Difference." This is the slogan for the Dallas Railway. Many high school graduates and college men are employed as trainmen while attending school.

"Ad" Explains Broadway Bus Service.—In connection with the starting of its Broadway bus service whereby Broadway, Providence, is served by buses only for local service the United Electric Railways ran an "ad" in the *Evening Bulletin* explaining the conduct of the bus operation. The "ad" contained a picture of both the bus and electric car in the company's service. "The outstanding feature in explaining these changes," says the "ad," "is better service."

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Personal Items

Mr. Griffin Made Vice-President of Texas Electric Railway

James P. Griffin, general passenger agent of the Texas Electric Railway, with headquarters at Dallas, has been elected vice-president of the company and a member of the board of directors. Mr. Griffin is the oldest member of the original Strickland organization in point of service.

He came to Dallas with the late Col. J. F. Strickland when preliminary organization of the Dallas-Sherman Interurban was undertaken in 1905. In 1906, when the road was incorporated, he was made secretary. When the road was completed and operation begun in 1908, he was made general passenger agent and auditor. On April 1, 1912, Mr. Griffin was made secretary of the Southern Traction Company, which was building the lines from Dallas to Waco and Dallas to Corsicana.

In October of that year he was appointed general passenger agent and auditor of those lines. When the Texas Electric Railway was organized in 1917, through the consolidation of the various Strickland interurban lines, Mr. Griffin became general passenger agent of the consolidated system and secretary of the company.

Mr. Griffin is now in his eighteenth year of service with the Strickland interurban companies.

C. P. Couch Vice-President of Holding Company

C. P. Couch, a member of the board of directors of the Arkansas Light & Power Company, has been made active vice-president of the Mississippi Power & Light Company, operating public utilities at Jackson, Vicksburg, Greenville and Columbus, Miss. He had been manager of the Arkadelphia-Malvern district of the Arkansas Light & Power Company. The Mississippi Power & Light Company with which he has become identified with headquarters at Jackson, Miss., was organized recently following the acquisition by H. C. Couch, J. L. Longino and their associates of the controlling interest in the electric light and power, street railway, and gas properties at Jackson, along with other electric light, power and street railway companies at Vicksburg, Columbus and Greenville. Mr. Couch is a brother of H. C. Couch, president of the Arkansas Light & Power Company and the Pine Bluff Company, at Pine Bluff, Ark.

H. F. Cameron Promoted

H. F. Cameron has succeeded C. P. Couch as manager of the Arkadelphia-Malvern district of the Arkansas Light & Power Company. Mr. Cameron was formerly manager of the Lake Charles Railway, Light & Water Works Company, operating the electric light and power, street railway and water systems in Lake Charles. He resigned this position to become vice-president and general manager of the Texas Gas & Electric Company. He became connected with the Arkansas Light & Power Company several months ago. For about two months he has been located at Malvern in charge of construction work there.

Thomas H. Nicholl Advanced

Thomas H. Nicholl was appointed superintendent of motive power of the Union Traction Company of Indiana, Anderson, on, July 1, 1923. Mr. Nicholl received his early education in the Anderson public schools and his college training at the University of Michigan. After leaving the University he was employed by the Union Traction Company of Indiana, in the electrical, mechanical and maintenance of way departments.

Thomas H. Nicholl

When war broke out he entered the first officers' training camp at Fort Benjamin Harrison and was appointed a second lieutenant in the regular army, after which he was promoted to a captaincy and served two and one-half years as captain of infantry.

After leaving the army he was employed in the engineering departments of the Mid-West Engine Company of Anderson, the Como Chemical Company of Kokomo and the Ball Brothers Glass Company, of Muncie, Ind.

In 1922 he accepted a position with the Union Traction Company of Indiana as assistant to the superintendent of motive power and from this position was promoted to his present position. The company operates one of the largest interurban systems in the country. It comprises more thaen 450 miles of track.

H. M. Blain Directs State Publicity Bureau

H. M. Blain, the director of the newly formed Louisiana-Mississippi Committee on Public Utility Information, mention of which was made in the ELECTRIC RAILWAY JOURNAL, issue of July 14 will bring to this committee valuable experiences gained in his various educational and journalistic endeavors. He made his Ph. D. at the University of Virginia and was elected to Phi Beta Kappa at the Washington & Lee University. From 1907 to 1920 Mr. Blain, as professor in the Louisiana State University, organized and developed the Department of Journalism and originated the combination of theory and practice in classroom and newspaper office for students. He was at one time managing editor of the *State-Times* at Baton Rouge, La. From 1917 to 1920 he was secretary American Association of Teachers of Journalism and from 1920 to 1923 manager of the Associated Rice Millers of America, an organization advertising rice nationally. During that time he edited a monthly magazine to the trade. In 1923 Dr. Blain was elected professor of Journalism at Tulane University. In the summer of 1916 he served as professor of journalism at the New York University.

W. P. Johnston has been appointed assistant general freight and passenger agent of the Spokane & Eastern Railway & Power Company and the Inland Empire Railroad at Spokane.

D. L. Evans, who has been business and commercial superintendent of the Georgia Railway & Power Company at Gainesville, Ga., has been placed in charge of the local railway lines of the company there with the title of superintendent.

C. D. SeCheverell, for the past four years secretary of the Wisconsin Railroad Commission, has resigned to join the Middle West Utilities Company organization. He will be assistant to Martin J. Insull, president of the Central Power Company, and for the present will be located at Grand Island, Neb. Before coming to Madison Mr. SeCheverell was for a number of years an executive of the Superior Water, Light & Power Company, Superior, Wis., from which company he resigned to take up war work.

M. H. Newton was appointed on July 1 advertising manager, Cleveland territory, for the ELECTRIC RAILWAY JOURNAL, succeeding David Cameron, who has been transferred to the New York office as business manager. Mr. Newton has been continuously associated with the transportation business since 1908. He was for a number of years a reporter for the Brooklyn *Eagle*. He comes to the McGraw-Hill Company from the position of advertising manager of the White Company, Cleveland. Mr. Newton is a member of the Cleveland Advertising Club and the Advertising Club of New York.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

British Thomson-Houston Company Prosperous

Addressing the annual meeting of the British Thomson-Houston Company in London recently, H. C. Lewis, the chairman, said that the directors' report would be considered satisfactory in view of trade conditions during the past year. The dividend on the ordinary shares was the same as last year and a somewhat larger amount was carried forward. The volume of orders received during the year was greater than in the preceding twelve months. A comparison between the current liabilities and the liquid assets showed that the company was in a very strong financial position. The liquid assets were about four times the current liabilities. The profit for the year, after deducting all expenses and charges other than interest on debentures and loans, was £494,592. To this there was to be added the amount brought forward from the previous year, £230,704, making the total amount to be dealt with £725,296. From this was deducted £118,614 for interest on debentures and loans; £99,386 for various depreciations; £13,125 had been written off the cost of converting the preference shares, and £50,000 has been set aside for a general reserve. This left to be carried to the balance sheet £444,171. Dividends on the preference shares had been paid up Dec. 15 last, and the directors now recommended that a dividend of 6 per cent, free of income tax, be declared and paid at once on the ordinary shares, which would absorb £120,000, and leave to be carried forward £236,671.

Orders of General Electric Increase

Orders received by the General Electric Company for the three months ended June 30, 1923, were $84,249,710, an increase of 34 per cent over a similar period for last year, according to the quarterly report of stockholders signed by President Gerard Swope.

New Wire Plant in Chicago

Announcement has recently been made of the organization of the Brenner-Moxley-Mervis Company to engage in the production of copper rods and drawn copper wire for electrical and power transmission. At the outset, the company will confine itself to the production of the articles mentioned, but eventually it is planned to manufacture various allied products as well. It is claimed that the location of the new plant, which will be in the southwest side industrial district of Chicago, will relieve Mid-West consumers of heavy freight charges and considerable delays involved in long-haul shipments from the East. The president of the new company is Nathan P. Brenner, who is also the head of the American Insulated Wire & Cable Company. The vice-presidents are William J. and George T. Moxley. N. P. Brenner, Jr., is treasurer and Meyer B. Mervis is secretary. These five men also comprise the directorate of the new company.

Army Surplus Sales

A series of advertisements now being published by the government tells the story of what has been accomplished by the Director of Sales in disposing of the huge surplus stock of army material. The first advertisement of the series appeared on July 21, and each one tells a different story of what has been accomplished. The announcement that the final sales will be conducted by the War Department in September draws attention to the remarkable success that has attended previous sales. More than 2½ billion dollars worth of merchandise has been disposed of in this way. Several years ago, before the commencement of the sales, it was generally predicted that the dumping of such large quantities of goods on the market would have a disastrous reaction, and seriously interfere with normal business. Events have not justified these predictions, however. The sales have been so skillfully conducted that they have passed almost unnoticed, in spite of the vast quantity of material disposed of.

Timber Famine Here

Timber is being destroyed faster than it is being replaced, quality is growing poorer and prices are becoming higher according to Col. William B. Greeley, chief of the United States Bureau of Forestry, who is actively aiding the Federated American Engineering Societies in a nationwide movement for reforestation. He states that originally the United States contained five trillion board feet of stumpage; now only 1,600 billion feet of virgin timber and 600 billion feet of culled and second growth remain. Soft wood is being cut eight times as fast as it is being replaced, and hard wood three times as fast. Of all timber 75 per cent being cut is not being replaced.

The average price of retail lumber advanced from 1840 to 1921 three and one-half times as rapidly as the index price of all commodities. In 1870 the per capita consumption was 345 board feet; in 1906 it was 516 board feet; in 1920 it had dropped to 315 board feet. Timber famine, as to the eastern and central United States, is not hypothetical or distant; it is here.

Colonel Greeley describes the manifest requirements of the situation as: First, make the timber we have go as far as it will through reducing waste and improving the efficiency of its use. Second, make progress as rapidly as possible toward a permanent and sustaining supply of timber by increasing the growth in woodlands and by putting idle acres to work growing trees.

ELECTRIC RAILWAY MATERIAL PRICES—JULY 31, 1923

Metals—New York

Copper, electrolytic, cents per lb.	14.50
Lead, cents per lb.	6.55
Nickel, cents per lb.	29.50
Zinc, cents per lb.	6.65
Tin Straits, cents per lb.	37.75
Aluminum, 98 to 99 per cent, cents per lb.	25.50
Babbitt metal, warehouse, cents per lb.:	
Fair grade	52.00
Commercial	25.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$5.475
Somerset mine run, Boston	2.625
Pittsburgh mine run, Pittsburgh	1.95
Franklin, Ill., screenings, Chicago	1.675
Central, Ill., screenings, Chicago	1.375
Kansas screenings, Kansas City	2.625

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	3.15
Tie plates (flat type), cents per lb.	2.575
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.125
Steel bars, cents per lb.	2.40
Ties, white oak, Chicago, 6 in.x8 in.x8½ ft.	$1.50

Hardware—Pittsburgh

Wire nails, base per keg	3.00
Sheet iron (28 gage), cents per lb.	3.85
Sheet iron, galvanized (28 gage), cents per lb.	5.00
Galvanized barbed wire, cents per lb.	3.80
Galvanized wire, ordinary, cents per lb.	3.35

Waste—New York

Waste, wool, cents per lb.	12–16
Waste, cotton (100 lb. bale), cents per lb.:	
White	11–13.50
Colored	8–13

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal.	$1.02
White lead (100 lb. keg), cents per lb.	11.85
Turpentine (bbl. lots), per gal.	$0.95
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4.75

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	17.50
Rubber-covered wire, No. 14, per 1,000 ft.	$7.00
Weatherproof wire base, cents per lb.	18.75

Paving Materials

Paving stone, granite, 4x8x4, f.o.b. Chicago, dressed, per sq.yd.	$3.50
Common, per sq.yd.	3.10
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.79
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	54.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.75
Cement, Chicago consumers net prices, without bags	2.20
Gravel, ¾-in., cu.yd., f. o. b. N. Y.	1.75
Sand, cu.yd., N. Y.	1.25

Old Metals—New York

Heavy copper, cents per lb.	11.50
Light copper, cents per lb.	10.00
Heavy brass, cents per lb.	6.00
Zinc, old scrap, cents per lb.	4.00
Yellow brass, cents per lb. (heavy)	6.00
Lead, heavy, cents per lb.	5.25
Steel car axles, Chicago, net ton	$17.75
Old car wheels, Chicago, gross ton	20.25
Rails (short), Chicago, gross ton	19.50
Rails, (relaying), Chicago, gross ton	33.50
Machine turnings, Chicago, net ton	8.75

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Rolling Stock

Savannah Electric & Power Company, Savannah, Ga., is reported to have ordered eight new one-man safety cars.

Department of Street Railways, Detroit, Mich., is considering the purchase of from fifty to one hundred new cars of the Peter Witt type. Although the details as to how the purchase will be financed have not been decided the object in placing the orders in the near future is to have the cars on hand for next spring. Proposals are being asked by the city Department of Purchases and Supplies for the sale of twenty-five of the city's double end one-man safety cars which the department proposes to dispose of.

Track and Line

Eastern Wisconsin Electric Company, Sheboygan, Wis., plans to replace the old tracks on Ninth Street, Oshkosh with a modern type of equipment including the latest style of steel rails, steel ties and bonding.

Jackson Railway & Light Company, Jackson, Tenn., is making track improvements which will cost about $35,000. The East Jackson line from Main to Royal is being modernized. A foundation of white limestone rock is being placed under the tracks.

Springfield Street Railway, Springfield, Mass., is relocating its tracks over Pecousic Hill on the Hartford East Side line, near the Springfield-Longmeadow boundary, preparatory to the widening, straightening and regrading of Pecousic Avenue by the city of Springfield.

Los Angeles Railway has started extension of the Brooklyn Avenue line. The new track will extend from the present terminal at Wabash and Indiana Streets to connect with the old and unused part of the Gage Street line. In addition to the new work the old track will be reconstructed.

Nashville Railway & Light Company, Nashville, Tenn., has been granted permission to change the alignment and grades on its Belle Meade line out of Nashville to conform to the new Federal aid highway being built beside this line. The change is about 2½ miles in length and tracks will be moved to the center of road. A double boulevard will be eventually built.

Bamberger Electric Railroad, Salt Lake City, Utah, is constructing spur tracks at Farmington and Kaysville, Utah, which will more adequately serve the shipping interests of Davis County and act as a stimulus toward the introduction of new industries. The Farmington spur will serve the Continental Oil Company, which has purchased property for the erection of oil tanks and warehouses at that location. The Kaysville spur will serve several important industries at that point.

Pacific Electric Railway, Los Angeles, announces that work will commence immediately upon the construction of a 2-mile extension of its Alhambra-San Gabriel line from the present San Gabriel terminus. The proposed line extension is to serve newly developed territory that has been extensively settled during the rapid growth of southern California. Present plans call for the completion of the project by Nov. 1 at a total cost of $250,000. At an estimated cost of $742,000, the company has the following reconstruction program now under way on its lines in southern California:

Long Beach, Pine Avenue, reconstruct and repave 3,920 lin.ft. of double track, using 7-in., 128-lb. grooved girder rail, rock ballast, mechanically tamped, and repaving with asphalt concrete pavement; continuous joints and double-concealed bonds.

Pasadena, South Lake Avenue, reconstruct and repave 3,600 lin.ft. of double track, replacing 6-in., 72-lb. T rail with 7-in., 128-lb. grooved girder rail; rock ballast, mechanically tamped; continuous joints and double-concealed bonds; repaving with asphalt concrete pavement.

Pasadena, East Colorado Street, reconstruct and repave 8,700 lin.ft. of double track, replacing 4½-in., 60-lb. A. S. C. E. rail with 7-in., 128-lb. grooved girder rail; continuous joints and double-concealed bonds; rock ballast, mechanically tamped; replace oil macadam pavement with asphalt concrete pavement.

Los Angeles, South Hill Street, West 16th Street line, also same line of West 16th Street, from Hill Street to Flower Street reconstruct and repave 4,580 lin.ft. double track-combination-gage track, replacing 61in., 72-lb. T rail with 7-in., 128-lb. grooved girder rail; rock ballast, mechanically tamped; continuous joints and double-concealed bonds; asphalt concrete pavement.

Power Houses, Shops and Buildings

Denver & Interurban Railroad, Denver, Col., has completed the construction of a new carhouse.

Western Ohio Railway, Lima, Ohio, is installing a turbine of 2,500 kw. capacity to produce 60-cycle current at the St. Marys power house, in place of a 1,100 kw. unit operating at 25 cycles.

Twin State Gas & Electric Company, Brattleboro, Vt., is going forward with the construction of the new addition to the power house at Gorham, N. H. The work is being done by the Sanders Engineering Company of Portland, Me. It is expected that the job will be completed about Jan. 1, 1924.

Bangor, Me.—Plans are being formulated which will link up all the power systems of Maine from Bangor to the New Hampshire line. It will mean an interconnection of the lines of the Central Maine Power Company, the Cumberland County Power & Light Company and the Bangor Railway & Light Company. Heretofore, these companies in emergencies have been entirely dependent upon their own resources. The Cumberland County Power & Light Company formerly served the western section of the state, the Central Maine Power Company is serving the central part of the state and the Bangor Railway & Light Company the eastern section. Complete details of the new construction have not yet been determined.

Trade Notes

H. L. Erlicher, formerly assistant to the general purchasing agent of the General Electric Company, has been named assistant general purchasing agent, effective Aug. 1, 1923.

Burford, Hall & Smith, American Trust & Savings Bank Building, Birmingham, have been appointed district representatives for the sale of diamond soot blowers by the Diamond Power Specialty Corporation of Detroit.

Root Spring Scraper Company, Kalamazoo, Mich., announces that Ross F. Hays, 2 Rector Street, New York City, is its representative east of Buffalo, with the exception of the New England States, where the Charles N. Wood Company, 948 Old South Building, Boston, are the representatives.

Portland Cement Association, Chicago, Ill., announces the appointment of James A. Hudson as district engineer in charge of a new association office just opened in Memphis in the Exchange Building. J. R. Fairman has been appointed district engineer in charge of a new office in Birmingham in the Jefferson County Bank Building and P. H. Johnston has been appointed district engineer in charge of a new office in Jacksonville in the Graham Building.

Surplus Steel Exchange, Inc., New York, N. Y., which was recently organized, announces the opening of an office in Chicago, in order to handle the listings and inquiries from that district which have hitherto been dealt with from New York. The Chicago office will be at 2257 Oakdale Avenue, in charge of A. E. Thiffault and Raymond I. Caspers both of whom have long been affiliated with the steel trade.

Robert E. Fritsch, 6601 Limekiln Pike, Philadelphia, announces that he has now entered the field of engineering, specializing on the study of electrolysis, and is ready to serve his past friends as well as future clients. He has severed his connection of more than eleven years with the E. E. Brownell Engineering Company. During this time he made a special study of electrolysis and devoted much time to its effect and its cure in connection with gas, water and lead sheath underground cable.

New Advertising Literature

Ohmer Fare Register Company, Dayton, has just published an interesting and attractively bound 51-page booklet entitled "Evidence — Expert Testimony Of Those Best Qualified by Ability and Experience To Make Decisions." The booklet is principally a reproduced collection of letters which the company has received endorsing the value of Ohmer Fare Registers by the most able electric railway operators in this country and Canada. Some extracts giving opinions on the Ohmer system of fare accounting are included.

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New York, Saturday, August 11, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 6

Utility and City Prosperity Go Hand-in-Hand

A NEW YORK CITY official recently justified the operating loss on the municipal trackless trolleys in Staten Island by the plea that the city will get back in increased taxes because of higher land values many times the loss in operating costs. Very likely this is true. This increase in value of real estate is a recognized byproduct of the operation of every public utility. Without their supply of transportation, electric light, water or gas, land otherwise suitable for building purposes is of much less value. Every city gains as the service of its utilities improves in quality and in the extent of the territory supplied.

But if this is so, why do so many municipalities act as if any prosperity of its local utilities is gained only at the expense of the citizens? Why, in New York for instance, does additional transit in Staten Island deserve a subsidy, while in the other four boroughs transportation has had to be decreased because the city failed to co-operate in helping to promote good transportation? The neglect of the city in providing the repair facilities for the rapid transit cars called for under the contract between the I. R. T. and the city is a case in point.

These are questions which the New York City administration can well answer. And there are other cities where the lesson of this close connection between city and utility prosperity is still to be learned.

Salaries Again—What Poor Salaries May Mean

EXAMPLES of underpay of men of the electric railway field, particularly the master mechanics, of which the JOURNAL has spoken frequently of late, keep coming to the attention of the paper. Perhaps all of them ought to be cited to impress the fallacy of one of the things that is holding the industry back. One instance, which shows more definitely than common what this policy means, follows:

Three years ago the master mechanic on a small city property operating some forty cars came to the manager and said he simply must have more money. He was making $2,500, had a family, and the high prices of necessities were pressing him hard. He was a competent man and was keeping the cars up to a high standard of repair. But the manager would not consent even to the $500 increase that would satisfy the man.

He quit—as he should have done. Subsequently this same manager replaced him with an inferior man whom he paid $3,600. The condition of the cars has steadily gone down, until today, a new manager who is about to make a change in this department, estimates that at the very least it has cost this company $200,000 in excessive maintenance expense, not to mention the losses of patronage from irregularities and failures of service, because that former master mechanic was let go.

Such decisions about the salaries of those men in responsible positions who have demonstrated their ability and in whom the company has the invaluable asset of experience on the property are evidence that no real thought is given the matter.

The JOURNAL is going to have more to say about this subject, because it believes that it points to the remedy for one ailment of the industry which goes right to the root of things. It is impossible to get 100 per cent heart and head interest in the work when the man carrying the responsibility is sadly underpaid, and knows it, and is spending half his time trying to find a way to jump to another field.

N. & W. Electrification Has Contributed Notably to Knowledge in this Field

ALTHOUGH it was not one of the earliest steam railroad electrifications, that on the Norfolk & Western Railway was a pioneer in several important respects. It was the first to demonstrate on a large scale the real abilitiy of electric operation to increase track capacity in the movement of heavy freight trains up long, steep grades. It was the first to prove that constant-speed motors can be supplied from a single-phase distribution circuit under the difficult conditions imposed by everyday service on an important freight-carrying railroad.

At the present day it requires a stretch of the imagination to picture the phase converter as it was ten years ago. The underlying principles upon which its operation depends were, of course, well known. But as a piece of laboratory apparatus it was merely of interest, and that is about all. There had not previously been any considerable commercial demand for a machine to convert single-phase into polyphase power. Ten years ago the demand materialized all at once and on a large scale. The result was highly creditable to the scientific knowledge and designing skill of the time, for the phase converter has proved to be one of the most reliable and effective parts of the N. & W. locomotives. The only important change in design, which will be incorporated in the locomotives now building, is in the use of the synchronous, in place of the induction principle in the phase converting apparatus. This is not a fundamental change, and it is simply for the purpose of improving the power factor. The slight extra complication in the excitation is believed to be offset by the better effect on the power circuit.

Being a pioneer, the N. & W. found it necessary to solve a number of problems. The solutions are now available to other roads contemplating electrification. They will, for example, save the Virginian Railway much expense and difficulty. Locomotives for service such as that involved in hauling 3,000-ton trains up 2

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per cent grades at 14 m.p.h. will hereafter be built more ruggedly than the first N. & W. machines because the test of time has shown where the weak points were. This is perhaps the greatest contribution to the development of the art of heavy electric railroading that the N. & W. has made.

A visitor to the N. & W. electrified zone is impressed by the matter-of-fact way in which the electric engines perform their work, and by their general inconspicuousness. All evidences of experiment are gone. The electrification as a whole functions like a well-oiled machine. Like so many of the electrification projects, heralded as great achievements and arousing greatest interest at their instigation, it plays its part in trunk line operation so well that its existence is almost forgotten by the general public and even by steam road men. In fact, the mileage electrified has been nearly doubled since the original installation, almost without any general cognizance of the extension. The article in this issue brings the N. & W. project back to mind and relates an intimate account of the results that are being obtained, as found by one of the JOURNAL editors after spending a week in the electrified zone.

The "Journal" Placed on the "Index Librorum Prohibitorum"

LAST week this paper printed an editorial to which the president of the company directly concerned took exception by telephone. Later by a written communication he discontinued all that company's subscriptions to the JOURNAL. He was invited to make use of the JOURNAL pages to express his views, if he thought the editorial unfair in any respect, but has not responded.

Since the JOURNAL is thus placed on the "Index Librorum Prohibitorum" for the men of this company, because of what was printed, perhaps the reason for the editorial should be stated.

The burden of last week's editorial was that the company in question had embarked on what appeared to be a dangerous experiment from the standpoint of the industry. In so expressing its own view, the JOURNAL, which aims to reflect also the best opinion of the industry it champions, naturally puts the interests of that industry as it sees them above the acts or interests of any individual company, where these seem to be running counter. It was thought that the shutdown of this property was a matter of great concern to the industry, for the reasons, among others, set forth in the previous editorial, and the developments up to Thursday night of this week have not changed this opinion.

A Reflex Benefit of the Merchandising Transportation Movement

SALESMANSHIP, in order to be most effective, must have to do with commodities or services which are first class in quality and well adapted to the needs of the prospective purchaser. This principle applies in selling electric railway car rides, as well as typewriters, automobiles or dry goods. No self-respecting salesman can afford to exert his efforts in selling things with which his customers will be dissatisfied. To do good work he must first convince himself or be convinced that the community in which he sells will be benefited by purchasing his wares.

Of late years the electric railways have been directing increased energy in salesmanship to meet private automobile and bus competition. They did not do much along this line until the competition became threatening. Coincident with the developing of merchandising plans, the qualities of the product of the competitors had to be studied, in order that all aspects of the competition might be met, as far as possible. This in turn caused a study of the qualities of the transportation service which the railways were already rendering, with a view to seeing if it could be improved and hence more readily sold. This reflex action has been highly beneficial; in fact, to it may be attributed some of the principal improvements which have come about recently in electric railway service, especially those affecting speed, and those affecting passenger comfort, convenience and safety.

The above qualities are usually summarized as "good service"; good service being service that the public wants and will consider good if furnished, rather than what the manager finds it most convenient and profitable to give. The present concentration of effort in merchandising transportation has tended to standardize the quality of good service. Once a railway is sure that, measured by modern requirements, it is giving good service, it may properly and profitably talk more about it.

Temporary Traffic Stimulators Are Not Good Business

THE article in the July 14 issue on "Selling Transportation in 1890" should be a reminder to the present-day operator that blanket transportation is not so new as some people imagine, and that no one need be afraid of it. Indeed, while the season ticket was but a sporadic phenomenon in this country it has been a matter of course abroad almost from the first days of railroading.

The experience of Mr. Owen's company in the far-away days of 1877 is not without a lesson for us now. His company covered a great deal of ground in going from 7 cents to 5 cents with six tickets for 25 cents in single-trip fares and in putting on passes that ran from one month to a lifetime. Apparently, he started off with a proper analysis, but the successive changes in rates, and especially in allowing unlimited riding for $1 a month, indicate that the company did not understand or follow the economic principle involved in the weekly pass. This principle is that the purchaser of a pass must pay a price equivalent to at least two standard or ticket fares a day, so that his reduction in rate is obtained only through the addition of non-rush rides that generally are available without an increase in the amount of service.

Probably the writer of the paper has gone to a realm where each inhabitant is supplied free of charge with self-contained, high-speed transportation, so he would consider futile any argument on his conclusion that traffic stimulators should be regarded only as temporary expedients. This is true enough of special excursion rates, and the like, but it is not true of plans like short-haul fares, off-peak rates, the monthly card and the weekly pass. There is ample experience to show that if such stimulators are removed, riding and revenue fall down to the old levels with striking swiftness. Therefore, the motto should be, in the words of Davy Crockett, "Be sure you're right, then go ahead," and make your patrons feel that you will stay put so long as no radical changes occur in costs.

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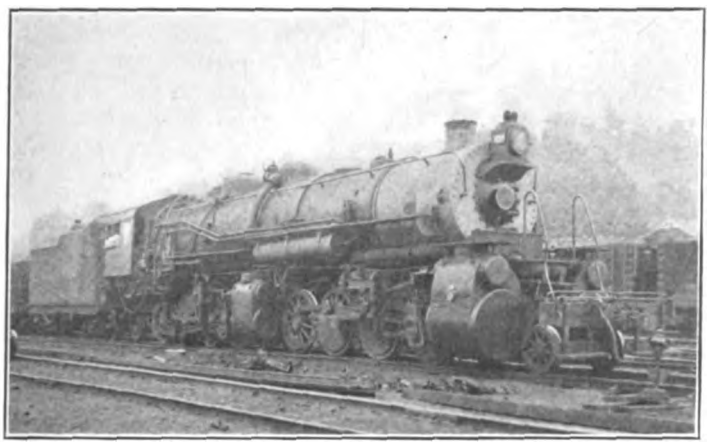
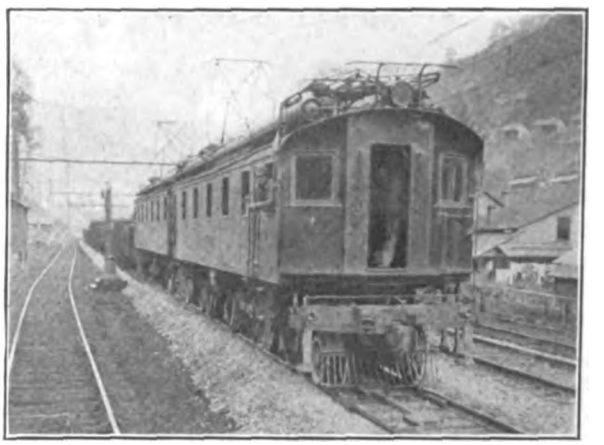
A Decade of the N. & W. Electrification

Operating Experience Has Led to Minor Changes in Original Designs—Electrified Mileage Has Been Doubled Since the First Project Was Completed—Some of the Methods of the Transportation and Other Operating Departments Are Described





Three of These Mallets Could Not Do What Two Electrics Do on the N. & W.

MANY changes have taken place since the Norfolk & Western Railway made its decision ten years ago to electrify the section over the divide in the Blue Ridge Mountains between Virginia and the southern part of West Virginia, about 360 miles from the Atlantic Ocean. Originally the plan was to electrify the line from Bluefield to Eckman Yards, but before the work actually was done an extension a few miles farther to Kimball was authorized. The route distance from Bluefield to Kimball is 27½ miles, or 1½ miles longer by way of a detour between Cooper and Bluestone Junction.

The total single-track mileage involved in the first electric installation was approximately 108, the road being double-tracked except for a section of slightly more than 3,000 ft. through the Coaldale tunnel, and for the detour between Bluestone Junction and Cooper. There also are numerous yards and sidings in the electrification.

Success of Electric Operation Attested by Consistent Extension Program

Hardly was the original installation completed when the process of expansion began, and it is now proceeding rapidly. In 1915 and 1916 the 5 miles of route between Bluestone Junction and Clift Yard were electrified, as well as a mile between Bluestone Junction and Pocahontas.

Just prior to the war an extension of the electrification westward from Kimball was started, including the main line to Farm and a single-track branch from Welch to Wilcoe Yard. Unfortunately this project, which comprised 51 miles of single track, was interrupted by the war, but since the armistice the work has been pushed to completion.

Even before the Wilcoe-Farm extension was finished, the directors of the company voted to continue the electrical installation westward to Iaeger. The Farm-Iaeger project, now being constructed under the direction of Gibbs & Hill, New York, involves a route mileage of 22, and a total of 50 equivalent single-track miles. With the extension just completed the mileage of the original installation will be nearly doubled.

Features of the Overhead Construction

In general the overhead construction in the new work will follow the lines adopted earlier, but a few changes have been made in details. Instead of tubular poles, columns of H-section will be used. These will be of four sizes, 12 in. x 12 in., 10 in. x 10 in., 8 in. x 8 in., or 6 x 6 in., as conditions may require. The columns will be supported on steel base plates bolted to concrete foundations.

The cross-members will be of H-section as in the original installation. On the Wilcoe-Farm extension the cross-members were made up of two angles riveted together to form a T, with spacers between the vertical sides. This was done because it was impracticable to obtain H-section steel during the war, although the latter is preferable as it is more substantial and is easier to keep painted.

The guys will be of strand in place of the rods used earlier. Each will terminate at the ground end in a threaded rod to which it will be connected by a turnbuckle. The sockets to which the strand will be attached directly will have extra large baskets. Tests have shown that the strand will break before it will pull out of a socket.

The guy anchor or "dead man" to which the threaded rod will be attached will be of concrete, and a sleeve of iron pipe will be slipped over the lower part of the strand to protect it and the rod. It is planned to pre-cast the guy anchors at a central point and haul them to the job, whereas in the earlier work they were cast in the field.

Suspension insulators will be used for supporting the messenger wire wherever possible, even in the tunnels. In the tunnels, however, it will be necessary to employ pin-type insulators on the insides of the curves. The hangers will be made extra long to allow of shortening

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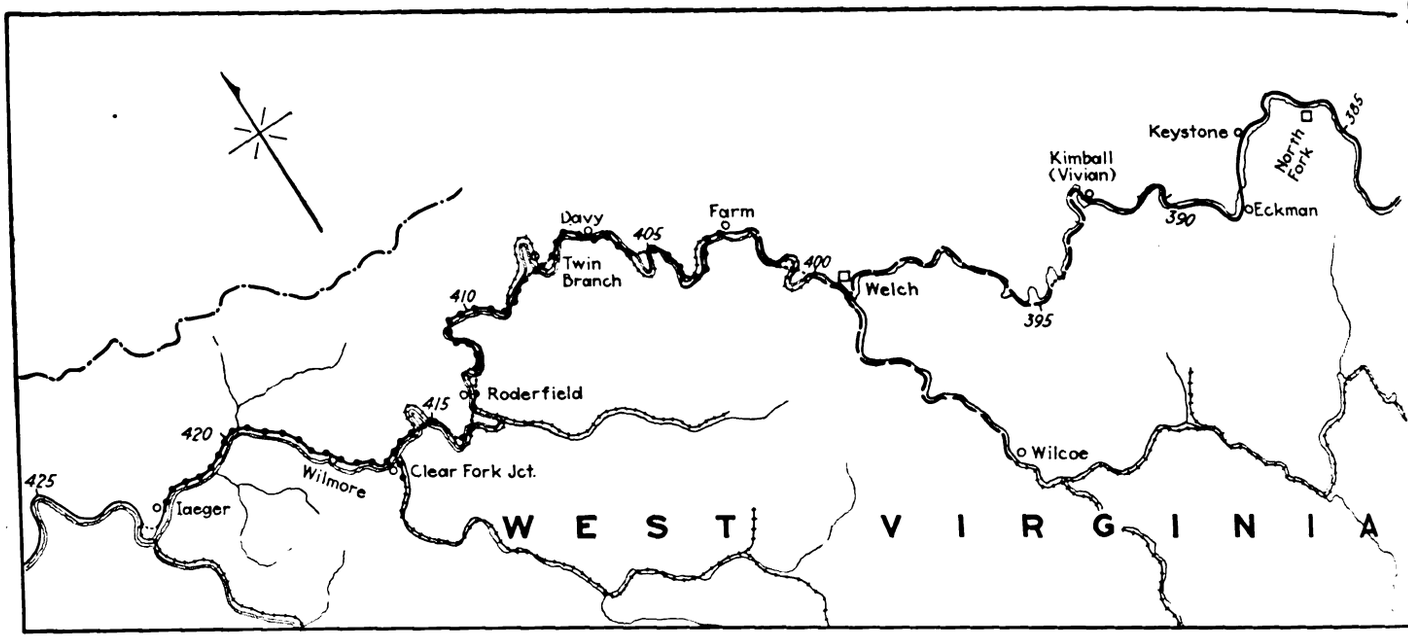

The Several Steps in the N. & W. Electrification from Bluefield to Iaeger Are

to maintain vertical clearance, as mentioned elsewhere in this article.

Practically all the fittings used in the tunnels will be of bronze to prevent corrosion. This will extend to the messenger, which will be of extra high strength bronze.

Some Changes in Overhead Found Desirable

It was expected at the start that changes would have to be made in the construction, as the Norfolk & Western was a pioneer electrification. For example, soon after operation was commenced it was found that the No. 00 hard-drawn copper auxiliary messenger wire which supports the contact line, and the contact wire itself, which was of No. 000 bronze, were overheated on the heavy grades. To remedy this a second auxiliary messenger, similar to the first, was added at certain points.

An interesting modification in the overhead construction has been made necessary by the steady rise in the track elevation, which has averaged about 1 in. per year. This rise is caused by the inclusion with the ballast of a large amount of coal dust dropped from the cars. It has been found difficult and expensive to separate this by forking or other ordinary maintenance method, the more economical way being to reballast the track to a slightly higher level. The result after ten years is that provision has had to be made for raising the contact wire from time to time in order to preserve the necessary clearance.

While in the most recent construction this condition will be provided for by shortening the hangers from time to time, this is generally impossible in the earlier sections of the electrification. In a recent case the procedure was adopted of lengthening the poles. This was effected by first cutting off the tubular poles at the ground line with an acetylene torch, which was necessary because the poles were firmly grouted in holes molded in the foundations, so that they could not be removed without breaking up the concrete with possible damage to the poles. After the cutting off of a pole it was reset in a casting consisting of a baseplate with a cylindrical sleeve, with an inside diameter considerably larger than the pole. A cement grout was tamped between the pole and the sleeve. The baseplate was attached to the concrete foundation with two anchor bolts, which were made long enough to permit the baseplate to be raised 8 in. or more on shims. The extended ends of the anchor bolts were covered with caps of pipe held down by extra nuts.

One of the largest reconstruction jobs which has fallen to the electric traction department, and which is now being completed, was due to the relocation of the main line on Ruth Hill between Bluestone Junction and the east portal of the Coaldale tunnel. The original installation at this point was single track, and since it was planned for a double tracking later the extra contact system easily could have been installed. It was decided, however, to relocate a portion of the track at the time the second track was installed, so as to improve the alignment, reducing the maximum curvature from 10 deg. to about 5 deg. This involved the relocation of the catenary structure for a distance of more than 2 miles. New foundations had to be installed, involving cutting off the poles and replacing them in base castings of the type used for raising the overhead. In some cases the cross-structure had to be lengthened. Signal locations had to be changed, and in some places new structural anchor bridges had to be erected.

Line Maintenance Methods

Line maintenance work is done by two groups of linemen, one having headquarters at North Fork, the other at Bluestone Junction. Their principal duties are to repair damage, paint the structures and test insulators. The chief sources of trouble are wrecked pantographs and insulator flashovers. A general line foreman has supervision over all line maintenance, with a foreman in charge of each repair gang. One man has the duty of patrolling the line constantly, for which purpose he rides the trains.

In line maintenance work a gasoline motor car is used, which has sufficient power to pull a trailer carrying materials. Line repair work can be handled from this car also; in fact, it takes care of most of the work, so that the work train is not called out more than once a year.

Work is done on a "hot" line only in the spans. For this purpose ladders impregnated with paraffin are

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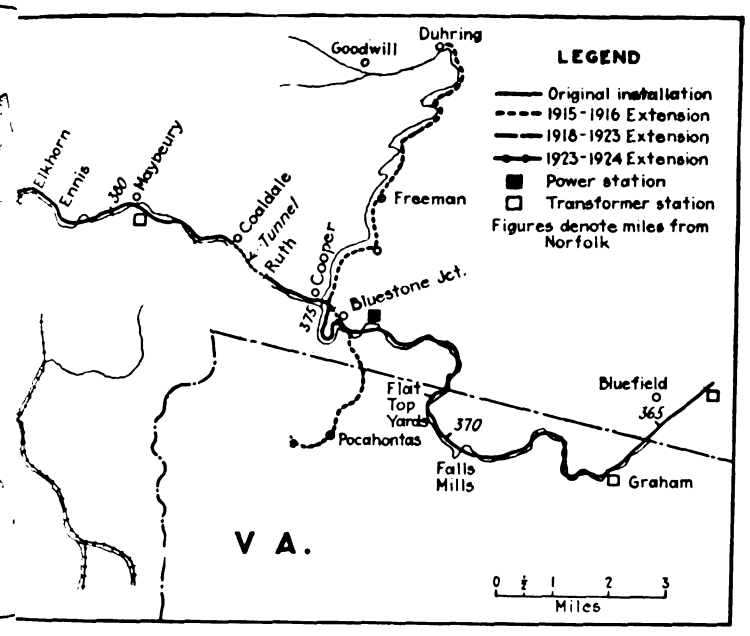

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employed, being in 12-ft. sections. If it is necessary to do work at the insulators the power is shut off. Few accidents happen in line work.

There is little wear on the contact wire, as it is of bronze alloy, and the pantographs are well greased.

Each insulator is tested with a "megger" every year or two. At present not more than 2 per cent of the insulators require to be replaced each year.

Wood strain insulators are used for pull-offs and between tracks. Formerly they gave some trouble from flashovers, but this has been stopped by reinsulation. The original varnish which came on the insulator is scraped off, after which the insulator is heated in a baking oven to dry it out. It then is painted with a dipping varnish and baked. It is revarnished and baked again, after which it is ready for service. About once a year thereafter it is given a coat of air-drying varnish.

There are now six step-down transformer stations for supplying the single-phase trolley. These are located at Bluestone Junction, Graham, Maybuery, North Fork, Kimball and Welch. Each of these is near a passenger station. The station agent gives general supervision to the operation, which is very simple. If a circuit breaker goes out, it rings an alarm bell in the near-by station. The agent steps over to the transformer house, looks at the switchboard to see what has happened, and telephones the power director, who gives him instructions.

All the transformer stations are under the general care of one electrician, with a helper. They visit the substations regularly every day or two.

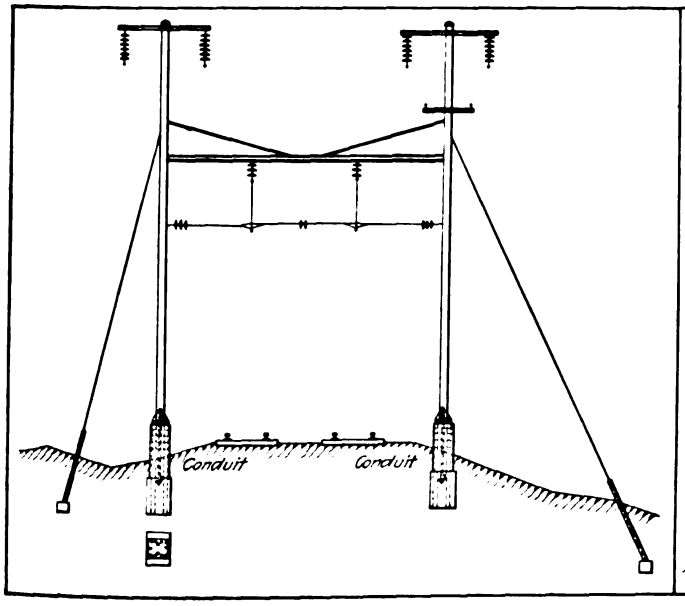
A possible cause of trouble that must be watched carefully is the failure of the supply of cooling water for the transformers. To protect against possible difficulty a simple device is used to warn the station agent by ringing an alarm bell in case of a failure of the supply. A light brass contact lever is pivoted near its middle on a bracket attached to one side of an enlargement of the vertical supply pipe. One arm of the lever passes through a window in the enlarged pipe and reaches into the path of the water current. The other end completes an electric circuit unless it is held out of contact by the force of the water impinging on the opposite end, the arm being pivoted off the center so that it is slightly out of balance.

The transmission line for the extension has been designed for an ultimate voltage of 88,000, although for the present 44,000 volts will be retained. Later it will be stepped up from 44,000 to 88,000 volts at Welch, 20 miles west of the power house.

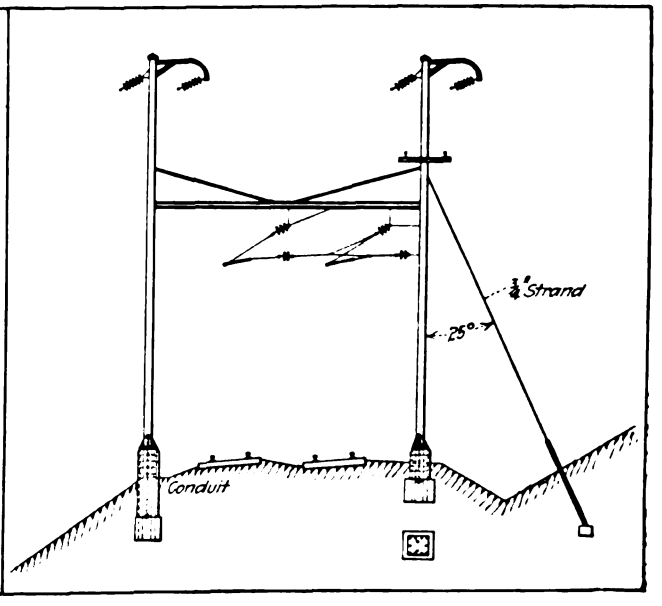
The new line will be insulated with four-section suspension insulators. Several tunnels are included in the route, and the transmission line will be carried over the mountains at the tunnels on a double pole line comprising H-columns set in concrete.

Extension Will Load the Power Plant Fully

Operation of the extension to Iaeger will place a full load on the power plant at Bluestone Junction, where the limiting feature is the supply of condensing water. It also will load to capacity the transmission lines to Welch, which were designed originally with a view to the present extension. The boiler equipment, however,



Essentials of the Farm-Iaeger Section Overhead Construction on Tangent Track Allows for Raising the Contact Line



On the Curves, Which Are Numerous, Special Construction of the Overhead Is Necessary

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had to be increased by the addition of two boilers which were provided for when the original twelve boilers were installed. These will be of the Stirling type, similar to those already in operation, with about 6,800 sq.ft. of heating surface each. The total installation will then be fourteen boilers, with a rating of something more than 8,000 boiler horsepower.

A question naturally arising in connection with the power plant capacity is the extent to which the electric locomotives return power during regeneration. Experience has shown that while considerable power is regenerated by trains descending the grades, it is all consumed on the line by other trains, so that while the power plant is relieved of load to that extent, power seldom is returned to the station to be absorbed in the water rheostat provided to guard against such an emergency.

Locomotive Frames Have Been Strengthened

The locomotive underframes originally were not designed for the tremendous stresses imposed on them in the starting of the heavy tonnage trains that are now hauled, in order to secure maximum capacity from the track. The twelve original locomotives not only handled all of the road work, but did the switching as well. The largest overhauling job which has been done has been to rebuild the locomotives with heavier side frames. This was accomplished without interfering with service, although it was carried out during a period of very heavy traffic demands. Today the locomotives are in practically perfect condition.

The lessons learned from experience with the first locomotives have been incorporated in the designs of the four ordered recently. These double-unit engines are now under construction by the Westinghouse and American Locomotive Companies. They will be one-third larger in capacity than the present machines. Their principal duty will probably be in pusher service on the long grade, which has its summit at the Coaldale Tunnel. These machines are due for delivery about Jan. 1, 1924, by which time the extension of the electrified section will be completed. These locomotives were discussed in this paper for Dec. 30, 1922, page 1012.

At present the full load on the 2 per cent grade eastbound, for a train with a leading engine and a pusher is 3,250 tons, while on the lighter grades 1,500 tons more can be hauled. One locomotive holds 3,250 tons easily on the 2½ per cent downgrade eastward from the tunnel by means of regeneration. Two of the new machines will take a train of more than 4,000 tons up the 2 per cent grade, and one will hold the same train by regeneration in the descent of the 2½ per cent grade.

Electric Operation Has Cut Down Congestion

From the standpoint of the men operating the electric zone, the outstanding feature of the electrification has been the reduction of congestion, particularly at the Coaldale tunnel. In the days of the steam engine trains would pile up on each side of the tunnel waiting to get through; now there is never any congestion. Formerly, on the long, steep grade leading eastward up to the tunnel, it was not possible for three Mallet engines to make more than 7 m.p.h. with a full tonnage train of 3,250 tons, whereas the electrics easily make 14 m.p.h. with one leading and one pushing locomotive.

Formerly "turning engines" was a time-consuming process, as it required from ten to twelve hours to recondition a Mallet for service after a run of from ten to twelve hours on the road. Not only was there much to be done in the way of cleaning fires, etc., but engines had to wait their turn for attention. With the electric engines, twenty-four hours or more of continuous service can be secured, while they can be "turned" in forty-five minutes.

Naturally, with these conditions, together with the general improvement in the electric zone due to the small number of clean, easily-controlled and reliable electric engines, the operating men are enthusiastic about electrification as they see it.

The electric crews form an independent section in the operating department, there being at present sixteen to eighteen crews to "protect" the eight or nine locomotives required to handle the traffic at this season. This year the movement of coal is largely westbound, due to the higher prices obtainable in the West. More men are needed when freight movement eastbound (up the grade) is the heavier.

The electric runs are selected by the crews in order of seniority. These runs are preferred to all steam runs except those in passenger service. The latter are in demand on account of the regularity of hours and general working conditions, so that men can depend on being at home at definite times. All freight trains, except time freights, are made up as business warrants, and electric crews are called out in rotation on eight hours notice.

When a run becomes vacant it is posted for five days, and the applicants ranking highest in seniority are assigned to it. The runs of the successful applicants are then posted for five days, and so on.

Men Qualified for Steam or Electric Operation

The men placed in charge of electric engines are qualified both for steam and electric operation. A supply of experienced men is assured, since the electric runs are in demand and those who apply for them are high on the seniority list. The steam men soon qualify for the electric runs, about a week being required for an engineer and less for a helper.

Instruction in electric engine operation is given by an assistant road foreman of engines, who is an electrically trained man familiar with every detail of the equipment. He first explains in the shop the different parts of the equipment and their functions and especially stresses the procedure in case of accident. He then goes into the handling of trains in regular service and gives practice in starting up an engine and shutting it down.

An examination is given at the office, such questions as the following being asked:

In case of wrecked pantographs, how do you protect yourself?

What holds a pantograph up and pulls it down?

How much of the circuit has 11,000 volts on it—that is, the main engine circuit, and what apparatus?

How many different circuits are there on this engine (high tension, low tension and control)?

What are the five duties of the phase converter?

What is the use of the rheostat?

How do you start up a "dead" engine—that is, one with no air?

After the men have satisfactorily passed the examination they are certified for electric operation. In the assignment of runs new engine men are paired with experienced helpers, so that they will not be bothered with details which the helper should be able to handle.

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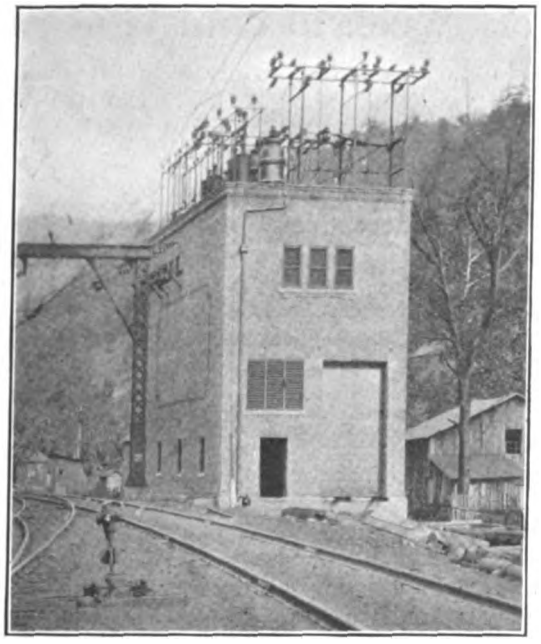
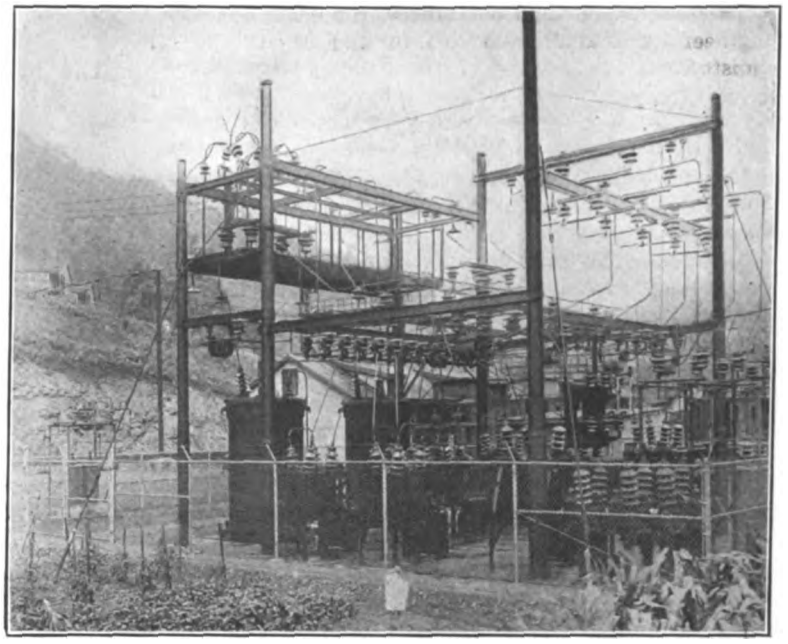




The Earlier Substations Were Largely Inclosed, the New Ones Are of the Outdoor Type

Once each week (Monday morning at present) the instructor holds a meeting of all who desire to attend, at which he reviews the subject of electric operation, answers questions, etc. Steam engine helpers attend this class at their option, if they desire to prepare for electric runs without interference with their regular work. They thus facilitate the taking on of electric runs when they become eligible for them.

In connection with the initiation of new men in the electric service, carefully worked out sets of instructions are used. The following partial quotation shows the general character of these:

Handling single trains with constant-speed electric engine.

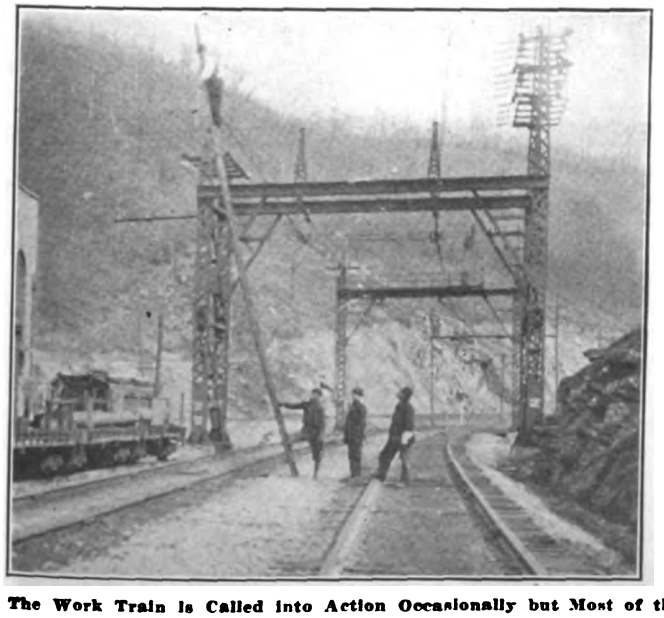
Speed changes. Accelerate first to 14 m.p.h.—change over to 28 m.p.h. by changing two trucks at a time in order to keep slack stretched.

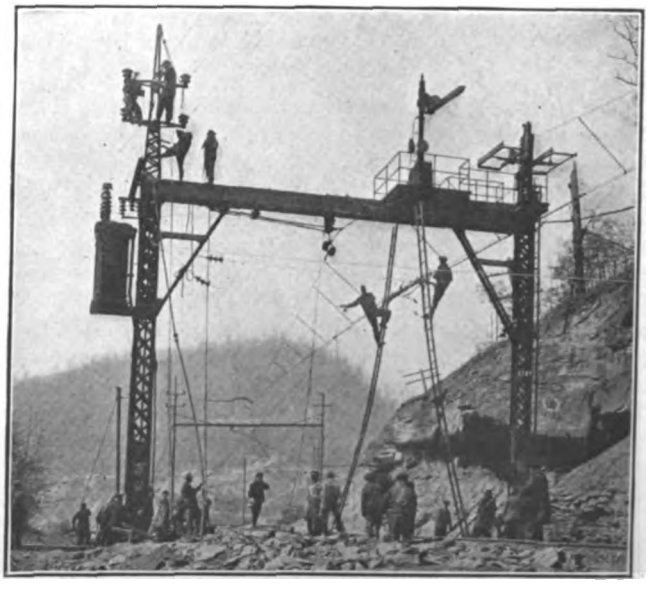
Change from motoring to regenerating. Selecting a time when the train is balanced over the summit in order to maintain constant speed while the change is being made and prevent rough slack action, shut off, throw the balancing lever from motoring to renegerating postion, etc.

An important operating rule, to which special attention is given in the instruction, relates to what is to be done if power fails. Under these conditions the rule provides that the train is to be stopped and hand brakes set. This is done so that there may be no possibility of damage due to air failure.

Power Demand an Important Consideration

Another important thing taught to the new electric operators is the importance of keeping the power plant informed of unexpectedly large demand for power. In order properly to co-ordinate the operation of trains and the supply of power, close communication is maintained between the train crews and the power house switchboard operator. The latter has before him a train sheet made up from reports furnished by telegraph operators along the line. He thus knows at least approximately the probable demand for power. He also has telephone communication with each eastbound signal, so that in case a train is liable to make





The Work Train Is Called into Action Occasionally but Most of the Maintenance Work is Done Without It. At the Right is Seen the Operation of Moving a Signal Bridge on the Ruth Hill Job

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an unexpected demand for power, the train conductor, engineer or fireman can call in and report the circumstances.

N. & W. Electrification Was Carried Out at a Fortunate Time

In conclusion, a few words regarding the general features of the N. & W. electrification may be of interest.

The electrified zone is part of the Pocahontas division, which covers the Bluefield-Williamson district in Virginia and West Virginia, as well as the Bluefield-Norton through the Clinch Valley in Virginia. The principal function of the electrified section is to gather the loaded coal cars from the sidings and yards along the line, where it is delivered from the mines in the famous Pocahontas coal region, haul them up the long 2 per cent grade and through the Coaldale tunnel, ultimately delivering them at the classification yard in Bluefield. Electric engines also assist in the movement of time freight and passenger trains through the electrified section, but their principal duties are the handling of loaded and empty coal trains.

Certain passenger trains eastbound receive assistance from electric pushers through the electric zone, but they need none when westbound. An incidental advantage of electric operation is that these passenger trains save twenty minutes over their former schedule time for the 11 miles between North Fork and Bluestone Junction. At first it was possible to make up lost time at this point, but the saving is now incorporated in the time-table, which allows thirty-[illegible] minutes for covering [illegible] steam locomotives and one electric are attached to the train, which makes a free running speed of 28 m.p.h.

The original installation was fully described in the issue of this paper for June 5, 1915, page 45, and in numerous shorter articles. It comprised a 27,000-kw. power station at Bluestone Junction, twelve "split-phase" (single-phase three-phase) electric locomotives, with a rated capacity of 3,000 hp. each on a one-hour rating, and five transformer stations in which the voltage is stepped down from 44,000 to 11,000 for use on the contact wire. Shortly after operation started an additional 9,000-kw. generating unit was installed in the power station.

The Results Have Fully Measured Up to Expectations

The primary purpose of the electrification was increase in track capacity and the result was satisfactory from the start. A dozen electric locomotives replaced thirty-four or more of the then most perfect Mallets. It was found to be possible to handle twenty coal trains eastbound daily, as well as assist six time freight and passenger trains up the grade, the total eastbound tonnage being 65,000 daily. In 1917 the electrical engineer of the railway stated that during the preceding year nine electric locomotives had handled a fifth more freight than forty-three steam engines had done in 1914, the normal number in service being respectively seven and twenty-four. The cost per million tractive-miles was reported to be 12½ per cent less with electricity than with steam.

Fortunately the electrification was in full operation before the breaking out of the war, and it was an important factor in delivering large quantities of coal for use on naval and merchant ships.

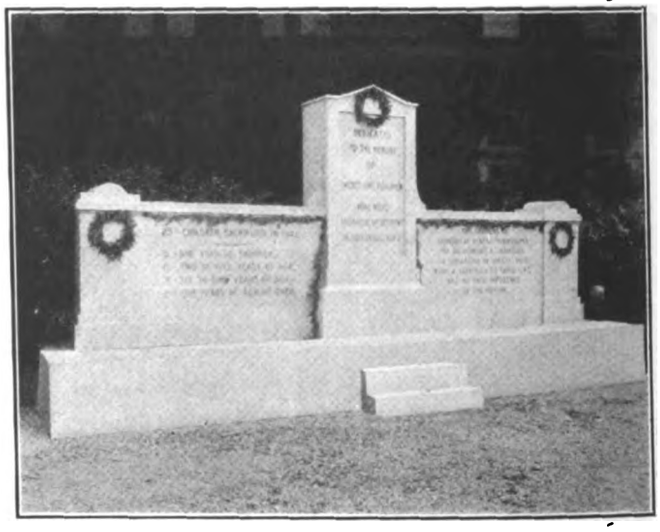
Safety Week in Louisville

The Safety Council Conducted a Successful Campaign—All the Local Industries Were Enlisted and Contributed Freely of Time and Money

By Neil W. Funk
Safety Director, Louisville Railway Company

For the past two and a half years our company has had in Louisville a safety council in its own organization that we believe has done and is doing some most useful work in the prevention of suffering, loss of life, and loss of much needed money. Regardless of how well we train our men, and regardless of how careful they are, there are still at least 60 per cent of the accidents that we cannot prevent unless the citizenship in the community is also trained to safety. We therefore welcomed "Safety Week" in Louisville as a fine opportunity to "sell" our citizens the ideals toward which we had been striving so hard and with considerable, yet not complete, success.

The Louisville Safety Council, of which Lee Miles, president of the Louisville Cab & Transfer Company



Monument Erected by Employees of Louisville & Nashville Railroad and Dedicated by Twenty-five School Children

is president, decided on a safety week for our city beginning June 3 and concluding June 9, 1923. George H. McClain, managing chairman, was able to interest practically all of our industries, including our railroad companies, in the movement.

The program opened on Sunday, and the ministers agreed to preach from their pulpits on the subject of safety. We therefore truthfully can say that safety week was opened with prayer.

On Monday there was dedicated a monument constructed by employees of the Louisville & Nashville Railroad to the twenty-five little children between the ages of one and fifteen who had been killed by automobiles in Louisville during 1922.

During the week the safety council maintained a bureau to furnish speakers to all industrial plants that requested safety talks. More than 100 large industrial plants had noon-day meetings, and the most prominent speakers of our city considered it a privilege to make safety talks to workmen. In this way the council was able to arouse much public sentiment for the safety movement. The speakers had been instructed to dwell especially on educating the child in safety ideals, and

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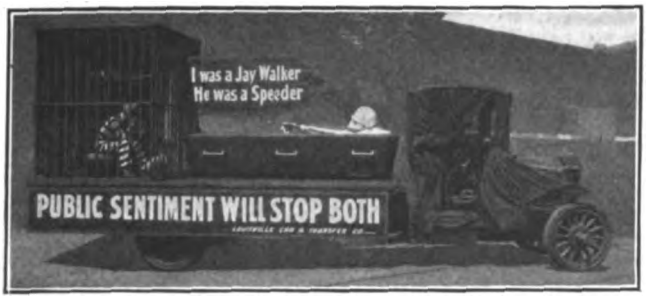


The Prize-Winning Float in the Safety Parade

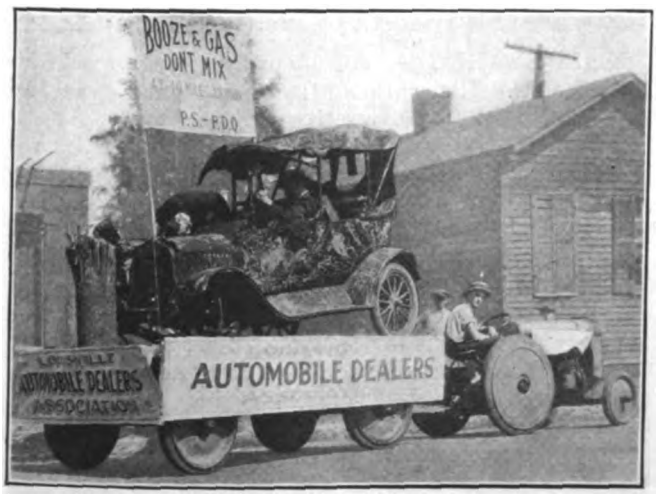
plant problems as to accident prevention also were emphasized.

On Friday of safety week perhaps the most beautiful parade that ever passed through the streets of Louisville was organized and held. L. J. Hannah, manager of the Dodge automobile agency, was chairman of the committee in charge. This parade was 2 miles long and consumed about an hour to pass. Numerous floats that represented the various industries of the city testified eloquently as to what the business men thought about the safety movement. Some of the features of the parade were novel. For instance, in the past year ninety-five people had been killed in accidents. This was gravely represented by having ninety-five boys dressed as skeletons to march with measured tread, leading the parade.

A prize offered for the civic organization presenting the finest representation in the parade was won by the Kiwanis Club, which had four impressive floats in line. The prize offered for the business house that had the finest float was won by the Louisville Cab & Transfer Company. The float is shown in an accompanying illustration. There were altogether sixty-five such floats in line. The United States government sent a band from Camp Knox, a regular army training camp. In all, more than 2,000 people took part in this parade. We were convinced that on this day Louisville had been sold on safety and accident prevention work.

Safety week was concluded on Saturday night by a public mass meeting, at which the main speaker was Jeff D. Keen, a railroad conductor of some forty years service. The title of his speech was "The Value of Safety." Our own company's Inspectors' Quartet furnished the music for this meeting.

Just previous to safety week a general meeting of seventy-five business men was held in the offices of the Louisville Railway, where Mr. McClain explained what he wanted the industries of Louisville to do. It was also agreed at this meeting to use as a general slogan the phrase "Don't Get Hurt." During the week this phrase was broadcasted from every truck, street car, and vacant billboard in our city. It also was painted on the sidewalks. This company has twenty electrically-lighted signboards, 8 x 10 ft. in size, which we use constantly to display safety ideals. We put these signs at the safety council's service, and at their request we ran the slogan mentioned above. We also had this "Don't Get Hurt" sign placed in more than 400 street cars, and in the motorman's vestibules. We ran a large truck bearing the slogan through the streets the entire week.



The Wrecked Ford Attracted a Great Deal of Attention

The four local newspapers, the *Post*, the *Courier-Journal*, the *Times* and the *Herald*, all gave their hearty support, and all those connected with the actual work felt that they owed a debt of gratitude to them.

This Slogan Was Displayed in Various Forms All Over the City

Briefly, a word of our own company activities during safety week. We held twenty-two safety meetings, with an average of about fifty men to a meeting. We all fe·- that small group meetings on a property where a man actually works were more congenial than if we made him dress up and come down town to some hall. The meetings were attended splendidly and the speakers' remarks received attention.

These meetings were addressed by our director of safety and superintendent of transportation. We donated the services of these two men to the safety council during this week. They made sixteen speeches in large industrial plants and on steam railroad properties.

C. W. Price, vice-president of the Elliott Service Company, was with us the entire week. He was the director general of the whole affair. It will be a long time before Louisville forgets the personality and splendid energy of this man.

We think we obtained great results from safety week. There was not a single fatality and but one serious accident, while there were three accidental deaths and twelve serious injuries the preceding week. Since then we have had very few serious accidents in the city. As far as results in our own organization are concerned, we believe it accomplished much. The Sunday following safety week we ran from 300 to 500 cars for twenty-four hours through our streets without a single accident, something we had not done in recent years. We, in Louisville, have also discovered and believe that with co-operative activity and enthusiasm from our business men and industrial organizations, safety ideals can be sold to the citizenship of a community as easily as merchandise.

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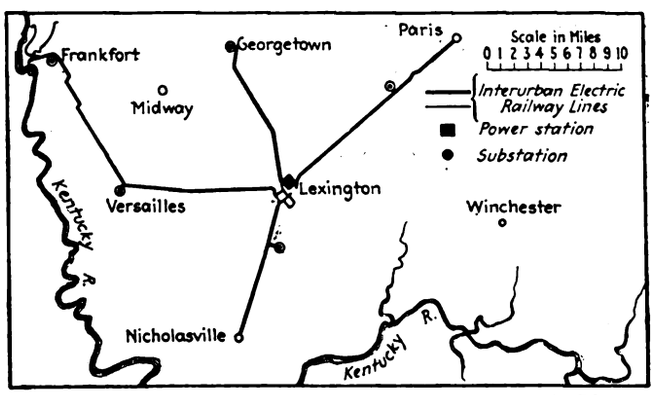
And Now, One-Man Freight Cars

Kentucky Traction & Terminal Company Applies Same Principles in Package Freight Service as Have Proved Successful in Passenger Business

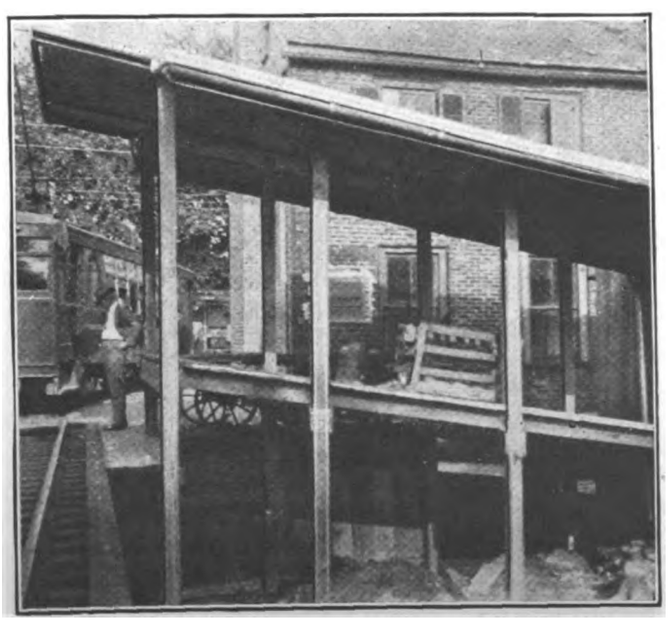
FOLLOWING the substitution, early last year, of light interurban passenger cars for others three times as heavy, the Kentucky Traction & Terminal Company has put two light freight cars in service, with one-man operation. These cars weigh 31,000 lb. each, are 40 ft. in length and are equipped with four 25-hp. motors, like the passenger cars. They were built by the Cincinnati Car Company. The management feels that their operation has been highly successful.

The general design of the cars is shown in the accompanying plan and elevation, together with the important dimensions. Each car is equipped for double-end operation, a compartment for the motorman being partitioned off at either end. An electric cab heater in each compartment is provided. The center end windows and the motorman's windows are equipped with drop sash, the wing sash being stationary.

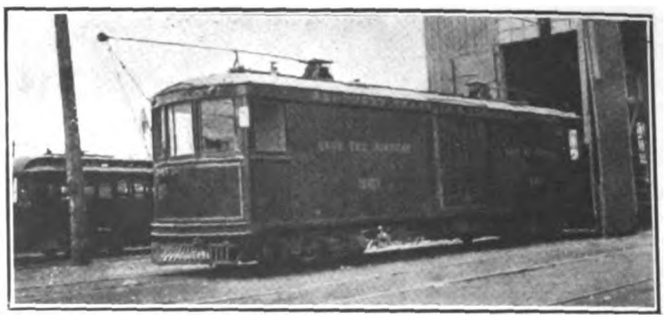
As shown in the accompanying map, four interurban lines radiate from Lexington to Frankfort (the state capital) and Versailles, Georgetown, Paris and Nicholasville. In each city there is a combined passenger and freight terminal. In each is an agent, paid by the month, who is normally on duty from 7 a.m. to 6 p.m., except at Lexington where he comes on at 6 a.m.



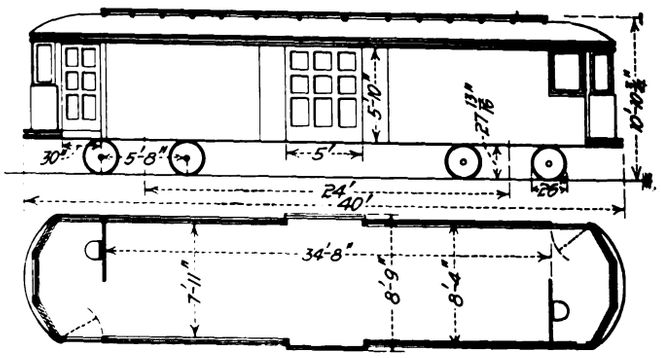
Map of the Kentucky Traction & Terminal Company's Lines



This Covered Inclined Freight Platform Is in the Rear of the Station at Georgetown



The New Package-Freight Car Weighs but 31,000 Lb.



Plan and Elevation of the Light-Weight Package-Freight Car

Accompanying illustrations show the rear of a building, on a prominent street in Georgetown, which is being remodeled for use as a passenger and freight station. Here the track swings off the street onto a trestle at one side of the property, where an inclined platform leads from the car floor level to the freight shed.

The schedule of operation for a day is this: Two cars leave Lexington early in the morning, respectively for Versailles and Frankfort (28 miles) and Paris (18 miles). After delivering their loads they take on freight for Lexington, and, returning, they load up at Lexington, one for Georgetown (12 miles), the other for Nicholasville (12 miles) and again return to Lexington. Each car thus makes either 60 or 80 miles in one day.

The freight cars are operated by one man unless way deliveries must be made, in which case another man is added. The company does not deliver freight locally, but in Frankfort has a delivery contract with a local truckman.

London Tramway and Bus Accident Showing Is Creditable

H. E. BLAIN, assistant managing director of the London Underground group, recently was the principal speaker at a meeting of the London Safety First Council, on which occasion he gave statistics regarding the street accident situation in London. He said that in the metropolitan area 104 more people were killed in 1922 than in 1921, the total number of killed being 684 and the number of injured 26,322. Of the total accidents 6 per cent were caused by motor omnibuses and 7 per cent by tramcars, the percentages being the same for 1922 as for 1921. As there was more than 6 per cent increase in passengers carried by omnibuses and nearly 3 per cent in those carried by the tramways, this showing was considered creditable.

For 1922 trade motor vehicles caused 21 per cent of the total accidents, motor and pedal cycles caused 21 per cent and private motor cars caused 24 per cent, a total of 66 per cent, or two-thirds, for these causes.

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Electric Railway Construction and Operation in Cuba—II

An Absorbing Account of the Means Followed in Adjusting Electric Car Equipment to Unusual Conditions—The Results Obtained Justified the Electrification

By L. Geenens
Chief Electrical Engineer Hershey-Cuban Railway

IN THE July 28 issue of this paper the author described why the Hershey-Cuban Railway was built by the Hershey Chocolate Corporation, the power generation and transmission system used and how the special electrical conditions brought about by the tropical climate were met. In this concluding instalment an account will be given of the rolling stock used, the shops in which the cars and locomotives are maintained and some facts about transportation conditions on the line.

The Cut Sugar Cane Is Hauled to the Nearest Electric Railway Loading Station in Ox Carts

The line started electrical operation with fifteen motor cars, of which ten are straight passenger, three combination passenger and baggage, and two straight baggage. There is one tower car for line work. The specifications for the passenger and tower cars follow:

Passenger Cars	
Manufacturer	J. G. Brill Co.
Seating capacity	50
Speed	40 m.p.h.
Weight	28,000 lb.
Length	49 ft. 3 in.
Width	8 ft. 6 in.
Trucks, type	Brill 27 X-MCB
Wheel base	6 ft. 3 in.
Wheels, diameter	33 in.
Distance, centers of trucks	26 ft. 4 in.
Control	PC-101 multiple control
Motors	Four—GE-263 (65 hp.)
Gear ratio	64/22
Headlight	Incandescent, 32 volts
Current collector	Pantograph
Air compressor	CP-29
Lightning arresters	Aluminum cell.
Length of seats	38 in.
Width of aisle	23¼ in.

Tower Car	
Manufacturer	J. G. Brill Co.
Length	40 ft.
Motors	Four—GE 263 (65 hp.)
Control	GE—K-47
Gear ratio	71/15
Headlight	Luminous arc, 600 volt

Each car has its own pantograph and carries in addition a trolley pole at each end for use on direct suspension overhead should it be needed to run the cars over tracks so equipped.

No power bus was provided for train operation. Only a 9-conductor 32-volt control cable runs through the train, together with the air-brake lines. It was soon felt that the existence of a power bus would have a marked advantage. Single car train are seldom run on the main-line service, there being always from two to seven or eight cars in a train. This means that with all pantographs up, the wear of contact strips and trolley wires is three times what it would be with one pantograph up for every three cars. Any obstructions in the way of the first pantograph will wreck not only this pantograph but usually all the pantographs of the train and thus cripple the train entirely. With only half or two-thirds of the pantographs up, there would be enough spares to continue the trip, and through the power bus the train would have full power in all the cars the same as before. If any pantograph of a train develops a defect during the trip, it can be lowered and another one raised without changing the driving power of the trains.

As 1,200-volt jumper cables are not desirable, a system was developed using the trolley poles already installed on the cars. The method is shown on page 213 and consists in the use of a ⅜-in. steel rod carried on a "boom" at each end of each car and extending out far enough to rest on the trolley wheel of the next car. Proper electrical connections are made on the roofs of the cars. This forms a connection of large capacity as it consists of two trolley wheels and poles in parallel.

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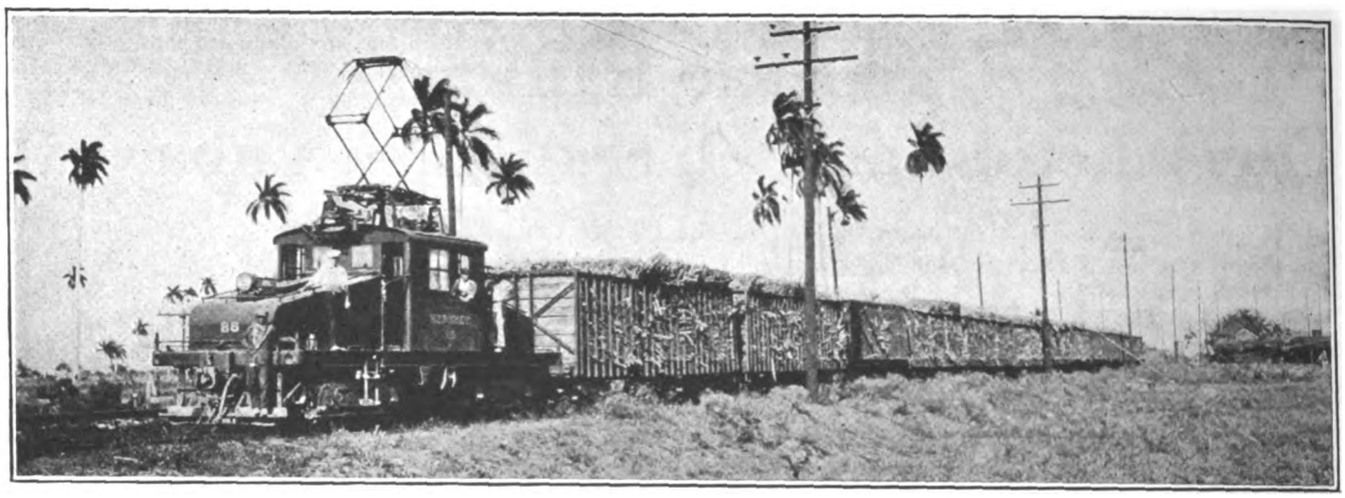

One of the Electric Locomotives Leaving a Loading Station with Ten Cars Loaded with Sugar Cane

It is very flexible as the wheels rolling on the rods take up all the motion between cars. If the cars are uncoupled the parts will clear each other automatically. All high-voltage parts are out of reach of the public and are entirely safe for the train crews as they handle only the trolley ropes. The device takes the curves without any trouble and has been working to our entire satisfaction.

The cars in general have been giving good service and are well adapted to the requirements of the line. The only field for improvement in the design is the ventilation. In a tropical climate an effort to provide all ventilation by means of louvers or hinged sash in the monitor roofs is not a success. Aside from their high maintenance, due to the warping of the frames from dampness, they have to be closed at each rain. These rains occur with a suddenness and force unknown in Northern climates and it is usually impossible for the train crews to close so many hinged monitor sashes before the passengers are drenched. With all doors and windows closed and a normal temperature of from 85 to 95 deg. F. the condition inside the cars soon becomes unbearable. Powerful roof ventilators, thoroughly rainproof, would be a decided improvement.

During the winter months there are cold winds and heavy mists, which make the passengers close the windows, and the situation encountered during the rainy season is repeated. With the side windows closed it is too hot and with these windows open and the car running at high speed there is a violent draft all through it. A possible solution would be to make the lower car sash stationary and the top part slide up.

Locomotives and Machine Shop

There are seven electric locomotives of 60 tons each, with the following characteristics:

Manufacturer	General Electric Company
Weight	60 tons
Motors	Four—251A
Control	Multiple unit
Compressors	Two—CP-30 of 35 cu. ft. each
Control power	600-volt dynamotor

The shop where the rolling stock of the railroad is maintained is in Central Hershey, alongside a well-equipped machine shop of 225 ft. x 38 ft. The latter shop is not a part of the car shop in that it has an independent force and carries out all the machine work needed for the car shop, sugar mill, power plant, agricultural department, etc. The car repair department sends its work to this shop through a system of work orders in the same way as other departments do. Hardly 40 per cent of the machine shop work comes from the car department, most of the remainder being repairs for the two sugar mills of the company. All machine tools in this shop are electrically driven with individual 440-volt three-phase induction motors. Two air compressors supply air for the car shop, machine shop, sugar mill and power house, a plan which eliminates the need of separate compressors for each of these departments.

A small foundry is operated in connection with the machine shop. Iron, brass and aluminum castings are made to replace broken parts, and enough new work is added to operate the foundry efficiently. When it is considered that it will take from one to two months to secure material on a rush order from the United States, it will be realized that a small foundry of this kind proves very handy for emergency repairs. It goes hand in hand with the acetylene and electric welding. A welder trained locally and handling both apparatus is working steadily, and at times a second operator is added.

The machine shop also takes care of the welding of broken rail bonds. For such repairs, the acetylene welding outfit is loaded on a gasoline-driven track automobile, and cylinders of compressed acetylene gas and oxygen are used. In the shop and around the mill and plant an acetylene generator, permanently mounted on a small track car, is used. A general repair of the bonding is made every year some time before the crop is gathered and ahead of the heaviest traffic.

There is no wheel lathe in the machine shop, as this work is easily handled on the heavy-duty 6-ft. lathe used for grooving the mill rollers. This lathe lies idle during the grinding season and by proper organization of the work, all wheel turning can be done during this period. This lathe is located in the mill room of the sugar mill, where a 20-ton crane is available for handling the work. When needed later, a wheel lathe will be installed.

The machine shop force also maintains and repairs the steam locomotives used on the cane supply tracks which are not electrified.

Car Shops and Shop Organization

The car shop itself is in a steel building 200 ft. long by 85 ft. wide, adjoining the machine shop already mentioned. It contains thirteen tracks, one drop pit

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for steam locomotives and four inspection pits. The car shop force maintains the rolling stock consisting of: fifteen passenger motor cars; seven 60-ton electric locomotives; 170 sugar cane cars; sixty box cars; twenty-five gondola cars; thirty-one flat cars; six cabooses; one locomotive crane; one wrecking crane; miscellaneous work-cars.

A superintendent of equipment is in charge of all operations in this shop and reports to the electrical engineer. His force is divided in three groups, as follows: the electrical group, the mechanical group and the car inspectors and cleaners.

The electrical group, composed of three electrical mechanics, maintains everything electrical on coaches and locomotives.

The mechanical group is composed of one foreman and from nine to twelve men, according to the work. Each man has a specialty. There are carpenters, riveters, boiler makers, air brake men, painters, etc. These men do everything which is not electrical, from renewing the rattan of seats in the coaches to changing bolsters, painting cars, picking up wrecks, etc. The rule is that each man must turn in a day's work, no matter what his trade is. It is not strange to see a carpenter handle a cold chisel or a painter drive rivets. The men are given every opportunity to learn. They are rated according to what they are able to do and not according to trades. The men like this system and the best results are obtained.

The third group is composed of train inspectors and car cleaners. There is a day and a night inspector at each terminal. All these men have passed through the shop and have practical knowledge of repair work both on freight cars and coaches. They take care of the interchange of freight cars with neighboring lines. These men have a fair knowledge of the electrical devices such as the renewal of contact strips on pantographs, replacement of fuses, etc. They are not relied upon, however, to maintain the coaches or locomotives, their work being more in the nature of a mechanical inspection, such as is done on passenger coaches on steam lines.

After a car has been on the road for fifteen days, covering some 3,600 miles, it is brought into the shop for one day and thoroughly examined. A competent man looks for worn or broken parts, loose bolts, clearances on side bearings, brake adjustment, leaky air pipes, etc. The electrical men examine the motors, commutators, brushes, control, lightning arresters, etc. The car is washed and disinfected; pantographs are tested for pressure against contact wire; brakeshoes renewed, etc. After this, the car is ready for another run.

Once a week, to supplement the inspections at the terminals, one of the three electrical mechanics from the shop is sent to these terminals to oil the journal boxes and renew motor brushes if needed. These are the only men authorized to oil journals, renew brushes and in general do work on the control devices of the cars and locomotives.

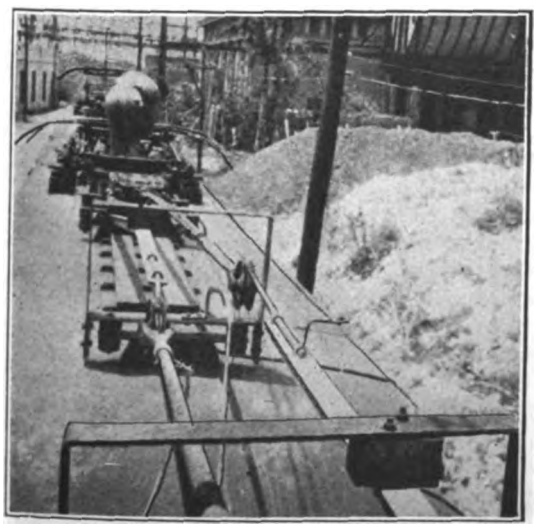
The electric locomotives cover some 2,000 miles before being inspected. The only work done during these runs is to change the brakeshoes, oil the bearings and adjust the brushes.

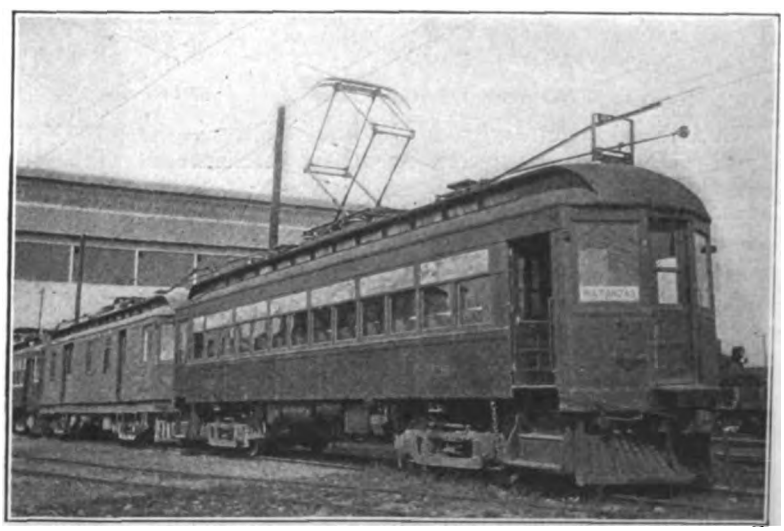
There is no night shift of any kind. The practice on steam operation of having hostlers and mechanics prepare the engines and attend to the departure of the locomotives has been entirely eliminated. The engineers take their cars and locomotives themselves. They have the keys of the doors. They raise the pantographs, fill the air-brake tanks and go off. A locomotive left in perfect working order by the shop force should remain in that condition for any length of time and therefore need no further attention when leaving.

A blackboard in the shop shows at all times the locomotives and cars ready for service. Special efforts are made to have as much of the equipment as possible in working order at the end of each day. All equipment which cannot be ready by night is reported to the traffic department with an estimate of the time during which the equipment will be out.

A general overhauling of each locomotive is done every two years during the non-grinding season when fewer locomotives are needed. They are taken out of service for one week. Unnecessary dismantling is avoided, parts which don't wear are not taken apart. The electrical control and the air-brake parts are left in place as all of these can be cleaned, inspected and tested while on the locomotives. The attention is concentrated on the driving motors and journals. Motors are removed, armatures and field coils are cleaned, painted and baked. Control coils are dipped.

It was found that at least twice a year all iron parts of the control of both locomotives and cars should be scraped and painted as a protection against rusting. Galvanizing does not last. There would be





At Right—A Three-Car Main-Line Train Operated from One Pantograph. The View at the Left Shows the Power Connection Between the Cars

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a marked reduction in maintenance in the tropics if brass, aluminum or copper were used in place of iron in the control parts. This refers not only to controls for cars or locomotives but also for automatic substations. All magnet coils should be so thoroughly dipped or coated with weatherproof compounds that not the slightest moisture can penetrate. Resistance

Passengers Leaving the Boat Landing at Casa Blanca to Board the Matanzas Train

tubes for instruments or other purposes with the resistance wires exposed do not last over two years.

When a passenger car is brought in for equipment overhaul the trucks are changed, and the car goes back in service after one day.

On both the cars and locomotives the oil in the air compressors is renewed every 20,000 miles. The crankcase is washed with gasoline and new oil introduced. This system has been most effective in keeping the bearings in perfect order. The locomotives have made more than 60,000 miles, and no shims have been removed as yet from the crank bearings of the compressors.

The locomotives, cars and automatic substations are still operating on the first set of contact tips on all the contactors after two years of service.

In an effort to counteract the rapid rusting of the steel cars used for hauling cane, the cars were sand blasted and afterwards sprayed with a blast of hot Mexican crude fuel oil atomized and heated with steam. This material has adhered to the surfaces better than any paint. Under the tropical sun it dries thoroughly within a couple of months. It is easily lettered with white paint. After one year of service, this coat was as good as new. The cost of material and labor was $1.35 per car.

Traffic and Transportation

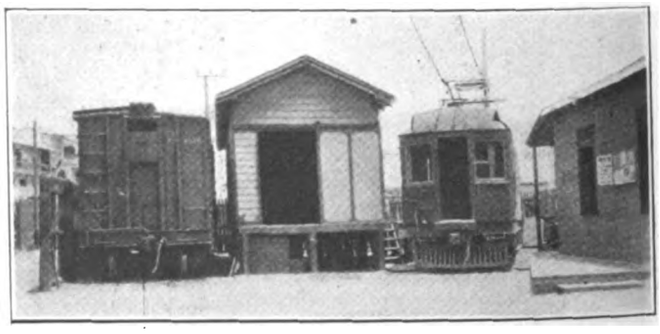
When the electric service on the line was begun the steam locomotive engineers who knew the road were broken in as operators of electric locomotives. They required the practice of only a few days with an instructor. It is remarkable how easily this change from steam to electric was made. Some engineers will still occasionally heat up the resistance grids by running on intermediate steps of the controller. In steam operation, every stop of the throttle is a running position, and they will forget this difference. They were eager to be assigned to electrical equipment. Most of the steam equipment was old, and it needed considerable attention and repairs on the road to keep it going. This meant longer hours, much dirt, heat, and in general, harder work without seeing results.

Steam engineers make the best operators for electric locomotives. They are fundamentally mechanics, used to harder conditions than are generally encountered in electric service, and they know how to handle trains on the road, which is far more important than to know the details of their locomotive. We take it for granted that in most cases they cannot make repairs of the electrical equipment on the road. We don't expect them to, and in case of failure spare equipment is immediately substituted. We consider that the electrical equipment must be so perfected and foolproof and so well maintained that these failures on the road are very exceptional. The methods of maintenance are established from the experience obtained from these failures. This procedure eliminates a considerable amount of teaching to new motormen while it throws more responsibility on the shop force.

There are six passenger trains each way daily. These trains make the trip from Casa Blanca, across the bay from Havana, to Matanzas, 56 miles, in two hours and fifteen minutes, with six official stops and twenty-five flag stations. They run at an average schedule speed of 25 m.p.h. These trains are composed of from two to four cars and occasionally six and eight to handle excursions.

At Casa Blanca the trains stop in front of the ferry landing of the Havana Central Railroad and the schedules are so arranged that the passengers to and from Havana make connection at this point. Arrangements between the two companies permit tickets to be sold and baggage checked at the Havana landing for any destination along the line. Passengers for Havana are provided with tickets in two parts, one of which is kept by the conductor on the train and the other is collected at the ferry. The railroad company transfers the baggage between train and ferry.

Excursion trips are organized during the winter season between Havana and Central Hershey for tourists wishing to visit the sugar mill in operation. The trip includes the transportation, a conducted visit of the mill, lunch at the Hershey Hotel operated by the company, and an automobile trip through the surrounding



Freight Station at Casa Blanca with an Express Car on One Side and a Freight Car on the Other. Merchandise Is Received at the Front of the Station

country, particularly the tropical gardens around the water pumping station which are being developed into an amusement park.

Central Hershey has become a favorite excursion place for clubs and schools from Havana and Matanzas. There are baseball grounds, race tracks, tennis court, dancing hall. Saddle horses can be hired for trips through the surrounding hills. Although no special efforts have been made to develop these amusements, it quite often occurs that all the cars are required to handle these crowds. The average number of passengers carried per month is 37,000, and the average

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length of ride per passenger is 16 miles (27 km.). The freight movement over the line consists principally of the transportation of sugar cane from the loading stations to the sugar mill. From 1,800 to 2,000 tons of cane are brought from the fields daily in specially constructed railroad cars made to handle this bulky material. The 60-ton locomotives, are able normally to haul eight loaded cane cars over the heaviest grade of an average of 2.5 per cent extending for 4 km. From four to five cane trains are run daily, and their schedule is arranged to suit the most efficient load condition at the power plant. Branch lines used exclusively for hauling cane during the six months of grinding season are not electrified because the economy to be derived from electrical operation on these lines does not justify the investment in overhead lines and power plant capacity. The cost of material and labor for electrifying, according to the standard type of construction on this road, and including a feeder, is $5,000 per kilometer, or $8,000 per mile. This figure does not include power plant and substation equipment nor transmission lines. Two steam locomotives are used for these branches. They distribute the empty cars and bring the loaded cars up to the main line from where they are handled with electric locomotives. These branches are merely industrial sidings as they are not open for public service.

A through train of coal cars leaves the Havana terminal daily and is delivered at Matanzas for shipment towards the interior of the Island. There is also a miscellaneous freight train running from each terminal daily. The railroad operates its own express service, which is practically the only means by which small packages can be delivered in the country.

The whole line was never operated by steam with the traffic as now existing, and therefore there are no definite comparative figures on fuel consumption, payroll, etc. However, some comparisons are interesting. The sugar crops of 1919 and 1920 were gathered with steam locomotives, and the fuel oil consumption during those crops was nearly the same as is now being used in the power plant, which supplies not only the power for moving the crop but also the power for two to four freight trains and twelve passenger trains daily and more than 400,000 kw.-hr. per month of outside load. This is not surprising in view of the utter inefficiency of oil-fired locomotives in the hands of native firemen entirely ignorant of the most elementary laws of combustion. Then, also, it should be considered that a passenger coach which takes 80 kw.-hr. to go from one end of the line to the other, thus using 15 gal. of oil, is consuming only as much oil as would be needed on a steam locomotive waiting in a siding for half an hour or so. Altogether, counting the oil used for fuel in five or six steam locomotives during the time that they are not moving, we can easily conceive that this oil, added to the oil wasted on these locomotives through bad combustion, will be sufficient to move the additional tonnage and produce the extra power mentioned before.

An immediate result of the electrification was the elimination of the pumping stations required by the steam locomotives. Ten such stations existed, of which six had elevated tanks and permanent operators, while the others were steam pumps run from the steam locomotives themselves. Stations with operators cost more than $1,000 a year. During the dry season considerable trouble was experienced due to lack of water, while some of the waters were corrosive. There are now only three emergency stations consisting of hose connections from city water mains, one at each terminal and one at Central Hershey.

Department Heads in Boston Inspect Property

THERE was an innovation in the practice of the Boston Elevated Railway on July 27 when the department heads took a tour around the property together to visit points of particular interest at the present time. A day was taken for the trip which was made in one of the company's buses. The first point visited was the South Boston power station, where foundations are being laid for a new 35,000-kw. turbine, condensing water tunnel, etc. A stop was also made at the division headquarters on Park Street, where the company has recently installed a passenger waiting station and a handball court for the employees. The next stop was at the Cedar Grove station of the Shawmut Branch Railroad, whose operation is to be taken over by the Boston Elevated Railway. Other stops were at the Lake Street car yard, the new Allston garage, the Bennett Street car yard and carhouse at Cambridge, the Harvard Square station of the Cambridge rapid transit line, the foundations for the new repair shop at Everett, the new Salem Street division headquarters in Medford and elsewhere.

A group view of the party, taken in the yards of the South Boston Station is presented. Left to right they are H. M. Steward, superintendent of maintenance; Edward Mahler, purchasing agent; H. W. Blake, ELECTRIC RAILWAY JOURNAL; C. W. Mulcahy, assistant general counsel; John Lindall, superintendent rolling stock and shops; James Smith, superintendent of transportation; Edward Dana, general manager; C. W. Learned, superintendent of inspection; H. W. Putney, secretary of the transportation department; H. B. Potter, assistant general manager, and F. S. Freeman, superintendent of power.

Boston Elevated Railway Officials Visit South Boston Power Station While on Tour of Property in Bus

The opportunity afforded to the heads of the departments of discussing on the ground the effect of new developments under way or contemplated proved so satisfactory that similar trips will probably be taken in future, perhaps periodically.

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Utilizing an Unusual Carhouse Site in East Providence

The United Electric Railways Is Constructing a Large Carhouse with Excellent Facilities for Inspection and Maintenance

THE United Electric Railways, Providence, R. I., is spending several millions of dollars in improvements this year. Among the structures under construction is a carhouse with capacity for ninety-eight 40-ft. cars, located in East Providence. This is of special interest because the directors of the company insisted that it be constructed at the absolute minimum of expense. Hence, among other items, the square tower at the corner, a feature of most of the company's carhouses, was omitted and every detail was studied with a view to elimination of any unnecessary cost.

The building is more than 460 ft. long over all and nearly 170 ft. wide at the front. It contains two six-track bays separated by a fire wall and a two-story row of offices, shops, etc., on one side as indicated in the plan and sections reproduced.

The doors inclosing the portion of the structure used for inspection are about 100 ft. inside the front end, decreasing the amount of building to be heated but providing shelter for two dozen cars. This part of the building has a 4-in. tar concrete floor, but no pits.

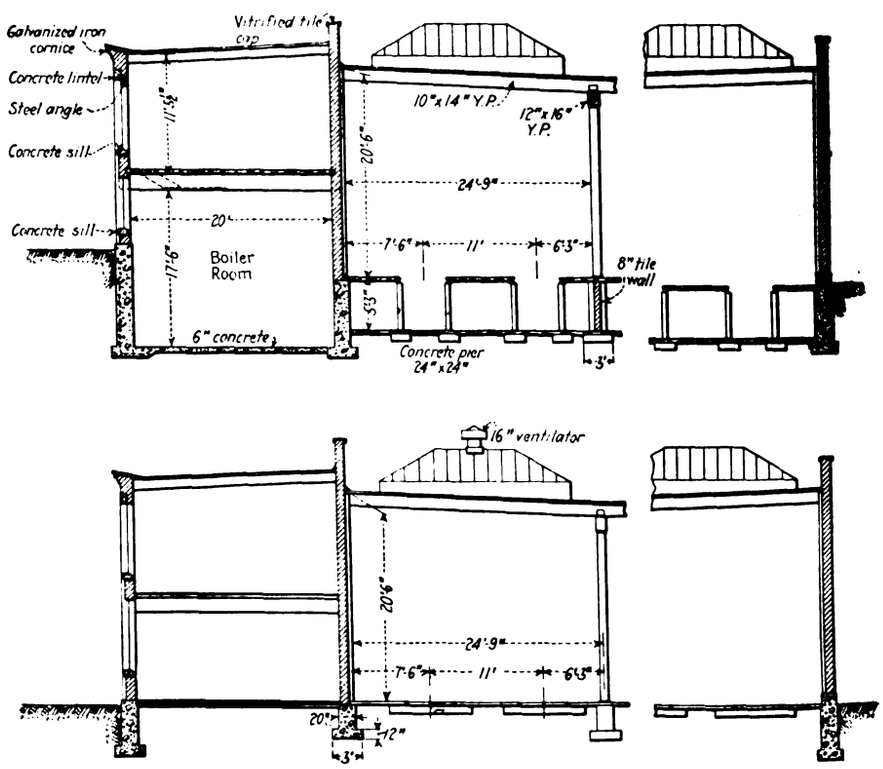
Behind this open section in the second bay is a 180-ft. pit section, for general inspection work only, and behind this is another large tar-concrete floor section for car storage. These sections are separated from the front open section by doors hung from roof-supporting columns.

Behind the open sections of the bays all tracks are provided with pits. Here are facilities for changing wheels and armatures, etc. Pit hoists are provided in two pits, a wheel grinder in another, and a large general repair shop, centrally located, is equipped to handle all ordinary maintenance work.

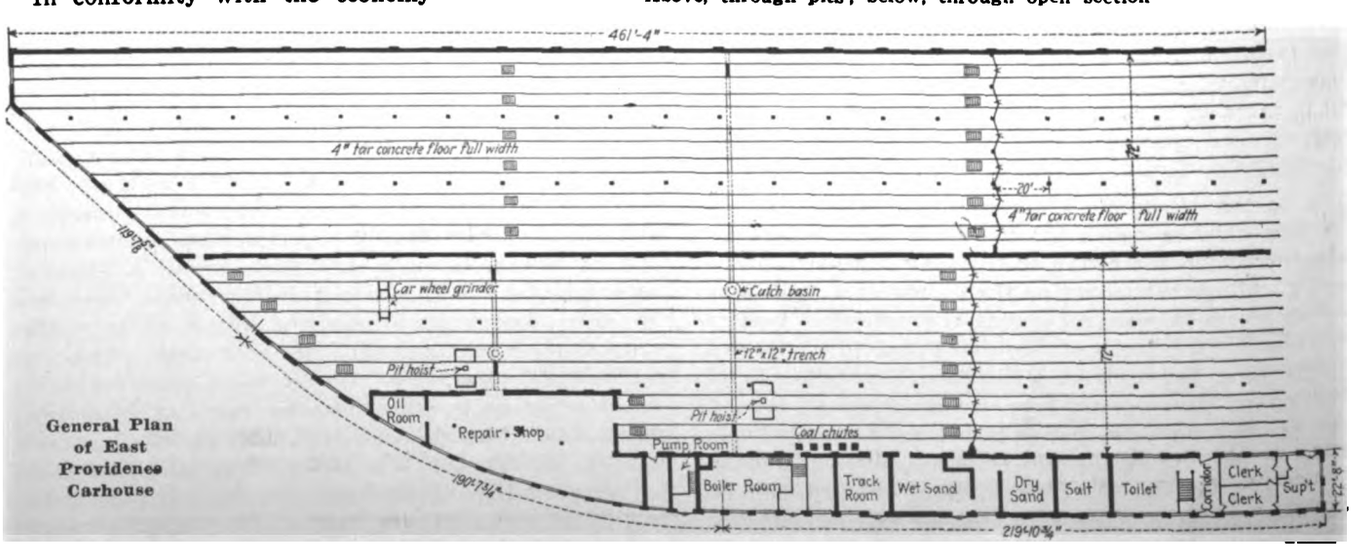
In conformity with the economy program, slow-burning mill construction was selected. The roof is of 3-in. yellow pine planking covered with tar and gravel. This is carried on heavy timbers supported on 10-in. x 10-in. yellow-pine columns spaced 20 ft. apart along the length of the building and 24 ft., more or less, across it. A liberal installation of metal skylights in the roof insures an ample supply of daylight, and a sufficient number of ventilators have been installed to provide fresh air.

For fire protection a sprinkler system is the main dependence. It is supplied from a reservoir located under the floor of the repair shop.

In the pit sections the track rails are mounted on 4½ in. round cast-iron columns, with ½-in. shell. The base of the column is a 12-in. flat plate with brackets cast on the four diagonals. At the upper end the column terminates in a flat plate 10 in. long and about 6 in. wide. In order to insure uniformity in the height of the columns and squareness at the tops, the tops are given a light cut in the machine shop.



Cross-sections of the Carhouse
Above, through pits; below, through open section



General Plan of East Providence Carhouse

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The base plates rest on concrete piers 24 in. x 24 in. in size and they are embedded in the concrete floor of the pits. On the upper plates rests the 8-in., 79-lb. rail, to which they are bolted with four heavy cap bolts for each column. The rails, in turn, support a reinforced concrete floor in the manner shown in a detail reproduced. The rail level is 4 ft. 9 in. to 5 ft. 3 in. above the pit floor.

This form of construction is so rigid that no side bracing is necessary. It provides an open area in the pits facilitating cleaning and rendering all of the basement space accessible.

Merchandising Transportation on the Chicago Elevated Railroads

Posters, Newspaper Advertising and Motion Picture Films Present Advantages of "L" Transportation as Well as Increase Friendly Feeling and Better Public Relationship

Done in Beautiful Colors, These Posters Advertise the Chicago "L"

ACTING on the theory that modern merchandising methods are as applicable in selling transportation as they are in selling dry goods or groceries, Britton I. Budd, president Chicago Elevated Railroads, some time ago created a commercial department having this function. Such a step was taken when it became imperative to increase riding on these lines, following a cut in fares which went deeper than a companion cut in wages. The only means in view of caring for the apparent deficit was by increased riding.

Every method known in modern advertising was immediately begun by John J. Moran, head of the department, following his appointment. The "weekly pass," new to the Chicago public, which was also instituted as a fosterer of increased riding, was made the chief "selling" argument. "L" patrons had to be educated in its uses. A campaign of newspaper advertising in the big local dailies, as well as foreign language papers, was the first step in Mr. Moran's work. Announcements of the new form and rates of fare were made with ideas and suggestions for the use of the pass as adjuncts. This was complemented by handbills, car and station cards and posters in the windows of the cars. A direct-by-mail campaign was also begun. When a man moves into a territory served by the Elevated he is greeted by a friendly letter welcoming him to the community and setting forth the excellence of the elevated service. This campaign has been found very valuable and is being continued on a large scale.

Probably the most valuable form of advertising ever developed by a transportation system, and the cheapest, is an outgrowth of the weekly pass, known as "co-operative advertising." It is plain to the regular patron on the Elevated that he may obtain additional rides for a slight cost in addition to what he formerly had to pay for his travels to and from work. To cultivate this off-peak traffic was the initial work of the commercial department and the work upon which its efforts were centralized. It was found comparatively easy to prove to the owners of the large motion picture houses, dance halls, theaters and other places of amusement in Chicago that the holder of an unlimited ride "L" pass would be a profitable person to appeal to in their advertising, because he would have to pay nothing

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extra for transportation to reach their establishments.

In advertising to reach customers for the weekly pass space was utilized in stations and on trains which had formerly gone to waste as far as advertising purposes were concerned, and Mr. Moran was able to enter into co-operative arrangements for this advertising with most of the larger and more desirable places of amusement, known to be most progressive in their advertising. Some of the examples of this method of advertising and the value of the results follow:

Co-operative Advertising with Theaters, Museums and Circuses

It had been the custom of the Elevated roads for the past eight or nine years to carry a painted wooden sign on the "head end" of each train announcing ball games at the two big league parks in the city. During the winter, necessarily, these signs were not used. The owners of the largest string of motion picture theaters in Chicago asked for this space, giving in return a 50-ft. motion "trailer" on the end of their feature picture, a concession for which they had repeatedly turned down large monetary offers. The "trailer" film read simply "It costs you nothing extra for transportation to visit this theater if you use your unlimited-ride weekly 'L' pass." This message reached more than 500,000 persons weekly through this medium.

Another motion picture combine granted Mr. Moran the same privilege for this "trailer" in return for window posters in cars and stations. This firm operates a chain of sixteen motion picture theaters in Chicago. In both instances the cost to the Elevated was merely that of the trailer, a small sum, the picture houses bearing the cost of printing and painting the signs. When it is realized that this movie concern rejected an offer of $10,000 for a week's showing of a similar "trailer," the significance of this advertising may be readily appreciated.

The field of operation in co-operative advertising was found to be very broad. The Field Museum, the Art Institute, the Chicago Historical Society and other civic centers of education and culture, as well as some of the churches, were quick to realize the importance and value of such advertising, and their response to suggestions by Mr. Moran has been marked.

When the circus came to town a large banner bearing the legend "Two World Leaders: Chicago Elevated Weekly 'L' Pass and Sells-Floto Circus" was exhibited in return for station cards advertising the show. Several dance halls have offered passes for prizes in their competitive contests. Many motion picture theaters have admitted the holder of an "L" pass free during a stated period. The value of this concession to the Elevated management as a good-will builder cannot be overestimated.

A survey of the elevated stations has been made by the commercial department and vantage points for the station cards chosen. Every turn a patron makes, from the time he enters the station until he reaches the train platform, he is greeted by a card or poster. Metal frames have been installed in which the cards fit snugly, insuring neatness, ease of placement and uniformity.

The Posters Are Artistic

Art was formerly far without the scope of an electric railway. It is surprising, therefore, to note the ease with which the Chicago Elevated has adopted it in its advertising. Mr. Budd, acting on the lead of the London Underground, inaugurated a series of beautiful posters pointing out to Chicagoans the attractive spots of their city. Under the management of Mr. Moran, who took this work over as part of the commercial department, the splendid standards set by Mr. Budd have been maintained. The posters, some of which are presented herewith, carry a minimum of wording which does not interfere with the artistic designs.

These Posters Advertise Special Attractions as Well as the Value of an "L" Pass

Because of their individuality and newness in the field, many requests have been made by the public for samples of the posters. Schools, artists' exhibits and meetings and private individuals all over the country have made use of them for various purposes. The value of such posters in schools, where many were used as models in art classes, is apparent. The minds of the children, being in their formative period, quickly grasp the idea and lasting impressions are made.

Many words of praise from art institutions, artists' periodicals and advertising publications have been given the Elevated posters. Perhaps the most pointed of these was given by Lorado Taft, famous sculptor and artist, in a talk before the advertising council of the Chicago Association of Commerce recently while speaking on "Art in Advertising." "I look with interest on advertising posters," said Mr. Taft, "and there are some beautiful things appearing now and then, some of which are really perhaps our furthest advance in art. It is what we need all the time. There is a poster just out here and I would like to meet the man who drew it. I would like to speak to him. I haven't the least notion who he is, but they have got a good man at work advertising our elevated railroads, telling you what you can find in the city. The poster I refer to is the Peristyle at the north of Grant Park—that moon-

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light and the columns there." This may be considered doubly important because of the recent move against unsightly billboard and poster advertising in the Illinois Legislature as well as in several other states.

The posters are in two sizes, known as three-sheet and one-sheet. The former are 42x84 in. and the latter 28x42 in. in dimensions. The work is done by the best Chicago artists, many recruited through the aid of the Art Institute, which heartily approves of the work done. Mr. Moran has followed the practice of allowing the artists free sway with their imagination as far as execution and ideas are concerned, usually merely suggesting the subject. Upon acceptance of the design the artist is remunerated for his efforts. Competitive bidding by the several lithographing companies is asked by the department before contracts for printing are let.

A NEW USE FOR YOUR "L" PASS

FOR ONE WEEK
STARTING SUNDAY, MARCH 11,
THE
RANDOLPH THEATER
(STATE AND RANDOLPH)
WILL HONOR YOUR "L" PASS
AS ONE-HALF OF REGULAR
ADMISSION PRICE

An Unusual Privilege Granted to "L" Passholders by a Prominent Theater

Many of the designs submitted by these artists are used in billboard advertising of the Elevated. Contracts for boards in desirable places throughout Chicago are made with the Thomas Cusack Company, which applies the designs furnished, as well as executing many original designs. The subjects of these boards are usually points of interest in Chicago, such as railroad stations, shopping districts and places of amusement. These advertisements are more general in their character than the printed posters, the showing of which is confined to Elevated property.

As a sample of the good-will building faculties of the Elevated posters, Mr. Moran tells of an incident which occurred at a football game at the University of Chicago last fall which was attended by many persons from outside of the city. In order that traffic might be directed to the Elevated, several blocks distant from Stagg Field, Mr. Moran had a number of signs painted bearing a large arrow and the word "Elevated" in large letters. "We were placing these around the field by driving pointed sticks, on which the signs were mounted, into the ground," said Mr. Moran, "when a groundkeeper came running up and said such tactics were strictly against the rulings of the university. It so happened that we had recently featured the university in some of our advertising posters and I referred the man to the head of the public relations department of the university, who was acquainted with what we had done. As a result of an interview with him, we were allowed to continue unhampered."

Cost of Conducting Commercial Department

Figures as to the operating cost of the commercial department of the Elevated are not obtainable as yet because of its short life. It is the consensus of opinion of the management and executives, however, that it has paid for itself many times over in value received. The results are hard to set down in cold figures. In increased riding the gain is apparent, as well as an increase in friendly feeling and better public relationship. When children in their schools are taught the use of the Elevated and citizens of Chicago inspired with civic pride by the portrayal of their city's accomplishments in the line of beautiful parks and buildings, the Elevated has established itself in the hearts of the people in such a way that no amount of adverse criticism or petty politics can discredit it.

The Economic Situation of the Swiss Railways from 1913 to 1920

THE full text has just been made public of a résumé of the economic status of the Swiss railroads from 1913 to 1920, presented in abstract at the last International Street Railway convention in Brussels by Charles Rochat, general manager of the Geneva Electric Tramway Company. It is a volume of 112 pages and goes exhaustively into the subject of the economic situation of the trunk line railroads, mountain railways and tramways in Switzerland. The accompanying table gives some of the data on tramways contained in it.

In commenting on the situation Mr. Rochat says that the railroads in Switzerland before the war generally had a good financial status, but the war completely changed conditions and imposed a number of problems most difficult to solve. Surrounded as it was by four belligerents, France, Germany, Austria and Italy, Switzerland suffered greatly from the restrictions of imports and exports made by them, so that costs of supplies greatly increased, particularly of coal, oil and metal objects. At the same time the requirement of maintaining an army made labor scarce. The table shows the effect on expenses of these two items

An added factor, however, was new laws passed in regard to the hours of labor after the armistice, particularly the introduction of the eight-hour day. To the establishment of this condition may be attributed in large measure the resulting high expenses of operation and it has been the principal obstacle to a reduction in fares.

TABLE SHOWING STATISTICS OF SWISS TRAMWAYS, 1913 TO 1920 INCLUSIVE

	1913	1914	1915	1916	1917	1918	1919	1920
Length of line operated (in km.)	468	468	484	487	487	484	492	492
Passengers carried (in millions)	149.5	144	133	157	181	197	206	191
Passengers per car (or train) kilometer	4.7	4.7	4.4	4.7	5.3	5.7	5.7	5.5
Receipts from passengers (in millions of francs)	17.64	16.86	15.64	18.60	21.94	25.62	35.62	41.10
Receipts per passenger (in centimes)	12	12	12	12	12	13	17	21
Receipts from all sources (in millions of francs)	18.37	17.55	16.36	19.40	22.86	26.74	36.87	42.54
Operating expenses (in millions of francs)	14.99	14.74	14.04	15.68	18.32	24.60	34.89	38.73
Division of operating expenses in per cent of total:								
General	3.85	3.9	4.0	3.7	3.65	3.45	3.2	3.35
Maintenance of way and structures	14.2	12.6	11.6	10.6	10.5	10.3	12.0	12.2
Conducting transportation	23.0	24.0	24.5	24.0	25.0	25.0	28.0	27.0
Power and shops	51.0	51.0	52.5	53.0	52.0	48.0	47.0	46.5
Miscellaneous	7.0	8.0	7.4	8.7	8.7	13.0	9.3	10.5
Operating ratio (in percent)	81.57	83.97	85.80	80.80	80.10	92.0	94.6	91.0
Number of employees (in thousands)	4.58	4.79	4.70	4.82	4.94	5.35	5.56	5.50
Employees per 100 car (or train) km.	5.3	5.7	5.7	5.3	5.3	5.7	5.6	5.8
Average cost of electrical energy in centimes per car (or train) km.	8.1	8.0	7.9	7.9	8.1	8.0	8.1	8.4

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The Readers' Forum

High Operating Cost Emphasized as Cause of Failure

AMERICAN ELECTRIC POWER COMPANY
PHILADELPHIA, PA., Aug. 7, 1923.

To the Editors:

I want to call your attention to the editorial in your issue of Aug. 4, entitled "Why Jersey Central Traction Company Has Been Abandoned."

It seems to me that while the facts alluded to in the editorial are all true and contributing causes to this abandonment, nevertheless, you have overlooked the really fundamental cause, and that is the abnormal rise in the cost of operation, particularly the wage cost. There are, unquestionably, in the country many roads which from twenty to thirty years ago would live, serve the public and produce a small return upon the investment, but which today cannot at any fare which the public will pay meet the increased cost of operation, more particularly, the payroll.

It seems to me from the standpoint of the industry that this point should be given due emphasis and not ignored entirely, and it is a point which I have been very careful to emphasize in all the discussion and proceedings which have led up to this abandonment.

C. L. S. TINGLEY, Second Vice-President.

[The editors have not been unmindful of the important effect of increased costs of operation in this, as in other instances, but the outstanding cause here seemed to be the steadily decreasing patronage of the railway.—EDITORS.]

Car Weight Important as Element of Rail Wear

CITY OF DETROIT
DEPARTMENT OF STREET RAILWAYS
DETROIT, MICH., July 26, 1923.

To the Editors:

The article on rail head wear, by Charles H. Clark, together with the editorial comment, appearing in the July 14 issue of the ELECTRIC RAILWAY JOURNAL, demonstrates the necessity of a comprehensive, unbiased and exhaustive investigation of not only the wear on the rail head from the number of cars which pass over it, including their weights and speed, but, in addition, the effect of weight of equipment on rails and the structures associated with them. R. B. Holt in his book, "Tramway Track Construction and Maintenance," has devoted two chapters to the subject of rail wear and rail corrosion; and numerous articles have appeared from time to time in the ELECTRIC RAILWAY JOURNAL bringing out to some extent the effect that the weight of equipment has on track structures as well as rail wear only.

The recent article confines itself exclusively to one type of rail, which type has less tendency to wear from vehicular traffic than the girder type more generally in use by street railways. A comprehensive investigation would cover all types of rail in general use.

From this article we infer that, given the number of wheels passing over a track, together with the depth of the rail head, the life of the track can be determined at once. This seems neither reasonable nor logical since there are numerous instances where the track life is well advanced though not due to rail wear. In order to estimate the life of a track structure it will be necessary to take into consideration other factors besides the number of wheel passes and rail-head depth.

It seems, therefore, that the effect of the weight of equipment and its relation to track as well as rail wear has not been taken into consideration. While it is true that when moving, a car possesses kinetic energy equal to one-half its mass times the square of its speed, and that, to stop the car, this kinetic energy must be absorbed, still this energy is not all absorbed by the track or rails. The question of impact, or the dynamic effect of a rolling load, would seem to have as much bearing on the life of the track structure as does the kinetic energy. Impact varies directly as the mass; consequently, a heavier car would cause greater initial damage, and the cumulative effect would increase much more rapidly than with a lighter car. Track deterioration from this cause would come from joint wear, inequalities in the rails and equipment, foreign matter on the rails, and irregularities in the track and rolling stock. This would effect the entire track structure.

That speed has little or no effect so far as impact is concerned, is brought out by F. E. Turneare and by E. H. Stone, in Vol. XLI of June, 1899, "Transactions of A.S.C.E.," and by F. W. Gardiner in Vol. LXXXIV, of 1921 "Transactions of A.S.C.E."

It would seem that the question as to whether tracks may be of lighter construction for the light-weight cars at present in vogue is one relating more to pavements and track structures than to rail-head wear. In this connection it would be interesting to have some information regarding the equipment passing over the worn rail section illustrated in Mr. Clark's article on page 47, since the illustration indicates a much greater wear per million wheel movements than the two instances noted in the text; namely, $\frac{7}{16}$ in. per 21,000,000 passes.

Mr. Clark has not mentioned the effect of grade or curvature, nor difference in the elevation of the two rails, nor has he made mention of the vehicular traffic, whether rubber or steel tired, in connection with rail wear. The composition of the rail would also have considerable bearing on the rail wear, as would the loss of metal from the corrosion of rails due to coal and other gases, particularly sulphurous gases from the burning of bituminous coal.

That not only our track engineers, but also the men in charge of equipment, are interested in this question is evidenced by articles in the ELECTRIC RAILWAY JOURNAL, from which a few quotations are included.

Dec. 11, 1920, Vol. 56, page 1195; extract from remarks by Frank Walker:

> Actually it was found that the safety cars were very easy on the track and the repairs required light. In some track formerly discontinued but now being rehabilitated for one-man car operation the company is putting in ties 5 ft. apart.

April 16, 1921, Vol. 57, page 736; extract from article by J. C. Thirlwall:

> The effect of weight on track and equipment maintenance is more difficult to determine. Obviously with light cars, the special trackwork, rails and joints will last longer and tie spacing can be increased, and with any given truck and motors, the lighter the body the longer the life of wheels, axles, truck members, brakeshoes and motor insulation. The longer and wider the body, the more it costs to repaint it and make the ordinary running repairs.

April 30, 1921, Vol. 57, page 820; extract from "Letters to the Editors":

> I, therefore, estimate that of the 65 per cent of the total which goes into track maintenance about 40 per cent is caused by weight, or approximately 25 per cent of the total.

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May 28, 1921, Vol. 57, page 984; in an article by C. T. Dehore it is noted that the cost of maintenance of track and roadway per car-mile was 5.3 cents while the company was operating old-type heavy cars as against 4.95 cents with new light-weight cars. Also the proposed tie spacing was 3 ft. as against the existing 2-ft. spacing.

June 18, 1921, Vol. 57, page 1128; extract from article by W. G. Gove:

The track maintenance saving is prominently indicated, although I do not recall any figures on the subject.

Oct. 2, 1920, Vol. 56, page 644, in an article by J. C. Thirlwall, it is shown that the cost of maintenance of way and structures per car-mile is 1.6 cents for safety cars, 3.3 cents for two-man cars, or a saving of 52 per cent.

Oct. 16, 1920, Vol. 56, page 785; in an article by R. Gilman Smith, the same cost is given as 2.5 cents for standard double-truck cars and 2 cents for standard safety cars.

June 3, 1922, Vol. 59, page 894. Extract from staff article on Kentucky Traction & Terminal Company, Lexington, Ky.:

The savings in car and track maintenance can only be determined in the future operation of the property, except that the company believes that when new ties are laid the spacing can be increased to from 34 in. to 36 in. from the 24 in. now used.

July 8, 1922, Vol. 60, page 49; extract from editorial:

Such cars will decrease operating expenses directly per car-mile . . . . by decreasing the wear and tear on the track . . . .

Jan. 22, 1921, Vol. 57, page 177; extract from article by Harry L. Brown:

The track, much of which was open, was in bad condition, and while the old single-truck cars rode so roughly as to be dangerous, the safety cars, operating at higher speed, negotiated the rough track with no discomfort to passengers. Furthermore, the voltage drop on the line with the old cars was excessive, but with the new cars, fewer in number and each pulling less current, the voltage drop was not unsatisfactory. Thus the installation of safety cars enabled the company safely to defer track repair expense and avoid more investment in overhead copper.

Jan. 1, 1916, Vol. 47, page 21; extract from article by W. A. Haller:

Light efficient cars tend to reduce construction and operating costs in many ways, chief of which are the following:
3. Reduction in track maintenance cost, due to lighter weight and less pounding on special work and no slipping on curves.

June 14, 1919, Vol. 53, page 1182; extract from letter to the editors by R. C. Cram:

While you are pleading for the rails, please make a plea for the continuation of the efforts now being made to relieve the track of its unjust burdens by lessening the car weights. The ultimate savings in operating costs of all kinds to be gained by so doing are obvious.

Sept. 22, 1917, Vol. 50, page 496; extract from staff article:

It can be said, however, that 60-lb. rails, whether in brick, block, concrete or asphalt pavement, have not stood up under the shock of cars weighing 48,000 lb. or more. In fact, track put down in 1911 has already required complete overhauling instead of giving twenty years or more of real service.

Sept. 22, 1917, Vol. 50, page 501; extract from article by J. C. Thirlwall:

Hence the replacement of the heavier cars with these, even with 50 per cent more units, means a reduction of from 50 per cent to 60 per cent in the weight upon the rails. This will result in economies . . . . in track . . . . maintenance.

. . . . In view of these factors, some competent engineers assert that the maintenance of way and structures would be at least directly proportional to the weight carried over the rails; others say that a reduction of 50 per cent in the weight would result in not more than 25 per cent saving.

Sept. 29, 1917, Vol. 50, page 562; extract from editorial:

This maintenance saving has been variously estimated to be from 20 per cent to 60 per cent of present maintenance costs. . . . Certainly it will not be necessary to use 129-lb. rail with heavy welded joint construction and 6 in. to 12 in. of concrete underneath the ties where the rolling stock weighs no more than 16,000 lb.

Feb. 4, 1922, Vol. 59, page 195; extract from article by Pierre V. C. See:

Assuming that rail costs $6,000 per mile and will last ten years under the operation of the 62,000-lb. car, all conditions being equal, the rail on which the 42,000-lb. car is operated should last proportionately longer. Experiments on the strength of steel have proved that steel will break more easily under much fewer heavy blows than a large number of light blows. Upon this basis, our engineering department has figured the saving in the wear and tear of rail alone at approximately $250 per mile, per year.

Concerning ties, the average maximum life of a good grade of tie is approximately nine years. In other words, a tie will decay during that period to a condition where it is of no value. In the running of heavy cars, the rail will wear itself into the tie, thereby considerably shortening the life of the tie as compared to the life of the tie over which the lighter cars are operated. How much this amounts to is difficult to figure accurately, but it is safe to assert that the ties over which lighter cars are run will last at least one year longer. This being true, the average renewal per year under heavy traffic would be 300 ties per mile. Under the lighter traffic it is but 270 ties per mile, making a new annual saving of 30 ties per mile. At an average price of $1.30 each, this amounts to $39 per mile per year.

There is also a considerable saving in the reballasting of roadbed. What this amounts to, so far as our experiments go, is but an estimate, but our engineers are a unit in declaring that the saving is easily 10 per cent per year. Track and roadbed, labor and ballasting material costs have been approximately $750 per mile, and upon that basis the 10 per cent saving amounts to $75 per mile. The apparent saving is, therefore, to be summed up as follows: rail, $250; ties, $39; maintenance of roadbed, $75; total $364 per mile, or more than $6,700 annually for the roadway of the entire line.

Feb. 7, 1914, Vol. 43, page 295; extract from editorial:

. . . . Just so much extra weight to consume power, to wear out the track, and to make more expensive repairs.

Third Annual Report by Board of Supervising Engineers, Chicago Traction, page 258:

Weight—In designing electric street railway cars it is of greatest importance to reduce the weight as much as possible consistent with the requisite strength and durability. The most important reasons for this are: . . . . 2. Increased life of track and special work.

It is interesting to note in Mr. Clark's article that track laid previous to 1902, which was removed from ten to twenty years thereafter, showed a decreased length of life; while the track which was laid after 1902 and removed after the same period, of ten to twenty years, showed an increased length of life. It was about 1902 that the weight of cars began to increase, and this increase continued practically until 1912, remaining at a maximum weight until about 1918 when the expense of operating the heavy cars was investigated, with the result that lighter weight cars began to be adopted. This indicates that track structures built for light weight cars would not stand up under the heavy equipment.

In 1909 M. V. Ayres, electrical engineer for the Boston & Worcester Street Railway, read a paper, which appears in the "Proceedings of the American Street Railway Engineering Association" for 1909. He went

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into the matter very thoroughly, and, speaking of tracks, stated as follows:

It is evident that a certain part of the cost of track repairs would be incurred irrespective of use, as decay of ties and corrosion of metals, and injury from teaming would go on just the same. Otherwise, wear is evidently about proportional to ton-mileage. If track construction is much too light for the car weight, doubtless the wear would increase faster than the weight, but with tracks suitable to the traffic, it is probably closely proportional.

This subject is a very pertinent one at the present time, and the track engineers would be of great assistance to the industry by giving instances of their actual experience in connection with the wear of not only the rail head but the entire track structure, and the effect of different weights of equipment. It would seem that the present time is a proper one for data based on fact to be presented, as heretofore articles on this subject have stated opinions more than facts.

In order that the data may be useful to the industry at large, it will be necessary for contributors to state the general conditions surrounding each case. These conditions comprise operating speeds, weight and design of cars, traffic density, number and position of stops, use of brakes, grades and curvature, vehicular traffic and type, design of rails and car wheels, maintenance, and finally, composition and section of rail with type of track construction.

W. R. DUNHAM,
Executive Engineer.

Vocational Training at Nashville

For the Past Two Years Classes Have Been Held for Benefit of Local Electric Railway Men—Results Justify Continuance of Educational Efforts

THE Nashville Railway & Light Company has made an active start along vocational educational lines during the past two seasons. Preparatory to this work the company sent J. J. Connors, carhouse foreman, to a summer school at Minneapolis, Minn., conducted under the auspices of the Federal Board of Vocational Education. This school or conference was conducted by C. R. Allen and J. C. Wright, of the federal board. It was attended by 150 or more foremen, state representatives of the board, college teachers and others.

The conference continued thirty days, and those who completed its curriculum were given certificates stating their competency to lead foremen training classes. The Nashville company representative received one of these certificates. He also attended later a local class organized under the state vocational board and received a certificate for this work also.

During the winter of 1921 and 1922 there was conducted for the company a foreman conference under the auspices of the federal board through the state agent, James Arensten. Mr. Connors and Mr. Arensten conducted the classes. The program of the conference consisted in what is known as "job analysis," that is, study of the characteristics of different kinds of jobs, which forms so important an element in modern industry.

This conference included the foremen of the machine shop, "riptrack," wood shop, paint shop, armature room, carhouse and track, the overhead lineman, the powerhouse foreman, the superintendent of schedules, the safety director and the division superintendents. The registration was about twenty-five, and the average attendance, fourteen. The company gave a supper each week in its own restaurant to encourage attendance at the conference. The conference continued for six months, sessions being held on Monday evenings from seven to nine. There was no charge for this instruction.

Since the conference disbanded over a year ago, the results have been evident throughout all departments of the company, the foremen being able to pass over to the subordinates the lessons which they learned.

THE SECOND SEASON'S EDUCATIONAL PLAN

The next step in the educational program was the inauguration during the season of 1922-1923 of a course in electricity under the auspices of the federal board, but for convenience the sessions were held at the Watkin Institute in Nashville. The registration was twenty-two, and the average attendance eleven. This class continued from Dec. 19, 1922, to May 15, 1923, meetings being held twice each week, a total of four hours per week. Timbie's "Elements of Electricity" was the textbook used and it was about one-half completed. It is expected that the book will be completed during the coming season.

For this class a graduate electrical engineer was secured as instructor. He took up every-day problems, especially those that arise in the shops in which the members of the class were employed. There was no lecturing and the men were encouraged to discuss the subject, freely.

Lessons were assigned in advance, together with problems, the solutions of which were to be put on the blackboard before the class. No fee was charged for this instruction, as during the preceding season. As the class was not held in the company's quarters, it was impracticable to continue to furnish supper.

The management of the Nashville property is enthusiastic regarding the possibilities of this kind of training, and what has been done during the past two seasons can be considered merely a beginning.

Traffic Doubled on Recent Extension

IN THE first five months of operation the passenger traffic on the Westminster extension of the Buffalo & Lake Erie Traction Company has about doubled. Prior to Nov. 26, 1922, when the company extended its West Twenty-sixth Street line from the old city limits of Erie to a point 3½ miles farther west, service to this section had been given by the Cleveland & Erie Electric Railway. The latter company suspended operation in the early summer of 1922 and for several months this section had no railway service at all.

People having business in Erie experienced great difficulty in getting back and forth from their homes, and the Buffalo & Lake Erie Traction Company was finally persuaded to purchase and operate part of the abandoned line. Instead of the former hourly service with big two-man interurban cars, thirty-minute service is now provided with smaller double-truck one-man cars. Two fares are charged, one to the old city line and a second fare from there to Westminster.

The people of the district are very much pleased with the service and even go so far as to decline offered automobile rides to town lest the railway become discouraged by losing some business. Much new home building is in progress along the route of this extension and railway traffic promises to become increasingly profitable.

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Association News & Discussions

Program Wisconsin Meeting

THE electric railway section of the Wisconsin Utilities Association will meet on Aug. 16 and 17 at Oshkosh, Wis., as previously announced in these pages. The program follows:

Thursday Morning

Address by Chairman B. W. Arnold, "Progress and Problems of Urban and Interurban Transportation in Wisconsin."

Address by Commissioner Andrew MacDonald, "What the Railroad Commission Expects of Operating Men."

Paper on "Urban and Interurban Track Problems" will be discussed by A. A. Oldfield, Eastern Wisconsin Electric Company; J. S. Hyatt, Chicago, North Shore & Milwaukee Railroad, and John St. John, Milwaukee Northern Railway.

Paper by W. G. Brooks, Westinghouse Electric & Manufacturing Company, "A Salesman's View of the Master Mechanic's Problems."

Address by Prof. James T. Rood, "What the University of Wisconsin Is Doing and Can Do for the Electric Railway Industry."

Luncheon at the Municipal Club.

Thursday Afternoon

An inspection trip to the new Oshkosh carhouse. Track under construction will be inspected en route. Inspection of new one-man interurban cars and de luxe coaches.

Demonstration by the Chicago Elevated first-aid team.

Baseball game, "Commercial Ambassadors" vs. "Transportation Dispensers."

Banquet at 6:30 with Prof. C. F. Hewitt, Oshkosh Normal College, as toastmaster, and an address on safety by Charles B. Scott, Safety Bureau, Chicago.

Dancing at 9:30 at Eweco Park.

Friday Morning

"The American Electric Railway Association and Its Services to the Electric Railways of Wisconsin," by James W. Welsh, executive secretary.

"Maintenance of Motor Vehicles," by Henry Cardell, Chicago, North Shore & Milwaukee Railroad.

"Bus and Coach Tires," by Howard Smith, sales manager General Tire Company, Akron, Ohio.

"Street and Interurban Transportation Problems," by Carl Allen, Wisconsin Public Service Corporation.

Friday Afternoon

Arrangements have been made for playing golf for those interested.

A program of entertainment for the ladies has been arranged for the convention, including shopping, bathing and boating, motoring, bridge and five hundred parties on the veranda at the Municipal Club, etc.

Mid-West Claim Agents' Association

THE third annual convention of the Mid-West Claim Agents' Association in Denver, recently concluded with the election of Travor C. Neilson, claim agent of the East St. Louis & Suburban Railway, and related companies, as president. In this capacity he will succeed W. C. Swisher, general claims attorney of the Kansas City Railways, Kansas City, Mo., who was elected at the convention held last year in St. Louis.

The other officers chosen were: S. G. Shaw, claim agent of the Denver Tramway, first vice-president; D. M. Finch, claim agent of the Des Moines City Railway, second vice-president; Charles B. Hardin, claim agent of the United Railways, St. Louis, executive committeeman at large; O. L. Borquist, chief clerk of the legal department of Kansas City Railways, secretary.

Training Oxy-Acetylene Welders

THE American Welding Society has just issued an outline of a course for the training of oxy-acetylene welders. This report was prepared by a committee and combines the experience of experts of the Federal Board of Vocational Education, the American Welding Society and the National Research Council for the information of the person who is selecting condidates, the text includes a discussion of the qualifications which the candidates for training should possess. For the information of the instructor, the text includes the fundamentals in gas welding, together with a detailed statement of content, classified under type welding jobs arranged in the order of difficulty. Copies may be secured from the American Welding Society, New York, N. Y.

Canadian Association's Secretary

EUSTACE SMITH, JR., who is executive assistant, Toronto Transportation Commission, has been appointed secretary of the Canadian Electric Railway Association, by H. H. Couzens, the new president.

A.E.S.C. Activities

THE American Engineering Standards Committee has taken under consideration for adoption as "American Standards" a number of new specifications proposed by the various technical societies. The principal ones of interest to the electric railway industry are those for line materials. The test methods for concrete materials, are approved as tentative standards.

The American Electric Railway Association has submitted its specifications for overhead line material for action by the A.E.S.C. A special committee to consider the question of sponsorship and scope of the specifications, which are also of direct interest to other than electric railway interests, is headed by A. H. Moore, representing the Electrical Manufacturers' Council on the A.E.S.C., and includes representation from the National Electric Light Association, American Railway Association, Electrical Manufacturers Council, American Institute of Electrical Engineers, American Electric Railway Association, American Short Line Railway Association, and the Bell Telephone System.

The attitude of the A.E.R.A., in submitting its specifications for this action by the A.E.S.C., will definitely favor the unification and elimination of conflicting specifications in this field, which is a very important one to a large group of industries, and involves expenditures of great magnitude annually in construction, maintenance and replacement of power, light, telephone, telegraph, and railway signal lines.

The following A.S.T.M., methods of testing materials entering into concrete have been approved as "Tentative American Standards" by the A.E.S.C.: Method of test for unit weight of aggregate for concrete; method of test for voids in fine aggregate for concrete; method of test for organic impurities in sands for concrete.

American Association News

Large Exhibit at Atlantic City Assured

PRACTICALLY all the space at present available for exhibits on the Million Dollar Pier in Atlantic City has been sold for the October convention of the American Electric Railway Association, and the exhibit committee is considering now with the pier authorities whether some arrangements cannot be made for additional room suitable for exhibits. The area sold up to Aug. 7 was 64,328 sq.ft. This includes all portions of the pier usually used for exhibits except some space in Aquarium Court which is being held for noisy exhibits or those which have some fire risk.

A list follows of the manufacturers to whom space has been allotted since the publication of the original applications on page 25 of the issue of July 7.

	Space
Albert & J. M. Anderson Manufacturing Company	28
American Car & Foundry Co.	410
American Steel & Wire Co.	551-553
Aluminum Company of America	308
Air Reduction Sales Company	200A
The Cleveland Fare Box Co.	402
Differential Steel Car Company	583
Federal Motor Truck Company	154-164 incl.
Gould Coupler Company	584-585
W. S. Goodwin Company	114
Hoover Body Company	303-305
Hubbard & Company	412
International Register Co.	537-539
Mack-International Motor Truck Company	301
Morganite Brush Company	535
Portland Cement Association	129
Rubberset Company	127
Standard-Johnson Company	622
Templeton, Kenly & Co., Inc.	582
Union Switch & Signal Co.	131
Van Dorn Coupler Company	404
Witherow Steel Company	109
Yellow Coach Manufacturing Company	313-315 317-319

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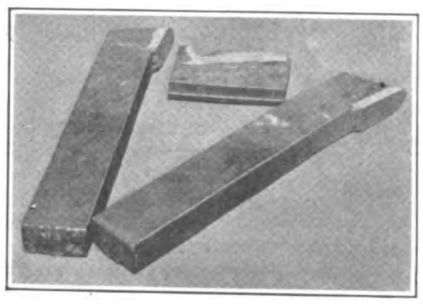
Maintenance of Equipment

Tipping Tool Proves Economical

THE Lehigh Valley Transit Company, Allentown, Pa., has been welding tool steel tips on the larger sizes of cutting tools used in its machine shops. A common quality of bar steel is used for the shank. This bottom part is cut so as to provide a shoulder at the back of the tool steel tip to take the strain from the machining operation. Both the bottom and the tip are scarfed along the edges where they join and to provide for welding the tool steel tips to the bottom. This practice reduces the amount of tool steel required



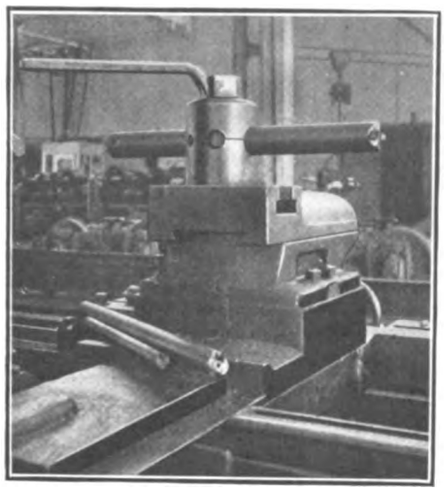
Tool Steel Tips Welded to Bar Steel Shanks

and some very satisfactory results are being obtained. Tools used in the turning of wheels last for turning from eighteen to twenty-two pairs of wheels with one grinding. An accompanying illustration shows several tools that have been tipped in this manner.

An Adjustable Boring-Bar Holder

AMONG the various devices which are in use in electric railway shops for holding a boring bar on a lathe carriage, the adjustable type shown in the accompanying illustrations is one of the most convenient. These illustrations were made from photographs taken in the machine shop of the Virginia Railway & Power Company at Norfolk.

The body of the holder is cylindrical. A projection at the bottom has a head to fit in the T-slot of the lathe carriage, and an extension at the top is threaded to take a standard nut. A transverse hole drilled

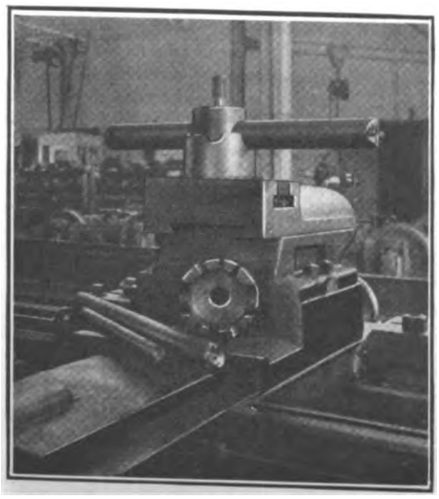


Boring Bars Can Be Quickly Changed or Adjusted by Means of This Three-Part Tool Post

through the center is of sufficient diameter to clear the largest-sized boring bar.

Surrounding the body of the holder is a steel sleeve of such a length that when the bottom rests on the carriage the top comes to the middle of the hole in the body. This is machined to accommodate several sizes of boring bars, three in the case shown. Over the top of the body fits a cap bored out to match the sleeve. When this is drawn down by means of a nut, it clamps the bar securely in position and clamps the holder to the lathe carriage.

The illustrations show the three boring bars which go with the holder, one in position, the others lying on the base of the carriage.



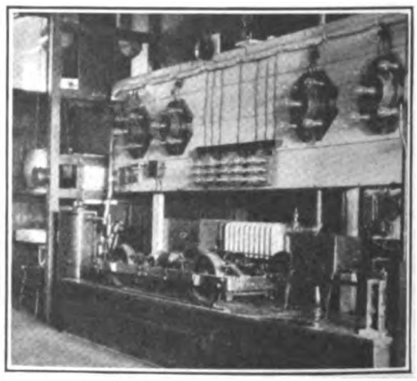
The Clamping of the Boring Bar Is Rigid and Simple

Grease Keeps Water Out of Track Switches

THE East Massachusetts Street Railway is using motor grease in its boxes of spring track switches. It is found that this keeps the water out and the parts in good condition. A light grease, somewhat similar to that which would be employed in the differential box of an automobile, is used.

Repair Shop Builds Model Truck

A SHORT time ago the repair shop of the Connecticut Company at Hartford built for instruction purposes a truck about one-third standard size. This truck was provided with airbrake equipment complete and then placed in the in-



Model Board and Truck in Hartford School Room

struction room for motormen in the State Street carhouse in Hartford. It now forms part of the instruction equipment there.

As illustrated, the motor electrical circuits are shown on the board in the upper part of the exhibit. Each of the four motors of a car equipment is represented by a model in relief of a motor, with armature and four field coils, each with a lamp, and a series of grid resistances. As the controller is turned, the separate lamps light up to show the connections. Above the board is a trolley by which power is taken from the overhead wire. The model also has a circuit breaker, air switch and door control.

Below on the platform is the

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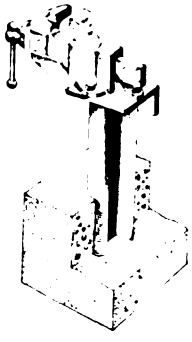
truck built in the Hartford repair shop. It is equipped with air brakes, controlled by an engineer's valve. Similar models are to be installed at the New Haven and Bridgeport instruction rooms.

Pedestal Vises Facilitate Repair Work

MUCH effort is wasted in the average repair shop in carrying work to and from the bench so that it may be held in the vise for various fitting operations. The West Penn Railways, Connellsville, Pa., has found it desirable to handle such work close to the job, either in the blacksmith or machine shop. For this purpose three vises have been installed at different points in the shop. These are standard machinists' vises with 8½-in. jaws, having a maximum opening of 12 in. Each of these vises is installed on an independent pedestal, made of old rail, which is set vertically into the ground, being sunk about 3 ft. beneath the floor. The rail is incased in concrete, making a very solid structure. The vises are about 3 ft. above the floor level of the shop. Being entirely separate from any work benches, these vises can be approached from any side, so that there is great freedom afforded the workman in handling parts in them. Their use has proved beneficial, has saved time on many jobs, especially those of fitting parts for truck work, and similar repair work.



The Vise Is Mounted on a Rail Imbedded in Concrete

Grease Gun Minimizes Waste of Lubricant

A CAPACIOUS and cleanly grease gun, made in the local shops, is used by the Newport News & Hampton Railway, Gas & Electric Company, in applying heavy grease. This consists of a tube about 3½ in. in diameter and 15 in. long, with an equal length of ¾-in. pipe projecting from the lower end.

The upper end is surmounted by a cap and nut through which travels a long threaded rod with an 8-in. crossbar at the top. A leather-packed piston is attached to the lower end of the rod. The piston rod is threaded eight threads to the inch, and a few turns suffice to inject a liberal supply of grease. The whole thing is under perfect control.

This gun enables grease to be placed in any location and is particularly effective in reaching inaccessible places which are frequently either over or under lubricated. A foot made of strap steel is attached to the cylinder to support the weight of the gun when it can be used in the position shown in the illustration.

A Practical Grease Gun Made at Hampton

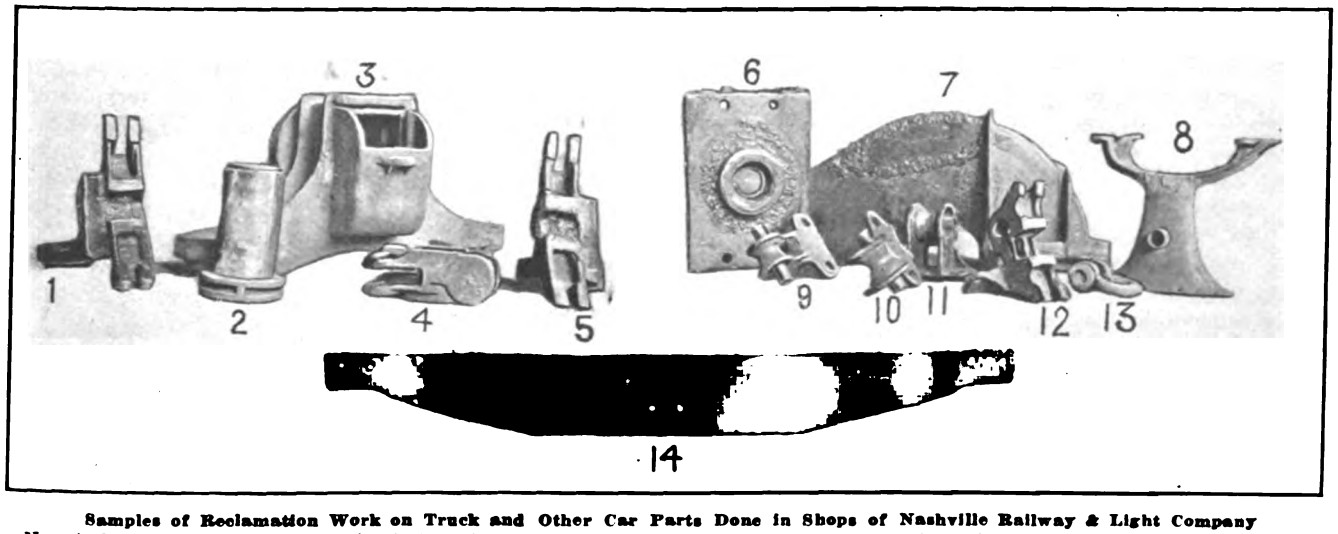
Typical Welding Reclamation Jobs

Illustrations Are Given of the Uses of Acetylene and Electric Welding—Savings Have Amounted to as High as $7,500 in a Single Month

IN THE SHOPS of the Nashville Railway & Light Company, of which George Swint is master mechanic, the use of electricity and acetylene in welding is highly developed. A number of the most successful jobs have been selected for illustration, particularly to show the reclamation of truck parts.

Reclamation plays such an important part of the shop activities at Nashville that in a single month as high as $7,500 worth of parts has been reclaimed. In the accompanying reproductions of photographs, taken recently in the Nashville shops, the several parts are numbered for identification. The salient facts regarding each of these jobs are as follows:

The pair of brakeheads for the driving wheels of the Brill 39-E



Samples of Reclamation Work on Truck and Other Car Parts Done in Shops of Nashville Railway & Light Company

Nos. 1, 5, 12. Brakeheads for Brill 39-E trucks.
No. 2. Bearing for GE-90 motor.
No. 3. Journal box for Brill 21-E truck.
No. 4. Brakebeam fulcrum.
No. 6. Center plate for Brill 39-E truck.
No. 7. Gear case for GE-57 motor.
No. 8. Pressed steel seat stand.
Nos. 9, 10, 11. Carriers for half-ball brake-hangers.
No. 13. Brake-rod clevis.
No. 14. Brake beam.

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truck, Nos. 1 and 5 in the illustration, were welded on the toes and filled on the lute with an acetylene torch. The same is true of the brakehead for the pony wheels of the same truck, No. 12. Another acetylene job, No. 2, was on the bearing for the GE-90 motor. Here the dowel pin holes were filled in so that the bearing could be redoweled.

The journal box for the Brill 21-E truck, No. 3, was cracked at the junction of the arm and the journal box proper. It was welded as shown by means of the electric arc. Another electric welding job, No. 4, was the brakebeam fulcrum, the holes in which were filled in ready for reboring. The truck center plates, No. 6, had the wearing surface on the plates completely renewed by the use of acetylene. The malleable-iron gear case for the GE-57 motor, No. 7, was also repaired by means of acetylene welding, a patch of sheet iron being welded over a large break in the case. Still another acetylene job is the sheet steel seat stand, No. 8. The upper part of this stand was completely broken off, but was replaced and welded into position as good as new. The pressed steel was, of course, too thin for the use of the electric arc.

A group of jobs of particular interest are illustrated in Nos. 9, 10 and 11. These are brake-hanger carriers in which the seats for the half-ball hangers have become worn. The seats are not built up and resurfaced to a spherical curvature, but instead a bushing or spindle, a piece of heavy steel tubing, was welded into place with the acetylene torch in each case. When the truck parts are reassembled, the weight of the hanger is carried on the spindle instead of the original surface.

Two more electric welding jobs remain to be mentioned. One is the brake-rod clevis, in which the metal worn away by friction was replaced, with a little extra for good measure. The other is the brake beam or bar, No. 14, which had begun to crack at the inside bends. The cracks were filled in with new metal and a reinforcing layer was spread out generously in all directions from the cracks.

The illustrations which are typical of all of the work done in the reclamation department bring out the fact that the gas welding is used wherever the metal is thin, and for cast iron, brass, copper and aluminum. The electric welder is used for everything else.

Device for Lighting Acetylene Torch

IN THE shops of the Kentucky Traction & Terminal Company, Lexington, Ky., a handy gas lighter has been made to permit gas to be lighted by means of a short arc drawn between two small carbons. The carbons are mounted in clamps at the end of a pair of brass springs anchored on a tapered block of fiber. The carbons are about ¼ in. in diameter and an inch long, and they are held in place by friction. The device is attached to a lamp cord leading from the negative side of a 500-volt lamp circuit to hold the current down to a small value. The springs and handle are wrapped with adhesive tape.

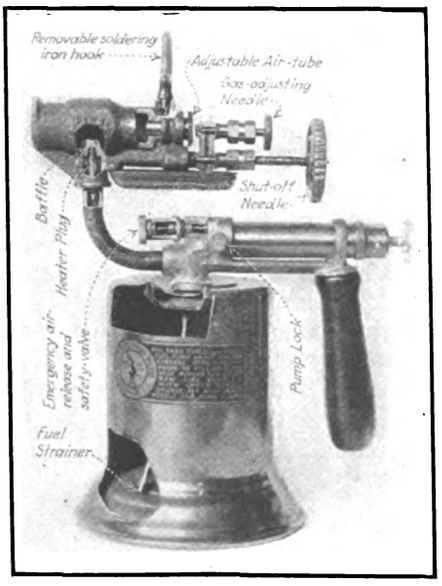
A Safe Lighter for Gas Torches

The lighter is about 8 in. in length, and about 2 in. wide when the carbons are held in contact.

New Equipment Available

New Features in Blow Torch

A BLOW TORCH with a number of new and useful features is now being marketed by the Turner Brass Works, Sycamore, Ill. The fuel tank is arranged with but one opening which is on top. This eliminates the possibilities of leaks from soldered connections and eliminates the hazard from fires, explosions, etc. A safety valve located at the end of the horizontal pump cylinder is fitted with a diaphragm which automatically opens and closes at 40-lb. pressure. As blow torches operate ordinarily at from 18 to 20-lb. pressure, this safety valve does not come into action until about double the normal pressure is obtained and the maximum limit of the safety valve is still well within safety.



Sectional View of Improvement in Blow Torch

An air release in combination with the safety valve is provided, which when opened after the operator has finished using the torch releases all pressure in the tank as an additional safety precaution. The pump is equipped with a leather that spreads like a parachute on the work stroke and closes on the return stroke. This leather is automatically lubricated from a reservoir containing vaseline.

In going from the tank to the combustion chamber, the fuel passes through the interior of a solid bronze baffle. The baffle is the obstruction in the burner on which the flame is constantly applied. Heating the fuel to a hot dry gas insures perfect vaporization of the gasoline or kerosene, thus generating more heat with lower fuel consumption, and without the danger of clogging.

The maximum admixture and combustion of oxygen is obtained by admitting air through a flared inlet in front of the needle valve instead of depending upon a multitude of holes in the burner tube. This inlet is a bell-shaped nut turned from brass stock an threaded so that the operator can screw it into or out of the tube, thus regulating the distance from the needle valve and consequently the volume of air admitted. The shut-off valve used to shut off the flame is a separate unit from the adjusting needle or orifice needle.

Another improvement consists in the provision of a pistol-grip handle. Special attention has been given to providing room for a large sized hand so that the torch can be handled without danger of tiring the user and without obstructing brackets.

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The News of the Industry

Union Depot Proposed

St. Louis Engineer Wants East St. Louis Line to Have St. Louis Terminal for Fifty Cars

The engineers committee of the St. Louis-East St. Louis Railroad terminals, 1922, has reported on the question of the operation of cars of the East St. Louis & Suburban Railway over the Eads Bridge into St. Louis. The committee believes that appropriate steps should be taken by the company to accomplish:

1. The abandonment of the Eads Bridge for railroad traffic.
2. The use of the upper roadway for highway traffic free from toll.
3. The use of the present railroad tracks on the lower level for electric street and interurban cars.

The East St. Louis & Suburban Railway operates a very heavy electric car traffic over this bridge to and from a stub end station with two tracks at the west end of the bridge at Third Street and Washington Avenue, St. Louis. Its tracks occupy the same roadway as other highway traffic.

The suggestion has been made that tolls be removed from the bridge, in which event the engineers regard it as practically necessary to remove the electric cars from the upper deck and put them on the railroad deck. This they say, would not only largely increase the capacity of the highway roadway for handling traffic, but would also expedite the passage of electric cars and interurban cars across the river. These cars handle, in round numbers, 10,000,000 to 12,000,000 passengers per annum, who get on and off the cars at the west end of the bridge.

On account of the interference with St. Louis street cars and other surface traffic in the vicinity of Third Street and Washington Avenue it has not been considered feasible to have the East St. Louis street and interurban cars extend into St. Louis. They cannot operate on St. Louis street car tracks on account of different gages. As the engineers see it if the cars be placed on the lower deck of the Eads Bridge, their operation can be extended further west underground as far as may appear desirable. They suggest as an excellent site for a terminal for these lines the "Market Block," owned by the city of St. Louis, bounded by Broadway, Lucas Avenue, Sixth Street and Morgan Street, three blocks west and one block north of the present end of the Eads Bridge electric car tracks.

Such a plan would necessitate removing all railroad passenger and freight trains from the Eads Bridge and tunnel.

Charles S. Betts, engineer of the Department of Public Utilities of St. Louis, in his comments and recommendations to the committee says in part:

The logical solution for an Interurban Station would be to leave the present railway tracks on the lower deck of the Eads Bridge at about the alley east of Second Street then southwest to Third Street landing at Third Street and Washington Avenue with about nine tracks as per present plans with 20 ft. track centers, or 12 ft. between cars which serve as loading and unloading platforms, each line having its separate track to come in on and depart on.

In other words, we would have our Union Station duplicated for electric interurban cars. This arrangement would cause no confusion as every track is numbered. The advantage of this station would be that it is all above ground. The interurban cars are double ended and for this reason can use this proposed station without change of car equipment.

Another use to which this station might be put would be for a garage on the second floor with entrance on Eads Bridge adapted for East side autos.

The proposed station is contingent on the lower or railroad deck being turned over to the interurban roads and the use of the Municipal Bridge by the steam railways now using the Eads Bridge.

The plan of the proposed interurban station with track arrangements for fifty cars and a storage of twenty cars was submitted by Mr. Betts.

Interurban Lines Will Construct Freight Terminal

Plans of the interurban railways entering Indianapolis to construct a new freight terminal on Kentucky Avenue, where the freight depot of the Terre Haute, Indianapolis & Eastern Traction Company is now located, were recently approved by the Public Service Commission. As a result of the action of the commission, Indianapolis will have adequate interurban freight terminal facilities.

The order of the commission releases the Indianapolis Street Railway from the obligation of providing the freight terminals and leaves the interurban lines free to construct an adequate freight depot.

The plans call for the construction of an addition to the present freight house of the Terre Haute, Indianapolis & Eastern, and for the construction of a large new freight terminal. It is hoped to have sufficient additional facilities provided by Dec. 31, to take care of the freight of the Indianapolis & Cincinnati Traction Company and the Interstate Public Service Company. Construction of the new terminal is to be financed by the formation of the Terminal Realty Company, which will acquire additional ground at the Kentucky Avenue site. The company was authorized to issue $1,500,000 of preferred stock, to be sold at $96.10, and $750,000 of common stock to be held by the interurban companies.

Wage Offer Accepted

Montreal Trainmen Will Continue for Another Year at Present Pay—Adjustment for Shop Men

Of 2,088 union tramway men who cast ballots on July 31 in the referendum held by the Montreal Tramways Union, 1,211 members, or more than half of the entire number, voted to accept the offer of the Montreal Tramways and settle the wage dispute in that way.

The result of the referendum vote on the matter was as follows:

To accept the offer of the company, 1,211 votes.
To refer the wage dispute question to a board of arbitration, 195 votes.
Willingness to strike within forty-eight hours from the taking of the ballot, 661 votes.
Spoiled votes, 21.
Total number of votes cast, 2,088.

The offer of the company, which the men by a majority vote have decided to take, is to sign a contract with the employees for one year dating from July 1, 1923, at present rates, with certain readjustments in the company shops and outside departments. On the understanding that this offer is accepted, the company further promises to give consideration to the establishment of a pension fund for all the employees as soon as all the obligations under the contract with the city of Montreal are fulfilled.

Reduction in Day Asked

Motormen and conductors are now paid in most instances at the rate of 48 cents an hour, for a ten-hour day, time and a half being paid after that number of hours have been worked. The original demands of the union were for an eight-hour day, with the same pay as at present being received for the present longer work day.

The company declined to consider any advance in wages paid to motormen and conductors affirming that the wages of their employees have been increased 100 per cent since 1913, and are now 65 per cent higher than they were in 1918, while the cost of living for a family of five, according to the figures of the Department of Labor, was only 6.52 per cent higher than in April, 1918.

Decision to hold a referendum among the membership of the union was reached at a meeting on July 23, as the negotiating committee could see nothing resulting from further parleys with the company officials, and they wanted an expression of opinion from the men in order that the future policy of the union in this matter might conform to the wishes of the majority of the union members.

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Interurban Asks Franchise

Ordinance for Entrance Into Cincinnati Provides for Right of City to Control Service and Fares

The Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, through its attorney, Stanley Shaffer, has made application to the City Council of Cincinnati for a franchise to bring its tracks from Anderson's Ferry into the heart of Cincinnati. This is the most important step taken by the interurban company to enter Cincinnati over an elevated structure. The interurban company plans to make its Cincinnati terminus on Third Street near the Dixie Terminal, the northern terminus of the South Covington & Newport Street Railway. According to Mr. Shaffer, most of the new route, which is more than 7 miles in length, will be made over private right-of-way, nearly all of which already is held under option. The estimated cost of the extension is about $800,000. At the present time, residents of towns along the route are brought from their homes to Anderson's Ferry. Here they are compelled to board cars of the Cincinnati Traction Company to convey them to Cincinnati.

Service-at-Cost Features

The interurban company always was willing to make the extension, but it was impossible until the Ohio Senate repealed the Schmidlapp law, which provided that only a 5-cent fare could be charged on an elevated railway. On the basis of a 5-cent fare, it was impossible to make the extension. Last March the State Senate passed the Lipp bill, which gives City Councils power to fix rates of fares on elevated railroads in excess of 5 cents.

Under the terms of the ordinance, the city has control of the service, has the right to fix schedules and designate the number, type and design of cars to be operated. All rates, fares and charges of the interurban company are to be based upon the cost of service. A feature of the measure is the establishment of a "fare index fund" to take care of surplus gross receipts remaining after deducting depreciation and taxes, also interest on the bonds which will be used to build the extension. Upon commencement of the service the ordinance provides the company shall deposit to the credit of the fund $10,000. The ordinance specifies that when the fund exceeds $20,000 it shall be conclusive evidence that the rate of fare is too high or the service insufficient and therefore the rate of fare should be reduced or the service increased, as shall be mutually agreed upon between the city and the operating company. When the amount credited to the fund falls below $5,000 then it shall be evidence sufficient to prove that the rate of fare is too low and therefore the rate shall be increased or the service diminished. The rate of fare will be 10 cents between Cincinnati and Anderson's Ferry.

Mr. Shaffer said that Edgar Stark and C. E. Hooven, receivers for ten years of the interurban company, now have the system on a paying basis and soon will make their final report and be discharged. With the discharge of the receivers a new company to be known as the West End Terminal Railway, which was incorporated last fall with a capital of $10,000, will organize and take over the operation of the extension. This company also will issue bonds for the improvement.

Incorporators of the new company are: H. Lee Early, L. B. Patterson, Morgan Wamsley, and Dr. John Walton. These men are residents of towns along the route of the Cincinnati, Lawrenceburg & Aurora Electric Street Railway.

Application Before Council

The application for a franchise has been referred to the Council committee of street railways for public hearings.

With the completion of the extension the length of the interurban line will be 40 miles.

Electric Railroad Between Los Angeles and San Francisco Contemplated

Recently the Santa Fe Railway system announced publicly that an appropriation was available to the amount of approximately $132,000 for conducting a complete survey for the construction of a new line between Los Angeles and San Francisco.

At the time of the survey considerable thought was to be devoted as to the most economical and feasible type of motive power to adopt. The Santa Fe's present connection for its steam road line on the Pacific Coast between Los Angeles and San Francisco is via its own line from Los Angeles to Bakersfield, thence from Bakersfield to San Francisco over the Southern Pacific Lines.

The Santa Fe system now has a budget for a $30,000,000 improvement program on the Pacific Coast, which involves double-tracking of several of its lines and the construction of several extensions. The proposed new line between Los Angeles and San Francisco will involve the greater portion of the budgeted amount, the estimated expense being about $25,000,000.

The line as proposed will be the shortest direct rail communication between the two largest cities of the state of California. At least 30 miles will be reduced from what is now the shortest rail route. The construction of the new line awaits the approval of President Story of the Santa Fe before actual work is undertaken. The surveyed route is stated to run from San Francisco to Bakersfield, thence south and west by the lines of least geographical resistance to the Tehachapi mountain range, thence by a system of many large and long tunnels into Los Angeles almost on a direct line.

It is stated that electricity for motive power will establish a precedent in extension work on an immense scale for the Santa Fe lines.

Six Per Cent Increase

Board Refuses to Grant Pay to Eastern Massachusetts Men Equal to Scale Paid on Boston "L"

A special board of arbitration has awarded an increase in wages to the employees of the Eastern Massachusetts Street Railway equivalent to about 6 per cent, or 3½ cents an hour. This award was announced in the ELECTRIC RAILWAY JOURNAL, issue of Aug. 4. The arbitrator for the men, James H. Vahey, dissented from the majority award, claiming that it was insufficient. Henry C. Attwill, chairman of the board, who is also chairman of the Massachusetts Public Utilities Department, announced the following new wage scale:

Motormen and Conductors	Cents an Hour
First three months	52½
Next nine months	52½
Over one year	58
One-man car differential	5
Transportation Department	
Crossing tenders	54½
General helpers	54½
Line Department	
Linemen	62½
" helpers	55½
Stores Department	
Helpers	54½
Power Plant	
Asst. eng.	70
Firemen	61½
Foremen of helpers	61½
Firemen helpers	58
General helpers	55½
Oilers	58
Pipe coverers	61½
Repairmen	59½
Substation operators	58
Switchboard operators	60½
Hoist. eng.	63

Roadway Department	Cents an Hour
Trackmen	54½
Repair Shop and Rolling Stock	
Blacksmiths	58
" helpers	54½
Babbiters	56
Carpenters	58
" helpers	54½
Car cleaners	54½
Firemen	58
Machinists	58
" helpers	54½
Painters	58
Pattern makers	58
Pitmen	57
" helpers	54½
Upholsterers	57
Watchmen	54½
Winders	59
" helpers	54½
Wiremen	58
" helpers	54½
Letterers	59½
Truckmen	59
" helpers	54½
Pipers	58
" helpers	54½
General helpers	54½
Electricians	58

In refusing to adopt the suggestion of the employees that their pay should be placed on an equality with employees of the Boston Elevated Railway, Mr. Attwill says:

In the instance of the Boston Elevated Railway the Commonwealth took over the management and operation of the property of the street railway company and guaranteed to the stockholders of the company the payment of dividends at a rate fixed in the act, while in the instance of the Eastern Massachusetts Street Railway the Commonwealth guaranteed nothing except the payment of certain serial bonds which might be issued by the trustees, which in no event were to exceed in the aggregate $5,000,000.

Undoubtedly the fact that the treasury of the Commonwealth stands behind the financial integrity of the Boston Elevated Railway and not behind that of the Eastern Massachusetts Street Railway is reflected in the difference in compensation heretofore paid to their employees.

In the one instance, if the compensation were made higher than the traffic would bear the deficit would be made up by taxes assessed in the communities in which the company operates, while in the other, if long-continued, a deficit would result in the company ceasing to operate.

Again, the Boston Elevated Railway is less likely to be affected by the competition of motor vehicles. Its gross revenue since its operation by the public trustees has steadily increased.

The gross annual revenue of the Eastern Massachusetts Street Railway has steadily decreased, rather than increased.

It is urged by the employees that no consideration should be given to the interests of the stockholders in the fixation of wages. Assuming this to be true, we must

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give consideration to the credit of the company, as no public utility can hope long to succeed and furnish the service required for the public unless it is able to secure new capital to meet its capital expenditures. Such new capital cannot be obtained unless the conditions are such as to attract it.

Notwithstanding the desirability of making the service-at-cost plan a success, the public ought not, in my judgment, to expect to enjoy the transportation furnished by the Eastern Massachusetts Street Railway as at present organized unless it is willing to contribute in fare sufficient to pay the men who operate the transportation system a wage which is fairly comparable with the wage paid by other utilities furnishing a like service under similar conditions, particularly when there is no indication that such wage is likely to be reduced in the near future.

He referred to the necessity for the company, in order to exist, to change its system into a one-man car system. Further, that by this change the company had been able to show extraordinary improvement in its financial condition and that the situation was now very promising providing the company received the co-operation of the men and that competition by motor buses was eliminated.

Mr. Vahey in disagreeing from the majority award said that he believed that most of the reasoning was faulty and also that the increase granted was insufficient even from the point of view adopted by the majority of the board. He said that he disagreed in particular with the attitude of the majority in regard to the importance of financial questions in a wage determination. That these employees entered the railway service to perform certain specified duties. That they were not consulted about any of the numerous problems of construction and investment and that they must not be forced to take upon their shoulders any of the burdens created by unwise or unfortunate decisions of the present or past managements.

The "Co-operator" Offers Helpful Suggestions

The Department of Street Railways, city of Detroit, is publishing monthly for its employees the "Co-operator," to develop a personal relation between the officials and their subordinates, as well as between the employees in the different divisions of the department. Mayor Doremus in congratulating the editors of the "Co-operator" says that each person should be encouraged to do his best and that faithful or meritorious service should be rewarded by a word or two of appreciation. He said that the pamphlets should prove invaluable in bringing about a closer spirit of co-operation among the many employees.

Number 3 of Vol. 1 contains an instructive article entitled "Co-operative Carefulness," by H. B. Selden, claims attorney. Mr. Selden remarks in his article that during the month of June the Department of Street Railways had 2,080 accidents, the majority of which were due to heedless and irresponsible automobile drivers. He adds that absolute safety can be obtained only by the personal co-operation of every individual in the community.

This particular article is one of three written by three department heads in answer to the question: "What would you say if you could talk to the 3,500 platform employees face to face on what would tend to better co-operation on the part of the platform men in connection with the work of your division?" Two other articles helpful with suggestions were also printed in No. 3 issue of the "Co-operator." The authors of these articles are H. B. Gould, electrical engineer, and P. A. Kerwin, superintendent of tracks.

Must Explain Why Service Cannot Be Restored in Spartanburg

An order of the Supreme Court of South Carolina has been served on George B. Tripp, general manager of the South Carolina Gas & Electric Company, Spartanburg, requiring that he appear before that body in Columbia on Aug. 28 to show cause why full railway service should not be resumed in Spartanburg. The order followed the securing of the signatures of Associate Justice R. C. Watts, together with a copy of the supplemental petition of the city of Spartanburg asking for such an order.

The petition of the city claims that the Railroad Commission did not have the power to issue the order of June 22 which authorized the abandonment of service in the city of Spartanburg on July 21. The petition declares that the amendment of 1923 to the act enlarging and defining the powers of the Railroad Commission expressly denied to the commission authority to make such order. The petition charges that on July 22 and before the dawn of July 23, the company removed all of the trolley wires within the city of Spartanburg through which the power to operate its street cars was delivered; that said trolley wires and appliances were a valuable part of the property heretofore dedicated to the service of the public under the charter and franchise under which the said street railway was operated.

The city reviews the history of the controversy which dates back to January of this year. The events leading up to the order of the commission were told in these columns previously. The city in its petition prays that the court issue its writ of mandamus requiring and compelling the respondents forthwith to restore the trolley wires and appurtenances necessary to the operation of the electric railway system in the city of Spartanburg; to restore the torn up and dismantled portion of its railway track in the city of Spartanburg; to resume operation of its electric railway systems in the city of Spartanburg and restore and maintain adequate car service thereon, and for such other relief as to the court may seem just.

President Tripp stated that he had no comment to make concerning the move of the city to compel the traction company to restore railway service in the city. Service was abandoned on July 22.

Commission Engineers Drawing Up Subway Plans

Approval was given on Aug. 3 by the Board of Estimate of New York to the two Brooklyn-Manhattan subway routes.

F. D. Waterman, chairman of the Committee of One Thousand, which urged the prompt construction of a new subway in Brooklyn and another in Manhattan, wrote the Transit Commission about the need of haste by the commission in doing its part to provide these added facilities. He said it was up to the Transit Commission to draw up the plans, which in turn must go back to the Board of Estimate for approval in detail. Mr. Waterman said that the Committee of One Thousand would suspend its active campaign for the time being, but that it would not disband.

Chairman George McAneny of the New York Transit Commission said that that body would have its engineers begin on Aug. 6 the task of drawing up plans.

$60,000,000 Tunnel Project Under Way

Work has been started on the Staten Island tunnel, connecting Brooklyn and Richmond. There are to be twin tubes for the use of both passenger and freight traffic, and their length between portals will be more than 5 miles.

The estimated cost of the project is $60,000,000. With railroad connections at Bay Ridge, Brooklyn and at Arlington, S. I., the total distance involved will be about 10 miles. The subaqueous section of the new tube will be 10,500 ft.

The municipal tunnel under the Narrows was directed by a legislative act, passed in 1921, and construction is carried on under a War Department permit, issued last September. The project is designed to maintain the supremacy of the port of New York.

The first digging is the construction of the Shore Road shaft in Brooklyn. The contract for this portion of the job was awarded by the Board of Estimate to Patrick McGovern, Inc., for $495,000. It involves the furnishing and erecting some 1,300 tons of structural steel, placing of 5,000 cu.yd. of concrete and excavating 10,000 cu.yd. of earth under compressed air.

The same contractor received the award for the building of the St. George shaft on Staten Island. The agreement was signed last month.

The new tube will have tracks not only for railroad freight and passenger traffic, but there are plans to use the underground way for rapid transit. Engineers of the Transit Commission, however, expressed disapproval at putting subway trains in the same tube with railroad freight cars. This is one of the questions yet to be worked out. At all events, the Narrows tunnel will give a direct rail connection between the roads entering greater New York from opposite sides.

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Arbitration Proceedings Under Way

Arbitration proceedings were started in Boston on Aug. 8 to settle the differences between the Boston Elevated Railway Company and its employees. George L. Mayberry, a Boston lawyer, has been agreed upon as the chairman of the board of arbitration with James H. Vahey representing the carmen and Charles W. Mulcahey representing the company.

There are five matters that the union officials and the company officials have been unable to agree upon, and which, therefore, went to arbitration. They are rate of wages; differential between wages of two-man car operators and the operators of one-man cars and buses; shorter working day on Sundays and holidays; one day off each week with pay; and increase in the eight-hour runs. Any adjustment which the board makes will be retroactive to July 1, and will remain in force one year.

The men are demanding 91 cents an hour, as a basic rate; they are now receiving 61 cents. They are demanding a large increase for the one-man car and the bus operators, up to $1.20 an hour for the latter if the two-man car operators should be awarded 80 cents. They want to work only six hours on Sundays and holidays, with pay for eight hours.

Love Your Enemies Slogan in St. John

"An eye for an eye, and a tooth for a tooth" is a philosophy with which the New Brunswick Power Company, St. John, N. B., has no sympathy. It believes in returning good for evil. For the past two years the company and the city of St. John have been in the throes of a conflict over the distribution of hydro-electric current. The company sought the right to distribute the current in St. John and suburban communities, while the city decided to install a civic distribution system, connecting with the hydro plant at Musquash River, 15 miles from St. John.

Despite the fact that the city has been installing poles, ornamental lights, transmission wires, distribution station, etc., in direct competition with the company, the company has not curtailed its scheduled plans for improvement in all services. New rails are now being laid through the principal streets of St. John. The roadbed in various parts of the city is also being repaired. Additional rolling stock is being purchased. Despite many rebuffs received from the representatives of the city, the company is improving its railway service.

Although the company is apparently passive in its attitude toward the city, yet it is going to fight, in its own way, the city's going into the light and power business. Substantial reductions have already been made by the company in house lighting rates. The civic distribution system that was to have been ready for operation in May is not yet ready and indications are that it will not be in operation until the latter part of August, and then only to a comparatively slight degree. The New Brunswick government insists that the city pay $12,000 for the month of June, although no current was used because of a contract entered into by the City Council of St. John, under the provisions of which the city guaranteed this sum to the government for June, whether or not current was taken.

The Federal Light & Traction Company is the new owner of the New Brunswick Power Company. Its management representative is Sanderson & Porter.

Jersey Men Still Out

President McCarter Insists Upon Comprehensive Settlement of Present Problem—More than Men and Money Involved

Efforts so far made to compose the differences between the Public Service Railway of New Jersey and its employees, now on strike, have all failed. In consequence local transportation in New Jersey in the territory formerly served by the company is still all being given by jitney. As President McCarter sees it, to use his own words, the matter has gotten beyond negotiations between the men and the company. He says that his statement still holds good that he will be glad to see the men any time they choose to confer with him, but "in the present posture of affairs I cannot conceive of anything that would be accomplished by such a conference."

Public Must Be Considered

This is the attitude taken by Mr. McCarter in a letter of Aug. 8 to President Osborne of the Board of Public Utility Commissioners, in which the head of the railway says further that "it is time for all who are charged with any responsibility in this matter to work out a comprehensive settlement." It was for this purpose, said Mr. McCarter, that he suggested a conference with the board in an earlier letter.

On the other hand, Mr. Osborne takes the attitude that the public is entitled to transportation facilities. He threatens that if the company and its former employees assume an arbitrary and unreasonable attitude, and thus make the prompt resumption of service impossible, "the present jitneys will be augmented sufficiently to give the public adequate permanent service."

He says that the desire of the company to protect the investment of its security holders is a duty of the company and that the men may desire to protect their jobs, but that in his view the company and the men should make further efforts to compose their differences. In the event of failure he says the board may then be called upon to act in accordance with its statement of Aug. 6. As a basis for negotiations he suggests:

1. An immediate conference between representatives of the company and the men.
2. An immediate temporary advance in wages, with a further increase after a seasonable lapse of time, the amount and the time to be agreed upon in conference and to be consistent with the prevailing wages in the industry and with the company's resources.
3. The taking of steps by the company to effect a reorganization if its financial structure to include the cutting off of non-paying lines not necessary to co-ordinate the service as a whole, where it is apparent that buses could better and more economically serve the public.
4. The seeking of co-operation of the various municipal authorities with a view to maintaining such service by bus as may be necessary, but restricting and rerouting buses so that ruinous competition may be reduced to a minimum and the public afforded a more comprehensive and efficient transportation system.

Mr. Osborne says that in agreeing to such a conference he would not consider either party committed to or bound in any way by the suggestions just set down. They were offered by him merely in the hope that both sides to the controversy, having a due regard for the public interest, might find in the suggestions a common ground for the adjustment of their differences.

Six-Month Permits Favored

Reverting to the statement of Mr. Osborne of Aug. 6, the chairman of the commission said at that time that unless the company and the employees were quick to compose their differences the board stood ready to approve so-called long-term permits for the operation of jitneys now running under the present emergency regulations. He said:

The parties to the controversy should not lose sight of the fact that their paramount duty is to the public. They can accomplish nothing standing at arm's length. There can be no doubt that some reasonable settlement is possible and negotiations should now be in progress to that end.

Unless an immediate effort is made by the company and the men to compose their differences, the Board of Public Utility Commissioners will indicate to the various municipalities affected its willingness to approve of long term permits for the operation of jitney buses to meet not only the present emergency, but to insure the public the future service to which it is entitled.

The board will, furthermore, under the statute, call upon the Public Service Railway to show cause why it should not furnish safe adequate and proper service as required by law and the provisions of its charter.

Thomas L. Raymond, Director of the Department of Streets and Public Improvements of Newark, in a statement on Aug. 6, declared that if the cars were not in operation by the next morning or if a plan for the immediate resumption of service was not placed in his hands by that hour he would issue 200 six months' permits to jitney owners.

The commission met on the morning of Aug. 9. Edmund W. Wakelee, vice-president of the railway, sent word to Mr. Osborne that the latter's suggestion made on the afternoon of Aug. 8 looking toward a conference of the company and the strikers would receive due consideration. At noon the board was reported still to be going over the entire situation with a view to possible further action. It was said unofficially at that time that the board might defer any definite action on its part until Saturday in view of the statement from Mr. Wakelee.

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Mr. Mayo Makes No Promises for Detroit

William B. Mayo, the newly appointed general manager of the Detroit Department of Street Railways, in outlining briefly his policies, stated that he will make no promises as to the future, pending the completion of reorganization of the plant taken over by the city. The work of general manager has been taken up by him at the request of Mayor Frank E. Doremus, and he has assumed the duty as a citizen to offer his best efforts in helping the city solve its transportation problem.

The governing idea with Mr. Mayo is that the citizens of Detroit desire the best railway transportation regardless of the merits or demerits of public operation. As he sees it the Detroit system, as a result of years of unfortunate controversy, had stagnated. The first task is to build a stable foundation. After that has been achieved the much-desired and anticipated innovations and improvements will inevitably come.

Mr. Mayo expressed the opinion that the first problem, namely, the task of securing the confidence of the majority of the people, has been solved.

It was necessary to show, according to the general manager, that the system would be operated without politics; that no expense of the system had been assessed against the taxpayers and that there is no indication whatsoever that there will be.

The street railway officials are hopeful of being able to announce within a few weeks, definite plans for rebuilding the property—plans which could not be developed until the completion of the first year of operation and comparative monthly figures were available as a guide.

Mr. Mayo paid a tribute to employees. He further cited that the men in the Department of Street Railways are not only taking care of Detroit's transportation problems, but that they are in a sense buying the plant outright for the people within a ten-year period.

The report of the Bureau of Governmental Research was referred to in the ELECTRIC RAILWAY JOURNAL for July 7, page 34. The trustees of this bureau are all big business men, among them merchants, bankers and engineers.

Will Spend $65,000 in Electrifying in West Texas

The West Texas Utilities Company, with headquarters at Abilene, has purchased the Roby & Northern Railway, a line 4.542 miles long, extending from North Roby to Roby, and announces that it will spend $65,000 in electrifying this short line. Terminals will be built both at Roby and at North Roby.

The line was constructed in 1915 under charter from the state granting carrier privileges for fifty years. It was the second and successful attempt of Roby, county seat of Fisher County, to get rail connection with the outside world. In 1907 Roby citizens subscribed funds used to project a line from McCaulley to Roby, a distance of about 14 miles, but the financial panic came on and the road gave up its activity, leaving its construction locomotive, caboose and material stranded at Pledger, to which point in 1907 steel had been laid. Years went by before Roby undertook again to get in touch with the rest of the world.

Citizens of Roby in mass meeting May 1, 1915, decided to build, this time from North Roby, nearly 5 miles away, where connection could be made with the Katy. The road was chartered May 4, 1915, with a capital of $10,000, and, the line was completed in the latter part of the year. The first regular train was operated over the line Jan. 3, 1916.

Arbitrators Appointed to Settle Municipal Wage Dispute

Judge Harry J. Dingeman has been selected as the third arbitrator in the wage dispute between the Department of Street Railways and the employees of Detroit's Municipal System. He will act with the first two arbitrators selected, Judge E. J. Jeffries for the employees and Frank D. Eaman representing the city. Aug. 10 was set for the first meeting of the arbitrators.

Two important announcements were made regarding the dispute. One was that the question of wages and conditions of labor and these matters only would be submitted to the arbitrators without delay. The other was that the questions of recognition of the union and of open shop would be dropped from consideration for the present.

Officials of the union repeated their denials that the demand had been made for recognition of the union and the closed shops, the discussion of which, according to Mayor Doremus, was prohibited by the city charter.

On the municipal lines, platform employees now receive 56¼ cents, 59¾ cents and 62½ cents an hour with 75 cents an hour for overtime work in excess of eight hours. One-man car operators are paid 5 cents an hour more than other platform men. Employees of the D.S.R. are also given one week's vacation with pay each year.

News Notes

Ordinance Again Defeated.—The franchise providing for a renewal of the franchise rights of the Alton, Granite & St. Louis Traction Company in Alton has been defeated for the second time. Alderman Pastorius moved the rejection because the company had failed to deposit $50 required of firms or corporations introducing ordinances.

Men Seeking Increase.—The contract of the Macon Railway & Light Company, Macon, Ga., with the employees of the railway lines expired on Aug. 1. The men are demanding an increase in wages before signing a new contract. Under the old scale the wages were 36 to 54 cents an hour, depending on the length of service. The company has refused to grant the increase.

Limit of Service Reached.—At a hearing by the Transit Commission on Aug. 2 it was brought out by engineering experts that the rolling stock of the Interborough Rapid Transit Company, New York, N. Y., is not able to maintain a three-minute train schedule. The hearing was on an appeal by the traction company on the commission's three-minute order.

Working for Personal and Equipment Cleanliness.—The management of the East St. Louis & Suburban Railway has adopted a plan whereby all motormen and conductors who meet certain requirements as to cleanliness are given a one-day holiday with pay. Recently, President Sawyer wrote letters to thirty conductors and motormen informing them that they had won the coveted holiday. It is the aim of the company also to have the East St. Louis cars the cleanest of those in any industrial city in the country.

Insuring Employees. — The Public Service Inc., New Orleans, through H. B. Flowers, president and general manager, is soliciting group life insurance upon each of its 4,100 employees, men and women alike, with the view of presenting to each of them, without expense to the insured, a life insurance policy, the amount of the policy to be graded according to the seniority, in service, of the employee. The award will be made by contract, through competitive bidding. The total face value of the policies to be written under the contract is estimated at $4,100,000.

Closer Contact for Public Relations Department.—Transfer of the department of public relations of the Indiana, Columbus & Eastern Traction Company and the Columbus, Newark & Zanesville Traction Company from Springfield to Columbus, Ohio, will be made soon according to an announcement from headquarters in Springfield. The transfer will bring the department in closer contact with activities that are centralized at Columbus and permit it to function more smoothly. Arthur V. Bland, director of public relations, and Robert H. Bryant, William Culp, Paul M. Culp, and J. W. McCloy will go to Columbus as members of the department.

Company Purchasing Property. — Plans are rapidly being developed by the Monongahela West Penn Public Service Company, Fairmont W. Va., for a terminal in Fairmont. In connection with such plans several purchases of property in the heart of Fairmont have recently been made. The latest purchase made by the company is a lot in Fairmont on Locust Avenue. In view of the fact that the railway not long ago purchased what is known as the Arnett property at the end of the South Side bridge in Fairmont for a terminal site, it is not known just what use will be made of the Locust Street property but it is thought that the latter may be used as a temporary terminal.

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Foreign News

A Novel Car at Hull, England

Experiments are now being conducted on the Hull city tramways with a car designed by E. L. Rayner, the general manager, which has several interesting features. The greatest novelty is a double worm drive. The whole vehicle is of specially light construction, as though it seats sixty-four passengers, its weight is only 8 tons. The stairway to the top deck is in the interior.

Suggested Improvements by London Employees

During the twelve months ended June 30, 1923, no fewer than 3,833 "Suggestions" were received by the London Underground Railway Company from the staff. Of these, 300 were accepted and awards made. Since 1917 a total of 22,850 "Suggestions" have been made and they continue to arrive at an average rate of 320 a month. The Underground Suggestions Bureau has been in existence in 1910.

London Underground Dividends

For the past half year the companies associated in the London underground railways group have, in addition to the payments on preference stocks, declared the following dividends on their ordinary stocks: Metropolitan District Railway, 1½ per cent (being the same as a year ago); London Electric Railway, 2 per cent (against 1¾ per cent); City & South London Railway, 2 per cent (compared with 1¾ per cent); Central London Railway, 2 per cent (the same as last year); London General Omnibus Company, 4½ per cent tax free (against 4 per cent).

London Traffic Regulation

At last there seems to be a prospect of something being done to constitute a general street traffic authority for Greater London. Such a step has been discussed and advocated for many years, but conflicting interests and politics have stood in the way. In face, however, of the growing street congestion, which has in many places become intolerable, the Ministry of Transport has for some time been directing special attention to the subject. In June and July the Parliamentary Secretary to the Ministry held conferences with representatives of local authorities, tramway and omnibus undertakings and others concerned, and the expectation is that in the coming autumn the government will introduce a bill in Parliament to deal with the subject. The scheme will probably embrace a wide area around London as well as the metropolis itself. A proposal that appears to find favor is that the Minister of Transport should be authorized to deal with problems of London traffic on the advice of a committee consisting of representatives of the Home Office, the Metropolitan Police, the county councils of London and surrounding counties, transport undertakings and transport workers. Probably a scheme of this kind would not meet with the opposition which might be raised in many quarters to the constitution of an independent expert traffic board with more or less autocratic powers. That such a board should be formed, with powers to initiate new schemes for transport, was recommended by a royal commission nearly twenty years ago, and varieties of the proposals have since then been put forward by various committees appointed to examine the question.

Cheap Railway and Bus Through Fares

The London Underground companies began an experiment on July 1 to bring the countryside nearer to central London by the introduction of through tickets from the principal stations in the central London area to the outlying country districts served by rural motor bus. These tickets will be issued on Sundays and bank holidays and will have the effect of cheapening the journey from central London and shortening the motor bus rides through the congested streets of the central area.

The combined fare for railway and bus is remarkably cheap. For a total distance of 16 miles the charge is 1s., and for 26 miles it is 1s. 9d.

Finance—A Great Improvement

The tramway accounts of the London County Council for the year ended March 31, last, show a surplus of £230,250 after payment of all charges including interest and sinking fund. For the previous year there was a deficit of £88,757. The total revenue was £4,895,605, as compared with £5,160,320 in the previous year. The working expenses were £3,660,577, against £4,386,891. The gross surplus was thus £1,235,028, against £773,429. After deducting cost of renewals, interest, sinking fund; income tax, etc., the net surplus was £230,250, as above. The working expenses (excluding renewals) per car-mile were 13.86d., compared with 17.68d., while the passenger receipts per car-mile were 18.13d., against 20.39d. The number of passengers was 733,811,367, against 688,151,316. For the current year it is estimated that there will be a net surplus of £78,617.

Operation to Start

The Domodossola Locarno Electric Railway in Northern Lombardy of meter gage and 1,500-volts d.c. will start operation the latter part of this summer. It gives a direct connection between Locarno, the Swiss city on Lake Maggiore, and Domodossola, the southern terminal of the Simplon Tunnel electric line. Although almost entirely on Italian territory, it will serve mostly Swiss traffic, as it is the only direct connection between the Swiss cantons of Valais and Ticino. The first consignment of motor and trailer cars has been received from the Carminati & Toselli Car Works, Milan.

More Underground Station Improvements in London

The last nine years have seen a great increase in the traffic at the two underground stations at Tottenham Court Road, London. In 1913 the number of passengers making use of both Hampstead line and Central London line stations amounted to 20,000,000. Last year the number had increased to 28,000,000. This remarkable growth in traffic has made it imperative for some scheme to be introduced whereby the transit of passengers from booking hall to platform level can be accelerated. Contracts amounting to £125,000 have been placed with Messrs. John Mowlem & Company and Messrs. Waygood Otis for what is virtually an entire reconstruction of these two stations.

The Central London station will be abandoned and the present Hampstead line booking hall beneath the road level will be enlarged and will act as a common booking hall for the traffic of both lines. Moving stairways will convey passengers from this common booking hall direct to the platform level. Further, the present arduous stairs and subway interchange between the two lines will be no longer necessary. Hampstead line passengers wishing to change on to the Central London line will be able to do so by escalator.

With a view to minimizing street accidents at this important junction where Tottenham Court Road, Charing Cross Road and Oxford Street meet, from the site of the present Central London station a subway will also be constructed connecting with the booking hall beneath the road. Passengers will therefore be able to gain the station without having to cross the road at this busy point. In the enlarged booking hall passimeters will also be introduced, thereby further speeding up the handling of the traffic.

When the improvements are completed, not only will congestion be entirely avoided but it is estimated that the time taken between entering the booking hall and reaching the platform will be reduced by half a minute. It is estimated that five seconds per train will be saved in the loading of the northbound trains to Highgate and Golder's Green during the rush hours by the introduction of escalators.

Track Switches in Milan

The Milan municipal railway has decided to install electrically operated track switches at a large number of busy traffic points. The switches so far installed are of Oerlikon make. Switch-points and frogs are mainly of Edgar Allen, Ltd., Sheffield.

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Financial and Corporate

Cuban Company Makes Good Showing

Railway Department of Company in Havana Shows Net Earnings Increase of 15.1 per Cent in 1922

The net profit of the Havana Electric Railway, Light & Power Company for the year ended Dec. 31, 1922, was $2,235,881. So far as the railway department is concerned the results showed a decrease of 3.96 per cent in gross earnings, but an increase of 15.1 per cent in net earnings compared with 1921.

CONDENSED PROFIT AND LOSS ACCOUNT OF HAVANA COMPANY FOR THE YEAR ENDED DEC. 31, 1922

	Railway Department	Light and Power Department	Total
Gross earnings from operation	$5,756,438	$7,154,268	$12,910,707
Operating expenses	3,689,592	2,262,856	5,952,449
	$2,066,846	$4,891,412	$6,958,258
Deduct			
Taxes, U. S. A.	$20,746	$28,000	$48,746
Taxes, Cuba	33,400	271,000	304,400
Trigo Annuities	3,373	.....	3,373
Interest	616,188	470,819	1,087,007
	$673,707	$769,819	$1,443,526
	$1,393,139	$4,121,593	$5,514,732
Deduct			
Reserve for depreciation	$589,370	$1,710,629	$2,300,000
Reserve for contingencies	153,749	446,252	600,000
	$743,119	$2,156,881	$2,900,000
	$650,019	$1,964,712	$2,614,731
Add			
Interest on deposits			$88,122
Income from securities			18,554
Rents			38,190
Other miscellaneous income			44,187
			$189,053
			$2,803,784
Deduct			
Miscellaneous accounts written off, net		$120,468	
Amortization of discount and expenses on funded debt		130,557	
Provision for sinking fund of thirty-seven-year English 5 per cent mortgage bonds of compañia de Gas y Electricidad de la Habana		15,949	
Provision for sinking fund of consolidated mortgage 5 per cent gold bonds of Havana Electric Railway		131,666	
Provision for sinking fund of general mortgage 5 per cent sinking fund gold bonds of Havana Electric Railway, Light & Power Company		135,513	
Premium on redemption of five-year 7 per cent secured convertible gold notes, dated Sept. 1, 1921		33,750	567,903
Net profit for the year, carried to surplus account			$2,235,881

At the beginning of the year 1922 the operating schedule required 434 cars on week days and 435 cars on Sundays. During the year it was increased to 443 cars on week days and 452 on Sundays and one new line was added, making the total thirty-five. The largest number of cars in circulation at one time was 478 on March 5, Piñata Sunday, the second Sunday of Carnival.

For the first time since 1915 the railway earnings decreased. The increases in 1921 and 1920 were unprecedentedly large. If, instead of taking the actual figures for the past three years (1920, 1921 and 1922), the figures are extended over the average rate of increase found in 1916 to 1919 inclusive, the results are within 3 per cent of the actual earnings.

Just as in the two other principal departments, the feature of the year was the increase in net earnings due to the reduction of operating expenses, and it is worthy of note that the gain in net earnings was more than $100,000 greater than it was in 1921, although in that year there was also an increase of 18 per cent in total earnings. The saving in 1922 was due to the combination of several factors, the salient ones of which were: the readjustments of wages of common labor in July, 1921, of conductors and motormen and carhouse men in September and October, 1921, and of shop men in February, 1922, the lower cost of fuel for the power plant, reductions in the cost of all maintenance material, and improvements in the organization and equipment of the shops and the track department, all of which will be further described under the appropriate headings.

There were no labor disputes and relations with the entire personnel of the railway division were excellent. The readjustment of the pay of mechanics and other skilled workmen, in February, was combined with a number of changes and improvements in the classification and distribution of work, especially in the car shops.

The total payroll of this division was reduced by about $3,500 per month.

The results obtained from the new model cars put in service in 1921 and 1922 were so satisfactory that it was decided to build more of them instead of reconstructing cars of the old type that were too short to accommodate eighteen seats. Eight were built for replacement in 1922.

STATISTICS OF RAILWAY SERVICE AT HAVANA

	1921	1922	Increase over 1921	
Total number of passengers carried	116,272,911	113,011,816	3,261,095*	2.80%*
Passenger car miles	17,624,763	17,532,658	92,105*	0.52%*
Passenger earnings	$5,813,645.55	$5,650,590.80	$163,054.75*	2.80%*
Passenger earnings per car mile	32.99	32.22	.0077*	2.33%*
Total earnings from operation	$5,993,610.70	$5,756,438.47	$237,172.23*	3.96%*
Total operating expenses	$4,197,911.11	$3,689,592.87	$508,318.24*	12.10%*
Total operating expenses per car mile	23.82	21.04	.0278*	11.67%*
Operating ratio	70.40%	64.10%	.....	.....
Net earnings from operation	$1,795,699.59	$2,066,845.60	$271,146.01	15.10%

*Decrease

New York Lines Improve

City Lines Taken as Whole Show $339,693 Net Corporate Income for Ten Months

The street railway lines of New York, including the subway and elevated companies, for the first ten months of the fiscal year 1922-1923, that is, from June to April, inclusive, show a materially improved financial condition, according to figures compiled from the monthly reports of the companies and made public by the New York Transit Commission. The companies, taken as a whole, show a net corporate income of $339,693. For the corresponding ten months of last year they showed a deficit of $3,110,532.

The reports for March and April show the highest mark yet reached by the various lines in their recovery from the conditions arising out of and following the war.

The tabulation below gives the results by months, those months in which there remained an actual deficit, namely, July, August and September, 1922, and January and February, 1923, being indicated:

Month			Net Corporate Income or (D) Loss	Improvement Over Corresponding Month of Last Year
July,	1922	D	$135,977	$516,869
August,	1922	D	380,630	214,142
September,	1922	D	158,132	96,007
October,	1922		90,062	431,342
November,	1922		61,696	178,170
December,	1922		169,268	247,054
January,	1923	D	10,849	273,900
February,	1923	D	369,462	160,467
March,	1923		510,286	340,046
April,	1923		563,422	312,836
			$339,693	$2,770,838

In April the subway and elevated lines of the Interborough and the former B. R. T. companies showed a combined net corporate income of $357,401. The net corporate income of the Interborough subway lines amounted to $312,557, and of the B. R. T., now the B.-M. T. rapid transit lines, to $159,022. The Manhattan elevated lines of the Interborough system, however, despite the efforts which have been made to build up traffic on those lines, still showed a deficit of $114,178.

The surface lines of the city had $206,020 net corporate income for April. The best showing was made by the Brooklyn City Railroad, with net corporate income of $221,513. All of the Brooklyn surface companies showed net corporate income except the Brooklyn Heights and the Coney Island & Gravesend companies, which reported deficits of $59,743 and $12,142, respectively.

The New York Railways showed an April balance on the wrong side of the ledger of $152,881. This large deficit, however, was in part offset by the net corporate income of $83,483 reported by the New York & Harlem, operating the Fourth and Madison Avenue lines, and by small net incomes for other companies, so that as a whole the surface lines on Manhattan Island showed a net corporate deficit of $70,900.

All of the lines in Queens showed

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deficits, while in Richmond, though the Richmond Light & Railroad Company showed a net corporate income of $51,-338, the municipally operated Midland lines showed a deficit of $1,452.

The Transit Commission has also made public abstracts of the reports of several of the companies for the month of May. Among these companies the Interborough showed a net corporate income of $240,659, an increase of $248,648 over May, 1922, when a deficit of nearly $8,000 was reported. The subway lines in May showed a net corporate income of $301,473, an increase of $38,445 over May, 1922. The deficit on the elevated lines for May was $60,814, as against $271,017 in the previous May. The big drop in the elevated deficit is, of course, due largely to the Interborough reorganization, under which, at the instance of the Transit Commission, the fixed charges of the company, in respect of its elevated obligations, were greatly reduced.

The New York Consolidated Railroad, now the New York Rapid Transit Corporation, of the B.-M. T. system, showed for May a combined net corporate income of $237,681, as against $162,656, a gain for the year of more than $75,000.

The Third Avenue Railway system, consisting of the Third Avenue Railway, the Union Railway in the Bronx and other controlled companies, showed a net corporate income for the month of $52,568, which was, however, a decrease of $16,981 from the May, 1922, figures.

The New York Railways, through its receiver, Job E. Hedges, reported a net deficit for May of $150,475, as against a deficit in May, 1922, of $123,332.

The Interborough in May, 1923, carried 91,670,511 passengers. This was slightly over 4,000,000 more than in May, 1922. The New York Consolidated's May passenger traffic was 45,-132,423, an increase of about 4,700,000 over the previous May. The Third Avenue system, with 5,316,509 May passengers, showed a falling off from May, 1922, figures of 139,000. A decrease of passengers carried was also shown by the New York Railways report, the traffic of 13,687,205 being less by 960,899 than that in May, 1922.

Wisconsin Railways Earned 3.12 per Cent in 1921

Due to the ever-increasing demand for gas, electric, telephone and electric railway services, the public utilities of Wisconsin show a tremendous growth in the amount of money invested in the business, in the total revenues received and in the number of customers served. These facts are all brought out in the latest report of the Railroad Commission of Wisconsin, which does not include the figures for 1922.

The investment in electric railways and city lines also showed an increase, although here, too, the increase was not nearly so marked as in the case of electric utilities. The property and plant accounts for 1921 totaled $83,018,480, as compared with $80,229,520 in 1920 and $72,534,563 in 1917. While the operating revenues increased from $11,323,-223 in 1917 to $20,300,808 in 1920, by the end of 1921 they had dropped to $19,662,146.69. The rate of return for electric railways is much smaller than that of any other utility. In 1917 the rate of return was only 4 per cent. By 1920 it had dropped to 2.76 per cent. Although 1921 showed a better return than 1920, the rate was only 3.12 per cent.

The total amount of capital invested in all electric utilities in Wisconsin was $116,564,856, an increase of $12,064,-488, or 11.5 per cent over the property value of 1920, and $44,528,615, or 61.8 per cent over that in 1917. The rate of return for 1921 on the money invested was 6.99 per cent.

Street railways carried in 1920 287,-905,241 passengers and in 1921 265,392,-587, a decrease of 7.8 per cent.

Boston Elevated Pays Back $1,631,753

Five years have now elapsed since the operation of the Boston Elevated Railway passed into the control of trustees appointed by the Governor of the Commonwealth. During the first year increasing costs of operation exceeded the revenue obtainable under a 5, 7 and 8-cent fare. An actual deficit occurred of $5,415,500 divided as follows:

$1,000,000 in the reserve fund exhausted.
3,980,151 assessed against cities and towns
435,348 back pay occuring in May and June, 1919, under an arbitration award.

At the present time the $1,000,000 reserve fund has been restored, the $435,348 back pay has been absorbed, and two payments, one of $517,196 and the other of $1,114,557 have been made to the cities and towns. Therefore 57 per cent of the 1918 deficit has been overcome, leaving $2,348,397 still due the municipalities. Edward Dana, general manager of the railway, said:

Our efforts cannot in the public interest be directed solely along one line. We have, however, made creditable reduction in the deficit, reduced the fare (26 per cent of the riders or 100,000,000 a year now ride for 5 cents), and we have improved the service with new cars, new track and increased mileage.

We are proud of our calling and we have proved that co-operation gets results.

COMPARATIVE DIVISION OF RECEIPTS AND EXPENDITURES OF THE BOSTON ELEVATED RAILWAY FOR THE YEARS ENDED JUNE 30

	1923	1922	1921	1920	1919
Total receipts	$33,612,335	$32,781,493	$34,224,149	$32,689,200	$25,223,495
Operating expenses:					
Wages	$15,024,348	$14,920,407	$16,753,669	$16,381,207	$13,554,685
Material, supplies and other items	3,149,688	3,056,520	2,899,983	3,321,671	4,096,537
Injuries and damages	700,741	476,844	627,629	627,626	805,353
Depreciation	2,004,000	2,004,000	2,004,000	2,004,000	2,004,000
Fuel	2,027,712	1,656,012	2,399,277	1,996,717	1,901,596
Total operating expenses	$22,906,489	$22,113,783	$24,684,558	$24,331,221	$22,362,171
Taxes	$1,722,707	$1,610,097	$1,306,738	$1,075,497	$941,612
Rent of leased roads	49,194	2,549,625	2,673,166	2,607,567	2,587,129
Subway and tunnel rents	2,025,263	1,974,141	1,947,963	1,591,323	1,491,999
Interest on B. E. bonds and notes	2,277,051	1,483,787	1,483,625	1,593,257	1,423,144
Miscellaneous items	65,986	58,475	54,479	69,284	37,372
Dividends	3,136,854	1,606,372	1,523,367	1,403,971	1,360,220
Total cost of service	$32,183,545	$31,396,281	$33,673,896	$32,672,120	$30,203,647
Gain	$1,428,789	$1,385,211	$550,253	$17,079	.....
Loss	.....	.....	.....	.....	$4,980,152
Back pay applying to May and June, 1919, but paid in October, 1919					$435,348
					$5,415,500

Stockholders Win Fight Against Mortgage Payment

Stockholders of the old Cincinnati, Dayton & Toledo Traction Company won a second victory in their fight against paying the balance of a bond mortgage of the extinct Southern Ohio Traction Company, when the Court of Appeals at Cincinnati handed down a decision affirming Common Pleas Judge Stanley C. Roettinger's action in sustaining demurrers which they had filed to the suit to assess stockholders' liability against them. As a result of the decision, approximately 4,000 stockholders of the Cincinnati, Dayton & Toledo escape paying approximately $1,000,000 to the holders of the Southern Ohio Traction Company's bonds.

The Southern Ohio Traction Company was organized in 1900, when the old double liability law was in force. When the Cincinnati, Dayton & Toledo and its subsidiaries consolidated and took over the Southern Ohio Traction, the Ohio constitution had been changed and single liability only was in force, and while the new company assumed all the debts of the old, its contracts specified and its stock certificates contained the specification that the new stockholders were not to be liable for the bonds issued by the Southern Ohio Traction Company.

When the bondholders sued to enforce stockholders' liability to pay the balance due on their bonds, after the sale of the mortgage security, it then was claimed that it was against public policy to relieve the new stockholders of liability on the old bonds, but the Common Pleas Court sustained a demurrer to this, and the matter went to the Appellate Court. In its decision the Court of Appeals says that the contract was between individuals and no public right was affected by it in any way, and, therefore, it was not a matter which comes under the rule of public policy, but one which must stand entirely upon the wording of the contract made when the money was lent. In other words, the decision declares that a debtor cannot change his security by claiming his contract is against public policy.

These bonds, aggregating $1,000,000, are held by the Cleveland Trust

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Company. They were issued by the Southern Ohio Traction Company, which was formed by the consolidation of three lines between Cincinnati and Dayton, and the trust company sought to hold the stockholders of all these subsidiaries and of the Cincinnati, Dayton & Toledo Traction Company, which later was formed and took over all the properties. Under the decision by the Court of Appeals, which was written by Judge Wade Cushing, and concurred in by Judges Robert Z. Buchwalter and Francis M. Hamilton, the Cleveland Trust Company is stopped from recovering from these stockholders.

Reorganization Plan for Michigan United Modified

Securities of the new company to succeed the Michigan United Railways, sold recently under foreclosure to the reorganization committee, are expected to be ready for distribution about Oct. 1. The sale was conducted on June 30. It has already been confirmed by the court. Application is now before the Michigan Utilities Commission for approval of the issuance of the new securities.

In this connection it has been announced that the plan of reorganization has been changed slightly, more nearly to meet the ideas of the holders of some of the outstanding issues of securities. The work necessary in connection with the adjustment of this matter had the effect of delaying the reorganization, but the matter is believed now to be moving fast toward conclusion.

Objections to the plan came from certain holders of the debentures and of preferred stock who contended that the plan did not yield to holders of the debentures and of preferred stock of the old company securities having a preference over the securities yielded by the plan to the holders of the common stock of the present company. The amendments which have been adopted by the committee may be summarized as follows:

1. The preferred stock to be distributed to bondholders will be called "Class A preferred stock," but will remain unchanged in preference position, dividend rate and all other respects.
2. Subordinate to the Class A preferred stock, a Class B 5 per cent non-cumulative preferred stock of an aggregate face value of $400,000 will be created. This stock will be sold to provide funds for paying reorganization expenses.
3. Subordinate to the Class A preferred stock and also to the Class B preferred stock, a Class C 5 per cent non-cumulative preferred stock will be created and distributed among depositors of debentures and of preferred stock of the present company; the debenture holders to receive one share of Class C preferred stock for each $100 of debentures deposited; and the preferred stockholders to receive one share of Class C preferred stock for each two shares of the old preferred stock deposited.
4. The bonds to be issued and sold provide funds with which to retire the Jackson & Battle Creek Traction Company underlyings, or for the purpose of exchange for Jackson & Battle Creek underlyings have been increased from $1,200,000 face amount to $1,400,000 face amount.
5. All rights of subscription to the securities of the new company have been eliminated. Inasmuch as none of the rights provided by the original plan were exercised, the committee deemed it unnecessary to carry such rights into the amendments.
6. No common stock is offered to depositors of debentures or of preferred stock of the present company and no common stock is offered for sale to provide funds for reorganization expenses. All of the new common stock is given to the holders of the common stock of the present company.

Hearings on Bronxdale Boulevard Resumption

Two hearings have been held before the New York Transit Commission to determine whether the Bronx Traction Company, a subsidiary of the Third Avenue Railway system, shall be ordered to resume service from Bronxdale Boulevard to Williamsbridge Road in Morris Park Avenue.

No service has been operated on this part of the line for several years. The city is contemplating the paving of Morris Park Avenue in the stretch covered by the railroad, which will require the relocation of the trolley tracks. The company seeks to abandon the tracks beyond Bronxdale Boulevard, and has filed an application to that effect with the commission. Witnesses called by the commission testified that the tracks are still in the street and could be operated in their present condition, with slight repairs and the setting of new trolley poles, but if the street is to be paved, more work would be required. It was brought out at the second hearing by the company that to add one car which would be required for the operation of the additional half mile, would cost $65 a day—a sum which would require 1,300 passengers to meet operating costs alone. The commission witnesses asserted that this figure was absurd. The case was taken under advisement by the commission.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were no sales of electric railway securities this week.

Six Months' Net $779,650.—The net income of the Market Street Railway, San Francisco, Calif., for the month of June was $120,816. For the six months ended June 30, 1923, the net income totaled $779,650.

Passengers Increase. — The United Railways of St. Louis during the quarter ending June 30, 1923, carried 71,768,428 passengers compared with 69,882,601 in the preceding quarters, an increase of 1,885,827. The average number of cars operated during the quarter was 1,291 compared with 1,280 in the preceding quarter.

Earnings $3,090,287.—The American Light & Traction Company and its subsidiaries, for the twelve months ended June 30, 1923, have reported earnings of $3,090,287. This is after all charges, including depreciation, replacement reserves and preferred dividends. It is equivalent to $10.22 a share on the company's $30,040,400 common stock.

Wants Record of Mortgage Established.—The Williamsport Passenger Railway, Williamsport, Pa., has filed a notice in court to establish a record for a mortgage dated Dec. 15, 1866, executed to secure bonds of $10,000. No satisfaction of payment of the bonds has been established by record, the company going to court to establish the payment legally. The mortgage was made to Mahlon Fisher and B. H. Taylor, long deceased. The mortgage was given when the passenger railway still used horses.

Petitions on Valuation Rehearings Denied.—The Missouri Public Service Commission has denied the petitions of both the city of St. Louis and the United Railways requesting a rehearing in the railways valuation case. The commission fixed the valuation for rate-making purposes at $52,838,110. The city contended the value was too high and the company that it was too low. The company will ask the Cole County Circuit Court to review the findings of the commission.

Makes Offer on Claim.—The Jersey Central Traction Company, Keyport, N. J., which suspended operations on July 28 appeared before the Middlesex County Freeholders and offered them $600 on a $1,080 claim the county holds against the company for its franchise from 1917 to the present year. The matter was referred to county counsel. The agreement between the traction company and the county called for the payment of $180 yearly since 1903 for franchise rights.

Additional Holding Company Preferred Offered.—An additional issue of $2,750,000 of Electric Bond & Share Company 6 per cent cumulative preferred stock is being offered by Bonbright & Company, New York, N. Y., at 97½, to yield 6.15 per cent. The proceeds of the sale will be used for the expansion of the company's business. Upon completion of present financing total preferred stock authorized and outstanding will be $20,000,000 and total common stock $20,000,000. All the common stock is owned by the General Electric Company.

Transfer of Stock Approved. — The Board of Public Utility Commissioners of New Jersey recently approved the transfer to the Public Service Railway of the $250,000 capital stock of the Emergency Fleet Railway. The Emergency Fleet Company operated a line during the war to carry shipbuilders to their work at Camden. With the exception of the rolling stock and the power house the entire Emergency Fleet Railway lines were constructed by the Public Service Railway. The Emergency Fleet Railway operated a line between Gloucester City and Fairview.

Accepts Lease from City.—The trustees of the Boston Elevated Railway have accepted a lease from the city of Boston for the double-track line previously operated by the Eastern Massachusetts Street Railway in Hyde Park. The rental will be 4½ per cent on $235,000 which is the amount fixed by the Massachusetts Public Utilities Commission as the value of that portion of the Eastern Massachusetts system in Hyde Park. The line extends from the old boundary line to Cleary Square. As a result passengers can now ride from Cleary Square, Hyde Park, to any point on the elevated system for a single fare.

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Traffic and Transportation

Receives Evidence

Interstate Commerce Commission Holds Hearing in Los Angeles on Proposed Plaza Union Terminal

The Interstate Commerce Commission, represented by Commissioner Clyde A. Aitchison on July 6, opened up in Los Angeles a hearing to receive evidence in support of the complaint of the city of Los Angeles. The city is seeking an order from the commission requiring the railroads to join in the elimination of the dangerous grade crossings along Alameda Street and the Los Angeles River and better serve the necessities and conveniences of the traveling public.

Plan to Accommodate Four Railroads

In previous hearings before the California State Railroad Commission the city of Los Angeles approved the Plaza Terminal plans of the commission's chief engineer, as compared with the Arcade Terminal plan submitted by the steam road and electric interurban lines.

At the hearing before the Interstate Commerce Commission Richard Sachse, former chief engineer of the State Railroad Commission, showed how he could construct his Plaza Terminal for approximately the same cost as the Arcade Terminal plan. Mr. Sachse stripped his plan down to actual physical necessities, claiming that his plan would accommodate four railroads, while the other plan would only take care of two lines. His original estimate for his terminal plan was $32,000,000, while his revised figures called for $7,350,700, while the carriers' plan called for a terminal costing $7,331,000.

Many Traffic Studies Made

Traffic studies by the city of Los Angeles Board of Public Utilities' engineers from the year 1918 to 1923 showed that there had been an increase of 136 per cent in the number of persons crossing in street cars the tracks of the steam road line on Alameda Street, which is one of the vital points in the city's fight to remove the steam road tracks from this thoroughfare in its proposed program of grade separations, which it claims can be accomplished by the construction of the Plaza Terminal.

Henry Z. Osborne, former chief engineer of the Los Angeles Board of Public Utilities and former chief engineer of the Los Angeles Traffic Commission, testified and cited results of his investigation of traffic conditions in Los Angeles since 1901 in support of the city's fight for the construction of the Union Plaza Terminal.

It was the belief of the commissioner representing the Interstate Commerce Commission that it would possibly be more than eighteen months before anything definite can come out of the proceedings now pending in the city's plaza terminal case.

Steam Roads Submit Revised Plan

An engineer of national repute was retained by the city to inquire into the matter. His testimony for the city's case outlined to the commission the type of union terminal needed for Los Angeles, comparing it with terminals at St. Louis and Kansas City. He planned that the Pacific Electric interurban lines should be required to come into the terminal through a subway, and that the entire terminal should be electrified, since that is the present trend of transportation.

Counsel for the three steam roads and the Pacific Electric lines in offering their plans in opposition to the city's Plaza terminal plan saw fit to withdraw the former plans known as the Titcomb plan, submitting a revised layout with many added features. The revised plans featured the construction of a new terminal station for the Pacific Electric lines at a point from 1,000 to 2,000 feet south of the Southern Pacific Company's present Arcade passenger station.

H. G. Weeks, transportation engineer of the State Railroad Commission, testified as to the needs of a union terminal, claiming the plans as outlined by the city did not seem unreasonable, owing to the rapid development of the community.

Paul Shoup, vice-president of the Southern Pacific lines and president of the Pacific Electric lines, took the stand in opposition to the city's Plaza union terminal plan, testifying that the plans of the defendants' traffic arrangement as suggested by the Southern Pacific-Union Pacific-Pacific Electric Companies would do away with all dangerous grade crossings along Alameda Street and at Los Angeles River, without the necessity of the construction of the terminal.

Safety Survey Placed Under Prof. Swain

Prof. George F. Swain has been placed in charge of the safety survey of the elevated lines in New York City to be made by the city. Prof. Swain is professor of civil engineering at Harvard University. He was formerly president of the American Society of Civil Engineers. According to tentative plans, the Brooklyn lines will be considered first and then the Manhattan overhead routes.

While this work is in progress another activity of the City Transit Bureau will deal with the surface lines. The City Transit Bureau is in charge of John H. Delaney, dock commissioner. This bureau has opened offices in the City Hall in charge of Frank Sinnott.

Jitney Status in Schenectady an Enigma

The Schenectady jitney situation is now in a muddle worse than has developed in any other similar situation. Supreme Court Justice Borst of Amsterdam on Aug. 4 set aside the order of the Schenectady County Judge McMullen which order had nullified the injunction order of Supreme Court Justice Angell restraining the operation of jitneys in Schenectady and vicinity but did not pass on the merits of the original order. As the matter now stands the merits of the original order will be heard at a special term of the Supreme Court on Aug. 11, either before Judge Borst, Judge Angell or possibly both justices.

What has really happened is that judicial courtesy has been offended and all judges being brothers no judge wishes to offend the other. Therefore, whatever merits the case may possess have been swallowed up in the matter of procedure. Probably never before did a county judge upset the order of a Supreme Court justice, although countless times county judges have issued or denied injunctions.

In the interval the jitneys continue to ply and it is extremely doubtful if any contempt orders of the original injunction will be served on any of the jitney operators in Schenectady until the legal aspect of the situation is thoroughly ironed out.

Injunction Against City of Birmingham Reinstated

The indications are that Birmingham jitneys will operate on the streets of the city until November anyway. It will take until that time before the courts can make a final decision of the case, and in the meantime an initiative election will be held.

Judge Lucien D. Gardner, of the Alabama Supreme Court, has reinstated an injunction against the city of Birmingham to prevent the city from putting the jitneys off the streets. Some days ago Judge William Walker of the Birmingham Circuit Court allowed the jitney owners a temporary injunction against the city. Recently, Judge Walker dissolved this injunction and the jitney owners took the matter to the Supreme Court. Judge Gardner allowed the reinstatement of the injunction pending an appeal to the Supreme Court on the matter.

In the meantime the people will be allowed to vote on the question as to whether they want jitneys. Since the passage of the city ordinance, which was to have gone into effect on July 1, thirty-one jitneys have surrendered their licenses. There are still more than 200 jitneys in operation and drivers say they will fight the city ordinance.

In the event the jitney owners win before the Supreme Court or at the election the city and the company will occupy the same positions as they did before the agreement was drawn and signed by both.

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Traffic Campaign—Movement of the Hour

An intensive campaign to educate the people of Atlanta on the traffic laws of the city is being waged at present by the Georgia Railway & Power Company, and a complete survey of the traffic needs of the city is being made, as steps in the plan of co-operation between the city and the company following Atlanta City Council's recent action in imposing a $5,000 indemnity bond on jitney operators.

Several weeks ago, the traction company asked that the city take immediate steps to regulate jitneys and enforce traffic regulations, and promised in return to take care of the city's needs in transportation, providing this assistance was given to prevent possible decadence of the city's system.

The City Council of Atlanta accepted the proposals of the company and as a first step toward carrying out the agreement passed the ordinance limiting the activities of jitneys. A move, however, is now on foot in Atlanta to regulate jitneys on the basis of common carriers, subjecting them to the conditions which are imposed on the street railway.

The traffic campaign of the company is taking up each detail of the traffic laws one at a time—devoting space to the movement on the dash signs of the cars, on the inside car cards and in the street car publication, *Two Bells*. Civic organizations in Atlanta are joining in the campaign and recent newspaper articles and editorials indicate that interest is being awakened in Atlanta over the traffic situation.

Chicago "L" Redecorates

Hardly had the eyes of the loop shoppers and workers become accustomed to the brilliant colors recently placed on one of the down-town stations of the Chicago "L" than three trains, each representing a different road, made their appearance upon the loop during the morning rush hour of July 30 and further surprised the patrons and pedestrians with their attractive new dress. A rich deep orange is used above the belt rails with a light green below. The sash have also been painted green, giving the necessary relief above the belt rail to the brilliant orange. The work of repainting the cars has been going on secretly for some time in anticipation of the delivering of 100 new cars, but after three trains were completed it was found necessary to place the revamped rolling stock in service.

The stations, one of which has been completed, are done in the rich orange, trimmed in light green, resembling to some extent the rolling stock. Attractiveness, cleanliness, and advertising qualities are some of the features of the new colors. With the new paint job on the rolling stock, comes the new heading on the letterboards of the car indicating that "Chicago Elevated" will be the name of the new consolidated companies. An outline of the proposed consolidation now in process of negotiation was given in the ELECTRIC RAILWAY JOURNAL, issue of July 21, page 114.

10,000 Maps a Day Requested by Vancouver Public

The British Columbia Electric Railway, Vancouver, B. C., has recently issued a map of its Vancouver city lines, measuring 12 in. x 9 in. in two colors, with car routes and places of interest detailed on the back. Conductors on all city cars received a supply and were instructed to hand them only to passengers who requested them. In three days 30,000 maps were thus distributed, and since then through the same channel and the company's offices a further 10,000 have been distributed.

It is noteworthy that this distribution was obtained without a cent being spent in newspaper advertising. The only copy advertising the map was carried in the company's weekly publication, the *Buzzer* and by means of a card costing $15, displayed in the company's space in its own cars. The map was produced by the publicity department for the purpose of stimulating travel, but has had the effect of creating considerable good will, judging by the expressions of approval received.

The maps, which are printed on 24½ lb. bond, to give long life, cost slightly more than 1 cent each and are expected to prove the cheapest form of advertising transportation.

International Rejects Bailey Avenue Bus Franchise

The International Railway has rejected the one-year franchise offered by the Buffalo authorities for a bus line in Bailey Avenue. The traction company also sought a parallel permit for buses in Delaware Avenue at a 10-cent fare and a 3-cent charge for transfers. The Bailey Avenue franchise was limited to a 7-cent fare with free transfers. The company would not accept the Bailey Avenue franchise without the right to operate the Delaware Avenue line. Failure on the part of the International to accept the Bailey Avenue franchise led Mayor Schwab to issue temporary permits to the Van-Dyke Company to operate buses along this street in competition with the International Railway, which operates cars part of the distance along the avenue. Regular 10-minute service with a 10-cent fare was maintained for two weeks until the courts interfered because of an action started by the railway.

"Passengers Always Right"

The Dallas Railway is conducting a "Merchandising Transportation" campaign, in which the central idea is to educate trainmen and others who come in contact with the riding public to smile, he cheerful, obliging and pleasant in their relations with the public to the end that all who ride the street cars once may be persuaded to ride again. The campaign was planned and launched under the direction of Richard Meriwether, vice-president and general manager, and is in charge of C. J. Crampton, superintendent of safety. A committee of trainmen appointed to outline some rules for motormen and conductors has submitted some good suggestions which have been adopted. Chief among these is "Never dispute a passenger's word—the passenger is always right."

Tokens in Force.—The North Carolina Public Service Company, Greensboro, N. C., on July 1 started using the Johnson fare boxes and tokens. The cash fare is 7 cents, with four tokens for a quarter.

Freight Tariff Rates Filed.—Lake Shore Electric officials have filed tariff rates to Detroit and points north which will be effective for the beginning of freight service on electric roads out of Toledo, beginning Aug. 18. This was announced by J. F. Starkey, general passenger agent.

Petitions for Bus Routes.—The Logan Valley Bus Company, a subsidiary of the Altoona & Logan Valley Electric Railway, has applied for permission to start two new bus routes in the city of Altoona, Pa., as feeders to the traction line. The districts to be served recently petitioned for trolley service.

Picnic Well Attended.—Between 3,000 and 4,000 people attended the second annual picnic of the employees of the Wheeling Traction System on Aug. 2. The greatest interest manifested was in the annual first-aid contest under the direction of Martin Cowan, director of safety of the company.

Better Service Planned.—When the Ohio Valley Electric Railway, Huntington, W. Va., puts into service the new cars ordered some time ago the present schedules will be completely revised looking toward a better and more expeditous service. It is said that virtually all of the cars now in use will be discarded.

Reduced Tariff Announced.—J. P. Mehigan, local general agent for the Milwaukee Northern Electric Railway, announced recently a new reduced freight tariff between points on the Milwaukee Electric Railway & Light Company lines and the Milwaukee Northern Electric Railway in connection with the Eastern Wisconsin Electric Company line.

New Service Announced.—The Seattle & Rainier Valley Railway, failing in its efforts to close negotiations for new automobile buses with which it proposed to give a fifteen-minute service to the city limits, announced a fifteen-minute service on July 8 between Norfolk and the city limits by a shuttle car, connecting with the Rainier Beach cars. The service will be continued until some other plan is arranged.

"Pay-As-You-Leave" Car Giving Satisfactory Service.—The new type of turnstile car described in the ELECTRIC RAILWAY JOURNAL for Dec. 30, 1922, is now being operated by the New York

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Railways over the Lexington Avenue route from the Ninety-ninth Street carhouse to the Battery. The car makes four trips a day. Passengers enter at both ends of the car without paying, but make their exit through turnstiles after depositing their fares.

Hearing on Abandonment and Bus Set.—There will be a hearing before Public Service Commissioner Parsons at Elmira, N. Y., on Aug. 20 on the application of the Elmira Water, Light & Railroad Company for approval of the declaration of abandonment of its Seneca Lake division between Horseheads and Watkins. Public hearing will be had on the same day on the petition of William Marshall for a certificate of convenience for the operation of a bus line between Elmira and Watkins.

Will Make Survey.—The City Commission of Oklahoma City has employed traction experts to make a complete survey of the lines of the Oklahoma City Railway showing its earnings and operating costs. This survey is the first step of the city government in its fight to restore the 5-cent fare. The city maintains that the traction company could be operated at a fair profit under a 5-cent fare now, if proper economies were practiced. Action is to be taken to compel the company to restore the 5-cent fare.

Safety First Meeting Held.—More than 500 persons attended the Safety First meeting held in the Ingomar Theater under the auspices of the Washington-Virginia Railway. The meeting was presided over by Thomas H. Travers, claim agent of the road and organizer of the Safety First committee of that road. An address to the employees was made by General Manager A. L. Reynolds and a short history of the inception of the safety first movement was given by Mr. Travers. An address on Safety First was delivered by J. M. Truitt member of the executive committee of the National Safety committee and a director of safety for the United Railways & Electric Company of Baltimore.

Safety Campaign Under Way.—The Chicago, North Shore & Milwaukee Railroad is conducting a novel safety campaign. Employees of the road and their friends are being supplied with small signs reading "This car stops at all railroad crossings." The sign, which is pasted on the windshield and on the back window of the automobile, is in red and immediately catches the eye of another driver, who will undoubtedly take note of it and will appreciate the necessity for such procedure. The company is also issuing a four-page pamphlet entitled "Some Safety Signs that Will Save Suffering and Sorrow." As a furtherance of the educational idea on safety first thousands of these circulars are being passed out to automobile owners traveling through this territory. Operators of all trucks and other vehicles are urged to follow the example set by the owners of private automobiles.

Book Reviews

Engineer Foundation Report

Annual report of the Engineering Foundation for year ended Feb. 8, 1923.

Engineer Foundation was established in 1914, based on a gift from Ambrose Swasey, designed as the nucleus of an endowment from many donors. The report shows a number of researches conducted of interest to the electric railway industry. They include an investigation of arch dams, fatigue of metals and the beginning of an investigation of the application of paint on wood, known as the wood-finishing investigation, and the graphitic corrosion of cast iron. Reference is also made in the report of the Division of Engineering, National Research Council, of the study of rail joints in which the American Electric Railway Association is interested, as entering the stage of active experimental work.

Kansas Court of Industrial Relations

Bulletin No. 322 of United States Bureau of Labor Statistics. Department of Labor, Washington, D. C.

This is an account of the industrial court law of Kansas, and its working, throughout the period that it has been in effect. The report gives the text of the law, which passed in 1920, a synopsis of the cases filed on the industrial side of the court during 1920 and 1921 showing the methods and principles adopted by the court in its various actions, and an account of the legal proceedings arising in connection with the attendance of witnesses before the court and other activities of the court. A résumé is also is also given of the annual reports which have been published and a bibliography of books and articles relating to the court is appended.

Sampling and Analysis of Coal, Coke and Byproducts

Methods of the chemists of the United States Steel Corporation. Published by the Bureau of Instruction, the Carnegie Steel Company, Pittsburgh, Pa.

The chemists' committee of the United States Steel Corporation is made up of the chief chemists of laboratories of the constituent companies organized into groups. One of these is the coal, coke and by-products group. From time to time each group collects from all the laboratories the methods of analysis common to its particular products, and selects the best, the compilation being carefully edited and issued in pamphlet or book form by the Bureau of Technical Instruction of the Corporation. for distribution among the laboratories. Owing to the authoritative nature of these publications, there has arisen a considerable demand for them outside the corporation and they are sold at a reasonable price.

The most extensive of these publications relates to coal, coke and by-products. It is a leather-bound book of 190 pages. A second edition has recently appeared which is substantially a new work. The work divides itself into two parts, as indicated by the title, the more valuable from the electric railway standpoint being the first. This embraces the sampling of coal and coke, physical tests and proximate analysis of these, analysis of coal and coke ash, ultimate analysis of coal, determination of the calorific value of coal and coke, etc. Obviously this work should be in the library of every electric railway which does chemical analysis on fuels.

Experiments on Loss of Head in Valves and Pipes of One-Half to Twelve Inches Diameter

By Charles I. Corp and Roland O. Ruble. University of Wisconsin, Engineering Series. Vol. IX, No. 1. University of Wisconsin Engineering Experiment Station, Madison, Wis.

A 143-page pamphlet giving the data secured in an elaborate series of experiments on gate and globe valves. The experimental methods are described and the data are presented in graphical and tabular form. Deductions are drawn as to the significance of the experiments.

An Investigation of the Fatigue of Metals

Bulletin 136, Engineering Experiment Station, University of Illinois. By H. F. Moore, research professor of engineering materials, and T. M. Jasper, research assistant professor of engineering materials. Published by the University of Illinois, Urbana, Ill.

This investigation was carried on through the co-operation of the National Research Council, Engineering Foundation, the General Electric Company and the Engineering Experiment Station of the University of Illinois. Bulletin 124 of the Experiment Station contains the first report of the tests made in connection with the present investigation.

Tests were made on specimens of wrought ferrous metal, kept under continuous series of cycles of stress in reversed bending, combined reversed bending and steady tension, and reversed torsion. A study of the test data tends to confirm the existence of an endurance limit for wrought ferrous metals, that may be determined with a fair degree of accuracy by a short-time test. The endurance limit seems to be correlated with the ultimate tensile strength, with the Brinall hardness number, and in a much smaller degree with the yield point, and the proportionate elastic limit. Tests of specimens for various temperatures of "draw" after oil-quenching indicate that for carbon steel neither the ultimate tensile strength, the endurance limit for flexure nor the ductility was appreciably affected by draws at a temperature lower than 600 deg. F.

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Legal Notes

FEDERAL COURTS—*Assessment Against Street Railway for Paving Held Not to Deny Due Process or the Equal Protection of the Laws.*

An assessment of $102,942.30 against a street railway for paving between, and for 18 in. outside, its tracks, as authorized by Pub. Laws N. C. 1915, c.56, on failure of the company to make the improvement, was not arbitrary or wholly unreasonable, so as to constitute a taking of property without due process of law or a denial of the equal protection of the laws, in violation of the Fourteenth Amendment, though the company's property on the street had a value of only $100,000, while abutting property, against which an assessment of $89,909.58 was made on a front-foot basis, had an assessed value of $5,083,250, and though the company was put to an expense of $75,108.85 in taking up and relaying its track, and though its railway was being operated at a loss. The franchise of the company required it to bring its roadbed and track to surface grade at its own expense when required, and while imposing no liability for paving, granted no exemption from it. (Durham Public Service Co. vs. City of Durham, 43 Supreme Court Rep. 290.)

FEDERAL COURTS—*Members of Trade Union Held Not Entitled to Recover Under Order of Court of Industrial Relations.*

Where the court of industrial relations of the state of Kansas found wages were unjust and adjudged that a minimum wage scale be in force from a certain date and be continued for six months, its order in effect was a finding that wages were not unjust prior to such date and subsequent to the date of service of the summons in the proceeding. Hence members of a labor union were not entitled to recover increased rate wages for the time between the service of the summons and such date, while the order of the Court of Industrial Relations continued. Decision by Circuit Court of Appeals, Eighth Circuit. [Local Union No. 497 of Amalgamated Association of Street & Electric Railway Employees of America et al. vs. Joplin & Pittsburgh Ry., 287 Federal Rep. 474.]

GEORGIA—*Grant of Right to Construct, When Accepted, Binds Company to Operate on Terms Stated.*

A franchise granted by the Board of County Commissioners specified the routes to be operated, schedule to be maintained, etc. After the line had been operated for a number of years the company decided to abandon a portion of it on the ground that its operation was unprofitable, but citizens along the line obtained an injunction against abandonment. The court held that the company could not abandon a portion of the line while retaining and operating another portion under the grant. So long as the company retains any of the benefits it must perform all the obligations imposed by the contract. [Macon Railway & Light Co. vs. Corbin et al, 116 Southeastern Rep. 305.]

KANSAS—*Freight Charges for Transportation of Brick for Paving Purposes Not Lienable as for "Labor" or Labor Performed.*

The freight charges of a traction company for transporting certain carloads of brick to be used for the paving of public streets are not lienable claims as for labor within the meaning of the mechanic's lien act, nor do such freight charges fall within the terms of the bond which was given by the paving contractor to the city to secure the payment of all claims for labor which might be the basis of liens. [Union Traction Co. vs. Kansas Casualty & Surety Co., 213 Pacific Rep. 169.]

MICHIGAN—*Statute Giving Court Jurisdiction to Order Reinstatement of Veterans Removed from Public Employment Is Unconstitutional.*

This case arose when a lineman in the employ of the Street Railway Commission of Detroit was discharged in November, 1920. As a veteran he brought suit for reinstatement and payment of wages during the intervening time because of the Michigan law which declares that no veteran shall be removed from a public office or employment except after a full hearing as to his competency before the Circuit Court of the county where he is employed. He was reinstated under writ of mandamus, but the court refused to adjudicate the matter of money due him. The Supreme Court declared that the constitution of Michigan defines the duties of the court as judicial, whereas if a court is to pass intelligently upon whether a person is suited for employment in public work, the inquiry is administrative in its character and not judicial. Hence the law is unconstitutional. [Koeper vs. Street Railway Commission of Detroit, 193 Northwest. Rep. 221.]

MISSOURI—*Liable for Conductor's Assault on Passenger Unless in Self-Defense.*

As assault by a railroad employee on a passenger is entirely excused only when the passenger's provocative conduct is such as in law amounts to a justification of the assault on the ground of self-defense, but where less than this, evidence of provocation is admissible in mitigation of damages only. [Hunter vs. Kansas City Rys., 248 Southwest. Rep. 998.]

NEW JERSEY—*"Tracks" in a Paving Contract Meant Rails.*

Where a contract between a city and a street railway required the railway to pave that portion of the street "that lies inside of the rails of any of their tracks and 2 ft. outside thereof * * * and to keep certain parts of said streets so to be paved by them as aforesaid inside of their tracks at all times in good repair," the word "tracks" in this contract meant "rails." [City of Bayonne vs. Public Service Railway, 118 Atlantic Rep., 9.]

NEW JERSEY—*Duty of Motorman in Approaching Street Intersection.*

The rule in regard to street intersections is that it is the duty of the motorman to have his car so far under control that he will not endanger the safety of a vehicle, driven with reasonable care, which may happen to cross the tracks in front of the trolley car. A request to charge that "a motorman must expect that other vehicles will cross his tracks at intersecting streets, and must keep his car under control in order to avoid collision at those streets," was properly denied. It was too broad, since it placed improperly the whole burden of avoiding a collision upon the motorman of the trolley car, without any regard to the recklessness of the driver of the other vehicle. [Geyer et al vs. Public Service Ry., 120 Atlantic Rep. 186.]

NEW YORK—*In Rate Fixing, Valuation at a Pre-War Basis, Less Depreciation, and Exclusion of Certain Overhead Expenses, Held Improper.*

In a valuation to determine rates, it was error to use pre-war costs, less subsequent depreciation, and not consider the valuation during and after the war. It was also error to exclude preliminary legal, administration and engineering expenses for building a 60 mile extension on the theory that this work had been done by the company's regular staff and charged to operating expenses because the way in which these expenses were defrayed in the past affects past earnings, which have nothing to do in determining whether the present rate is confiscatory. [People ex rel. New York State Railways vs. Public Service Commission, 195 New York Sup., 174.]

PENNSYLVANIA—*Where a Passenger Transfers from One Car to Another He Must Look Out for Opened Doors.*

A passenger of a street car upon being requested to transfer to a car in the rear remains a passenger while walking from car to car. But where such a passenger walked so close to an intervening car that she was injured by the opening of door which protruded approximately 6 in., a directed verdict for defendant was warranted. The opening of the door itself was an entirely proper act, as the motorman was not bound to anticipate that a person would be walking within 6 in. of the car when there was a wide space beyond. [Swink et ux. vs. Philadelphia Rapid Transit Co., 120 Atlantic Rep. 827.]

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Personal Items

William Walker With Shore Line

Former Hartford & Springfield Official Placed in Charge of Rehabilitated Property

Out of New Haven, Conn., there is now operating an electric railway which had long been shut down. It is the old Shore Line road, now under the management of William Walker. The road was conceived and constructed originally by the late Morton F. Plant. He saw a great future ahead for the territory skirting Long Island Sound between New Haven and New London, but before the road could be made to pay Mr. Plant died.

While he lived Mr. Plant's money was his own to do with as he liked. After he died there was another story. The executors of his estate promptly set about the work of cutting off ventures of his that had become a liability In this process the part of the Shore Line System previously referred to was shut down. And it remained shut down until July 17 of this year. On that date service was resumed under the direction of Mr. Walker by a new company, the New Haven & Shore Line Railway, headed by William A. Sperry, New Haven, and associates, no less enthusiastic about the possibilities of the road in the future than was Mr. Plant. They have opened the road from New Haven to Guilford and propose to extend operation soon from Guilford to Saybrook, 33 miles from New Haven.

The original road was well built, largely on its own private right-of-way. So far as the engineering work in connection with its rehabilitation was concerned the problems that presented themselves for solution were easy. The real questions were how to equip the road and how to run it so that the public might be served adequately and a profit made for the new owners. This is the problem that is now up to Mr. Walker. Nearly all his experience has been with roads confronted with problems somewhat similar to that now presented by the rehabilitated Shore line. He was formerly general manager of the Hartford & Springfield Street Railway, Warehouse Point, Conn., and for eight years before that he was superintendent of the Southbridge division of the Worcester (Mass.) Consolidated Street Railway.

He entered railway work as a conductor on the Schenectady Street Railway in 1894 and later served that company as inspector. His service with that company covered a period of ten years. He next was appointed a train dispatcher with the Berkshire Street Railway and a year later was transferred by that company to Westfield as an inspector of construction on the Western Massachusetts Street Railway. When the Western Massachusetts was placed in service Mr. Walker was appointed an inspector of transportation. He was next transferred from Westfield to Springfield in a similar capacity and later was made superintendent of the Blackstone Valley division of the Worcester Consolidated Street Railway. He

William Walker

was made superintendent of the company's Southbridge division in 1912. Other men there are with experience similar to that of Mr. Walker, but probably few with a wider range of experience than he in handling problems such as will undoubtedly be presented for settlement in connection with the operation of the Shore line and certainly very few, if any men, with a keener knowledge of the needs of the people of the territory served by the rehabilitated road.

A. C. Starkey Heads Railway Division—W. L. Clayton in Charge of Buses

Several changes in the personnel of the transportation department of the Indiana, Columbus & Eastern Traction Company were announced on Aug. 1 by C. C. Fast, general superintendent of transportation, from his offices in Springfield, Ohio.

Arthur C. Starkey, superintendent of the Springfield - Lima division, was placed in charge of all traction line operations on the Dayton-Columbus; Dayton-Union City, and Springfield-Lima divisions.

W. L. Clayton, formerly superintendent of the Dayton-Columbus division, will have control over all bus operations on the Dayton-Columbus and Springfield-Lake View divisions.

R. L. Jacobs, who has been superintendent of all bus lines of the Indiana, Columbus & Eastern Company, was transferred to Columbus to direct bus operations between Columbus and Grove City, and all bus operations of the Columbus and Zanesville line. He will serve under John W. Hewitt, general superintendent of the Columbus, Newark & Zanesville Electric Traction Company.

C. O. Strait, former dispatcher at Springfield, is stationed at Dayton as inspector in charge of Dayton freight operations and the Dayton-Union City traction division.

The placing of all bus operations on the I., C. & E. divisions under the direction of Mr. Clayton, Mr. Fast announced, is in recognition of the importance of this phase of the company's activities and also because under the new Freeman-Collister bus law, the bus is placed on a new status as an agent of transportation, "the company being fully awake to the possibilities of the situation."

W. R. Johnson has been appointed superintendent of the railway properties of the Menominee & Marinette Light & Traction Company, Menominee, Mich. He will succeed J. I. Searles, who lately left the company to become connected with the Lake Superior District Power Company's railway lines. Before taking up his new duties, Mr. Johnson was connected with the Wisconsin Public Service Corporation's railway and interurban lines in and near Green Bay. Before becoming associated with the Wisconsin Public Service Corporation, he was with the Chicago, Milwaukee & North Shore Railway in Milwaukee.

William Dineen, Madison, was appointed secretary of the Wisconsin Railroad Commission to succeed C. D. SeCheverell, who resigned to accept a position with the Middle West Utilities Company at Grand Island, Neb., as head of the utility company there. Mention was made of Mr. SeCheverell's resignation in the ELECTRIC RAILWAY JOURNAL issue of Aug. 4. For the past sixteen years Mr. Dineen has been connected with the commission, starting as office boy. For the past five years he has been chief clerk, a post in which he was called upon to do much commission detail work.

E. F. Schneider is back at work. His many friends will be glad to know that he is sufficiently recovered from his long and serious illness so that he can again undertake some work though limiting his responsibilities. It will be recalled that Mr. Schneider was formerly vice-president and general manager of the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, and was most active in railway circles. He had to give up his connection with the Cleveland & Southwestern early in 1921 on account of his illness. At present he is doing some work in the claim department of the Cleveland Railway. He attended the summer meeting of the Central Electric Railway Association held recently at Cedar Point and was welcomed back by his many friends in this territory. He was president of the Central Electric Railway Association 1914-1915.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Coal Crisis Imminent

Strike in Anthracite Field May Be Followed By Sympathetic Bituminous Strike—Coal Commission Reports

A very serious situation exists in regard to the coal supply. This fact is set forth in a letter sent under date of Aug. 7 to the member companies of the American Electric Railway Association. According to this circular letter, signed by J. W. Welsh, secretary, many people regard a strike on Sept. 1 in the anthracite coal field as inevitable. They predict that a sympathetic strike in the bituminous field may follow.

It is stated that the American Electric Railway Association is co-operating with the Joint Fuel Committee under the chairmanship of John W. Lieb, and every possible assistance will be rendered to the member companies. "We cannot urge too strongly," states the latter "that all electric railway managements take immediate steps toward increasing their fuel supplies to the maximum of storage capacity. The time to begin is now."

PRESIDENT COOLIDGE IN CONFERENCE

What steps, if any, the new administration plans to take in order to avert a tie-up are unknown. A conference between President Coolidge and a representative of the Federal Coal Commission has been held, however, and the President is thoroughly conversant with the situation. It is understood that he firmly indorses the report of the commission.

The anthracite wage agreement expires on Sept. 1. After four weeks of conference at Atlantic City between representatives of the United Mine Workers and the anthracite operators, all negotiations have been called off. The particular cause of the deadlock was the miners insistence upon the check-off and the refusal of the operators to grant it. It is declared that John L. Lewis, president of the United Mine Workers, will insist upon the granting of the check-off or will call a strike. It is further stated that anthracite operators will make no effort to break a strike should one be declared by the men.

Bituminous wage agreements include the check-off and the funds received from it would go to help finance strikers in the anthracite field. It is upon this fact that prediction of a sympathetic strike by the miners in the bituminous field is based.

REPORT OF THE COMMISSION

The United States Coal Commission made public on Tuesday, Aug. 7, a supplemental report on labor conditions in the anthracite industry, containing twelve recommendations for bringing about peace. The recommendation that the President should have the right by law to prevent a coal strike is in line with the previous recommendation of this body. Compulsory arbitration is declared to be no remedy. The check-off which is one of the outstanding issues in the present controversy is not mentioned in the report. Both sides are again condemned for the loose and misleading statements which they have given to the public. Other recommendations made in the report are very similar to those contained in the preliminary report of the commission published in ELECTRIC RAILWAY JOURNAL for July 14, page 56.

$1,000,000 Contract Awarded by Ford's Road

Preparations are now under way for the electrification of the first unit of the Detroit, Toledo & Ironton Railroad. Contracts aggregating $1,000,000 have been awarded to the Westinghouse Electric & Manufacturing Company for the construction of equipment and rolling stock. The original capacity of the Rouge power house is being doubled. The present two 12,500-kw. turbo-generators are being replaced by eight turbo-generators of 30,000 kva. capacity each. One of these turbines is already nearing completion.

The electric locomotives will weigh 350 tons. They will have a normal capacity of 4,000 hp., and a one hour capacity of 5,000 hp. Sixteen driving axles will develop 108,000 pounds drawbar pull at 25 m.p.h. The maximum speed will be 45 h.p.h.

In addition to the rehabilitation of the power plant and the construction of locomotives, 13¼ miles of double track will be built between the River Rouge plant and the Flat Rock yards. Many other minor improvements are contemplated.

It has been Mr. Ford's goal from the first to electrify the road. Many rumors to this effect have been current in the past, but the first official announcement of them was made in the "D. T. & I. News" recently as noted in the ELECTRIC RAILWAY JOURNAL for July 28, page 153.

Thirty-Year History Compiled

A review of thirty years' history of the General Electric Company, from its foundation in 1892 to 1922, is made the subject of a thirty-four-page booklet just issued to the company's stockholders. Tracing the development which grew out of the early pioneering work of the Edison General Electric Company, and the Thomson-Houston Electric Company, the growth of the business and the constantly widening application of electric power are pictured.

The following are the principal headings: "Large Scale Power Generation," "Power on the Sea," "The Trackless Trolley," "At the Panama Canal," "Contributions to Long-Distance Wireless Communication," "Lightening Home Burdens," "Far-Reaching Aid to Medical Science," "Progress in Illumination," "A Great Necessity at a Small Expense," "One Million Volts," "Prices Increased Less than the Average," "How G-E Money Is Spent," "Opportunities for the Future."

Overproduction of Oil

It was recently announced that many oil refineries in the mid-continent field intended to suspend operations during a period of several weeks. The principal wells of this field are located in the bordering states of Texas, Oklahoma and Kansas.

An unprecedented surplus now existing was given as the reason for this move. Rather than suffer a price reduction which would make it impossible to sell at a profit the refiners discussed the idea of shutting down their plants until the surplus had been absorbed. So far as is known, no effort has yet been made to carry out this move. It is felt that Government intervention might occur in case the attempt were made.

Although a somewhat general condition of overproduction exists, many of the large oil companies are taking no part in this proceeding. For several months past the capacity of the pipe lines and the storage capacity at tidewater has been severely taxed. For this reason there has been little attempt made to drill new wells. It has been thought better to hold back until the present supplies have been further absorbed.

In any case, lubricating oils probably will be little affected. Many of these oils are made from a Pennsylvania paraffine base and a shutdown on account of overproduction in the mid-continent field would have no bearing upon the situation in the Pennsylvania oil field.

Metal, Coal and Material Prices

Metals—New York	Aug. 7, 1923
Copper, electrolytic, cents per lb	14.312
Copper wire base, cents per lb	17.125
Lead, cents per lb	6.525
Zinc, cents per lb	6.50
Tin, Straits, cents per lb	38.375
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.375
Somerset mine run, Boston, net tons	2.625
Pittsburgh mine run, Pittsburgh, net tons	2.075
Franklin, Ill., screenings, Chicago, net tons	1.65
Central, Ill., screenings, Chicago, net tons	1.375
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$7.00
Weatherproof wire base, N. Y., cents per lb.	18.75
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal	$1.02
White lead, in oil (100-lb. keg), N. Y., cents per lb	11.85
Turpentine, (bbl. lots), N.Y., per gal	$0.95

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Rolling Stock

Danville Traction & Power Company, Danville, Va., has received five sets of Taylor reduced height trucks equipped with Taylor straight action brakes for use on its new cars.

Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., is expecting delivery this month on the fifteen special safety cars which were ordered in March from the Perley A. Thomas Car Company of High Point, N. C. For these new cars the Taylor Electric Truck Company has made a shipment of its reduced height trucks with Taylor straight action brakes.

Georgia Railway & Power Company, Atlanta, will expect delivery next December of the twenty cars ordered several months ago. The specifications of these cars are as follows:

Builder of car body.....Georgia Railway & Power Company
Type of car .....Closed
Seating capacity..... 48
Total weight .....37,000 lb.
Bolster centers, length.....20 ft. 6 in.
Length over all.....44 ft. 6 in.
Truck wheelbase .....5 ft. 4 in.
Width over all.....8 ft. 3 in.
Height, rail to trolley base.....12 ft. 2 in.
Body .....Steel
Headlining, Roof .....Arch
Air brakes.....Westinghouse-DH 16 Compr.
Armature bearings .....Sleeve
Axles .....4 in., heat treated
Bumpers .....Channel
Car signal system .....Consolidated
Car trimmings.....Dayton Manufacturing Company
Center and side bearings.....McGuire-Cummings
Conduits and junction boxes.....Metal
Control .....G-E., PC. 5
Couplers .....Tomlinson, Form 10
Curtain fixtures.....Curtain Supply Co.
Curtain material .....Pantasote
Designation signs .....Keystone
Door operating mechanism.....Manual
Fare boxes .....None
Fenders or wheelguards.....Atlanta—Similar to H-B
Gears and pinions.....G-E, Grade M.
Hand brakes.....Ackley, Staffless
Heater equipment.....Consolidated
Headlights.....Golden Ray & Golden Glow
Journal boxes .....McG., MCB
Lightning arresters .....Aluminum Cell
Motors, type and number....4-GE—265-A
Motors, outside or inside hung.....Inside
Paint.....Paint and varnish
Registers .....O-B
Sanders .....
Sash fixtures .....Dayton Manufacturing Company
Seats .....Hale & Kilburn
Seating material .....Rattan Filled
Slack adjuster .....American
Step treads.....Kass & Feralun
Trolley catchers or retrievers.....O-B
Trolley base.....O-B, Form 1
Trolley .....Wheel
Trucks.....McGuire-Cummings Company
Ventilators .....Nichols-Lintern
Wheels (type and size)...26 in. Cast. chilled

Louisville Railway has announced the specifications for the fifteen new cars and twenty-five trailers recently ordered and mentioned in these columns previously. The detailed specifications of the cars follow:

Date order was placed.....July 5, 1923
Date of delivery.....Nov. 1-15, 1923
Builder of car body.G. C. Kuhlman Car Co.
Type of car.....Peter Witt D.Ent. D.Exit. Double Truck Four Motor
Seating capacity 46
Total weight.....36,900 lb.
Bolster centers, length.....22 ft. 6 in.
Length over all.....45 ft. 1¾ in.
Width over all.....8 ft. 2 in.
Body .....All steel
Interior trim .....Birch
Headlining .....Agasote
Roof .....Arch
Air brakes.Westinghouse, T. B. Co. Straight
Bumpers .....Angle iron
Car signal system.....Consolidated Car Heating Company
Center and side bearings.....Brill
Control .....G.E. "K"
Couplers .....Tomlinson No. 6
Curtain fixtures...Curtain Supply Company
Curtain material .....Pantasote
Designation signs .....Dash signs only
Door operating mechanism..National Pneumatic Company front platform, hand-operated center.
Fenders or wheelguards.....Louisville Railway Company
Fare boxes...Louisville Railway Company
Gears and pinions.....General Electric Company
Hand brakes..Quick release, ratchet handle
Heater equipment.Cutler-Hammer Company
Headlights .....Ohio Brass Company
Journal bearings .....Plain
Journal boxes .....Brill
Lightning arresters.....General Electric Company
Motors, type and number.....4-G.E. 247-I
Motors, outside or inside hung.....Inside
Paint .....Enamel
Registers..International Register Company
Sanders....Ohio Brass Company No. 13,797
Sash fixtures .....Edwards
Seats .....Brill
Seating material .....Wood Slat
Springs .....Brill
Step treads .....Feralum
Trolley catchers or retrievers.....Ohio Brass Company
Trolley base ....General Electric Company
Trucks .....Brill
Wheels.....26-in. F. C. S. Griffin

The specifications of the trailers are as follows:

Date order was placed.....July 5, 1923
Date of delivery.....Nov. 10-30, 1923
Builder of car body.....G. C. Kuhlman Car Company
Type of car .....Center entrance; pay as you pass
Seating capacity 60
Total weight.....25,000 lb.
Bolster centers, length.....23 ft. 7¼ in.
Length over all .....46 ft. 8¾ in.
Width over all .....8 ft. 2 in.
Body .....All steel
Interior trim .....Birch
Headlining .....Agasote
Roof .....Arch
Air brakes..Westinghouse T. B. Company
Bumpers ..... Angle iron
Car signal system .....Consolidated Car Heating Company
Couplers .....Tomlinson No. 6
Curtain fixtures .....No curtains
Designation signs .....None
Door operating mechanism..Hand operated
Fare Boxes....Louisville Railway Company
Fenders or wheelguards.....Louisville Railway Company
Gears and pinions.....G.E.
Hand brakes..Quick release, ratchet handle
Heater equipment .....Cutler-Hammer
Headlights .....O. B.
Journal bearings (if ball or roller)..Plain
Journal boxes .....Brill
Lightning arresters .....G.F.
Paint .....Enamel
Registers..International Register Company
Sanders .....O. B. Company
Sash fixtures .....Edwards
Seats .....Brill
Seating material .....Wood Slat
Springs .....Brill
Step treads .....Feralun
Trucks .....Brill
Ventilators .....Brill
Wheels (type and size)26-in. F. C. S. Griffin

Track and Line

Elmira Water, Light & Railroad Company, Elmira, N. Y., has been engaged in an extensive program of track reconstruction. The plan includes new track and paving on east and west Miller Streets, Maple Avenue, west Third Street and Railroad Avenue and south Main Street.

Capital Traction Company, Washington, D. C., will soon start work improving the old car line from Chevy Chase Lake to Kensington. Under the lease by which the Kensington Railway passed into the hands of the Capital Traction Company it was agreed that the leasing company would improve the roadbed and operate modern cars over it.

Altoona & Logan Valley Electric Railway, Altoona, Pa., has started work on the construction of 2 miles of double-track. About $40,000 will be spent. The company will extend the double track from Ramey's to Ale's station, 1.3 miles and from Buena Vista to Tipton, a distance of 1 mile. The division has double track at present from East Altoona to Ramey's, a distance of 3 miles. A contract has been awarded to E. L. Grannas for excavation and filling in work necessary for the second track. The trolley company is doing the track laying work. Thirty foot "T" rails are being used. This construction is in line with the company's expectation that patronage will increase through the construction of the $250,000 board automobile speedway at Tipton.

Power Houses, Shops and Buildings

Trenton & Mercer County Traction Corporation, Trenton, N. J., will purchase a plot of ground on East State Street between Cuylet and Walter Avenue, and erect a carhouse there. Permission has been obtained to use the plot for a carhouse.

Sioux City Gas & Electric Company has postponed the construction of the proposed $3,000,000 power plant which was to have been completed and ready for operation in 1924. High prices of material and equipment are the reasons for deferring this construction.

Georgia Railway & Power Company, Atlanta, has ordered one 3,000-kw. 600-volt d.c. motor-generator set and switchboard for the Stewart Avenue substation. The coal and ash-handling equipment and automatic stokers for the Davis Street plant and Butler Street plant have already been ordered.

Philadelphia Rapid Transit Company will soon start on its building program which in addition to the new southern carhouse includes the construction of new and modern shops on Tenth Street and Erie Avenue. The new southern carhouse will be located on the property acquired by the company from the Girard Estate lying between Nineteenth and Twentieth Streets, Moyamensing Avenue and Johnson Street. It will accommodate more than 400 cars and will cost about $1,300,000.

Olean, Bradford & Salamanca Railway, Olean, N. Y., will soon move its office and waiting room from the head of Main Street, in Bradford, to the Erie Railroad depot there. With the removal of the offices, the work will be started on the installation of a switch on to the tracks of the Erie which will make the railroad depot the terminus of the traction lines. This change will help in relieving the congestion along Main Street, by diverting all freight cars on to the railroad tracks and leaving the depot for loading and unloading of freight cargoes. This move is part of the retrenchment policy of the company.

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New York, Saturday, August 18, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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HENRY W. BLAKE and HARRY L. BROWN, *Editors*

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The Fruits of the Standardization Seed

THAT the benefits from standards are beginning to be realized is clearly indicated by the following illustration as to how it works when the standards begin to come into play.

A large company in the east has consistently used the Association standard 7-in. girder grooved rails. Recently on three occasions in renewing tangent tracks compromise joints have been found unnecessary when these tracks have been connected up with crossings. The latter had previously been rebuilt with the standard guard rail and a saving of $160 was effected in the compromise joints alone at one of these crossings. In one case, also, the stock of standard guard rail had run low, and through an oversight this was not noted in sufficient time to get orders placed to secure a reasonably quick delivery, which under the old conditions would have required possibly three months to secure delivery of any non-standard section. However, in this case, the rail was secured from the stock of one of the manufacturers within about ten days after the order was placed. Such a delivery would have been impossible except for the use of the standard.

Here is another interesting example of the benefit of standardization. A railway company located about 150 miles away from the one previously mentioned ran short of rail, needing about 3,000 ft. to complete a job. The rail could not be secured from the mill in less than six to eight weeks. Then application was made to the first company and it secured the rail wanted within four or five days, and the construction work proceeded merrily onward. This also was only possible through the use by both companies of the same Association standard rail.

These illustrations are cited to emphasize the points that the Association standards are being used, and more extensively as time advances, and that the advantages of this practice are accruing to the railways.

Wheel Wear Still a Leading Problem

WHILE collecting information for the survey articles on wheel, gear and axle practice, the first of which is published in this issue, the editors found the men responsible for wheel maintenance particularly interested in the problem of wheel wear. This subject has formed a general topic of discussion ever since electric cars first came into existence. When one stops to analyze the various causes for excessive wheel wear, he is soon impressed with the large number of elements that enter into the problem and the great variation in wheel life that must necessarily result.

Improper alignment and loose parts in trucks, badly worn bearings, excessively worn gears, improper mating of wheels, badly fitting brake shoes and bad track conditions are some of the factors causing wheel wear that can be grouped under the general head of maintenance. Design includes the size of wheels, the contour of tread and flanges and many other details. Methods of manufacture and foundry practice comprise another group. Service conditions, such as grades, curves, number of stops, etc., form another, and the location of the railway brings into the problem weather conditions, dirt, etc. It is little wonder, then, that there results a large variation in the life obtained and the ultimate cost of the wheels for different properties.

The influence of the shape of the tread and flange on wear has been considered by various association committees for years, and the subject will come up again this fall in connection with the report of the special committee of the American Electric Railway Engineering Association on wheel tread, flange and rail head contours. Standardization is desirable, but there is no value in establishing an ideal standard which will not be used generally. Maintenance men seem to have a deep-seated conviction that their companies have some special conditions that must be met, and that it is undesirable to limit the manufacturer in making provision for these conditions in the product furnished.

The wear of steel wheels for their first thousand miles of service is far greater than after that period. Track engineers have used this as an argument in favor of a curved tread that will conform to the rail contour. Some manufacturers of wheels and equipment men maintain that much of the apparent wear at first is really a cold rolling of the metal in the tread and flange, and that the actual wear is really quite uniform throughout the wheel life.

The width of treads is another feature of design that has come up for considerable discussion. As there is considerable side play some feel that a wider tread will distribute wear over a larger area, give greater bearing surface and so result in increased life. With wide treads the highest point or outside edge of the rail is always in contact, and a uniform wear results, while with the narrow treads the side play is not sufficient to produce contact on the outside edge of the rail and a small beveled edge is formed on the rail which produces extrusion of the metal on both wheel and rail.

Where the tread of a chilled wheel is wider than the rail head there is danger of chipping if the treads strike high paving. On the other hand, wide treads tend to reduce the number of chipped flanges because they better carry the wheel over special trackwork and so save both the wheel flange and the special trackwork.

The discussion on most of these conditions is largely theoretical, as very few tests have been made to determine the actual wearing effects resulting from the individual considerations, and even where tests are made, it is very difficult entirely to eliminate the numerous

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other factors which affect wheel wear. Maintenance men realize that much can be accomplished by careful wheel and truck maintenance. The method of boring wheels for pressing on axles may have considerable effect on wheel wear. The size of axle used should also be a considerable factor in wheel wear. A wheel running even slightly out of true is found to wear abnormally. Some roads have attributed abnormal taper wear on treads to a bending of the axles under load. One road found its wheels wearing out of round, and investigation indicated this to be caused by the hub of the wheel being not concentric with the axle. This company has turned all wheel hubs so as to be concentric with the wheel bore, and now requires concentricity of hubs from manufacturers. Trouble from wearing out of round has decreased considerably as a result.

During a period of deferred maintenance roads have found their wheel life decreased considerably. This indicates the value of keeping truck joints tight and trucks properly squared up. Bearings should also not be allowed to remain in service when excessively worn. Chipped and broken flanges on cast-iron wheels, and flat spots and scoring from improperly fitted brake shoes on steel wheels are the largest sources of annoyance, and these factors also account for most of the decreased life obtained from wheels.

Expense Involved Justifies Greater Attention to Special Trackwork Development

ON THE average progressive street railway time and money are not spared in providing systematic engineering supervision over the construction and maintenance of plain or tangent track. Many systems keep elaborate records for this purpose. Tests are frequently made upon various types of rail joints in an effort to evolve a joint equal in life to that of the rail. The recent appropriation of $20,000 by the American Electric Railway Association for an exhaustive study of welded joints is a special example of the extent to which plain track construction is studied. The back numbers of the ELECTRIC RAILWAY JOURNAL disclose elaborate studies of the cause of rail corrugation and of defective joints, analyses of the wear of rails and data as to the cost of maintenance per foot of track of different types per car mile. These elaborate studies with regard to plain track seem to be justified by the continuous improvement that is in evidence.

In the light of this observation with respect to plain track, the question arises as to whether special trackwork should not have the same thorough attention, in view of its important influence upon the total costs of the track department. In the average city system the value of special trackwork in place amounts to one-fifth to one-fourth of that of the tangent track. Furthermore, the average life of special trackwork is only one-third to one-half that of straight track. Consequently, it would appear that from the standpoint of expense, special trackwork involves about as much money as plain track over a period of years.

The following aspects of special trackwork maintenance emphasize its importance. A much higher technical skill is required in its maintenance than is required for tangent track. There are more component parts to wear out. The total number of joints involved in special trackwork on a city system may approach the number in plain track. The wear and tear on car equipment due to faulty special trackwork is greater than that due to poor tangent track. Derailments are more frequent at special trackwork and they generally result in a greater loss of time—and hence money.

These considerations look toward the suggestion that it would pay most sizable railway companies to have a competent engineer devoting his full energies to the design and maintenance of special trackwork. While development work of this nature is largely done by the manufacturing companies, much more progress would be accomplished if the railways had engineers who were studying the problems and developing new ideas, for their work would act as a stimulus to the manufacturers' engineers.

Good Inspection Is Essential for Low Maintenance Cost

THAT the industry has not begun to realize the possibilities for low maintenance costs is the conclusion of Henry S. Day in an article in this week's issue. While it is necessary to begin right by having a good standard of equipment when it is purchased, and to do the heavy overhauling work thoroughly, there remains a great opportunity for saving in proper inspection.

It stands to reason that this must be so, as it is much better to discover a potential defect than to allow it to result in a failure in service. Not only is the work that has to be done to remedy the defect itself less, but there is no succession of failures that often follows the first one, so that sound parts are not affected.

To get this high standard of inspection is a difficult matter. Not only must there be proper facilities in the form of clean, light and comfortable carhouses, but the class of men employed in the work must be such that proper attention to details is obtained, for it is prompt attention to every defective condition, no matter how small, that gives a really high standard of performance.

Obtaining good men for supervisory positions in inspection work, as in any maintenance work, is not an easy task, as has been pointed out frequently in these pages. The practice of promoting a man to be a foreman just because he has stuck to the job a long time, or because he can be used at a lower cost than a new man brought in from the outside, will not in general produce the best results. The choice should be made on the basis of ability, combined with the knowledge of how to handle other men and keep them busy and contented. Unless such men are picked for the higher jobs there is little use to preach the possibility of improving maintenance standards. Or to put it another way, the railway industry can ill afford to permit its best mechanics and foremen to drift away to the automobile and manufacturing lines because of better pay and more attractive working conditions there.

Results of improved inspection are apparent not only in the direct reduction of cost in the equipment department. Every time a car is withdrawn from service and replaced by another there is work to be done by the transportation department, which may not appear in the expense accounts of the mechanical department, but which is an operating cost, nevertheless. Any failure of a car on the street causes a break in the service, and there is a loss in revenue which may be greater in its effect than the added costs. Then, too, there is a loss of prestige which is damaging to another kind of maintenance—that of public relations. Taking all these factors into account, it should be apparent that, as in so many other things, the best is the cheapest.

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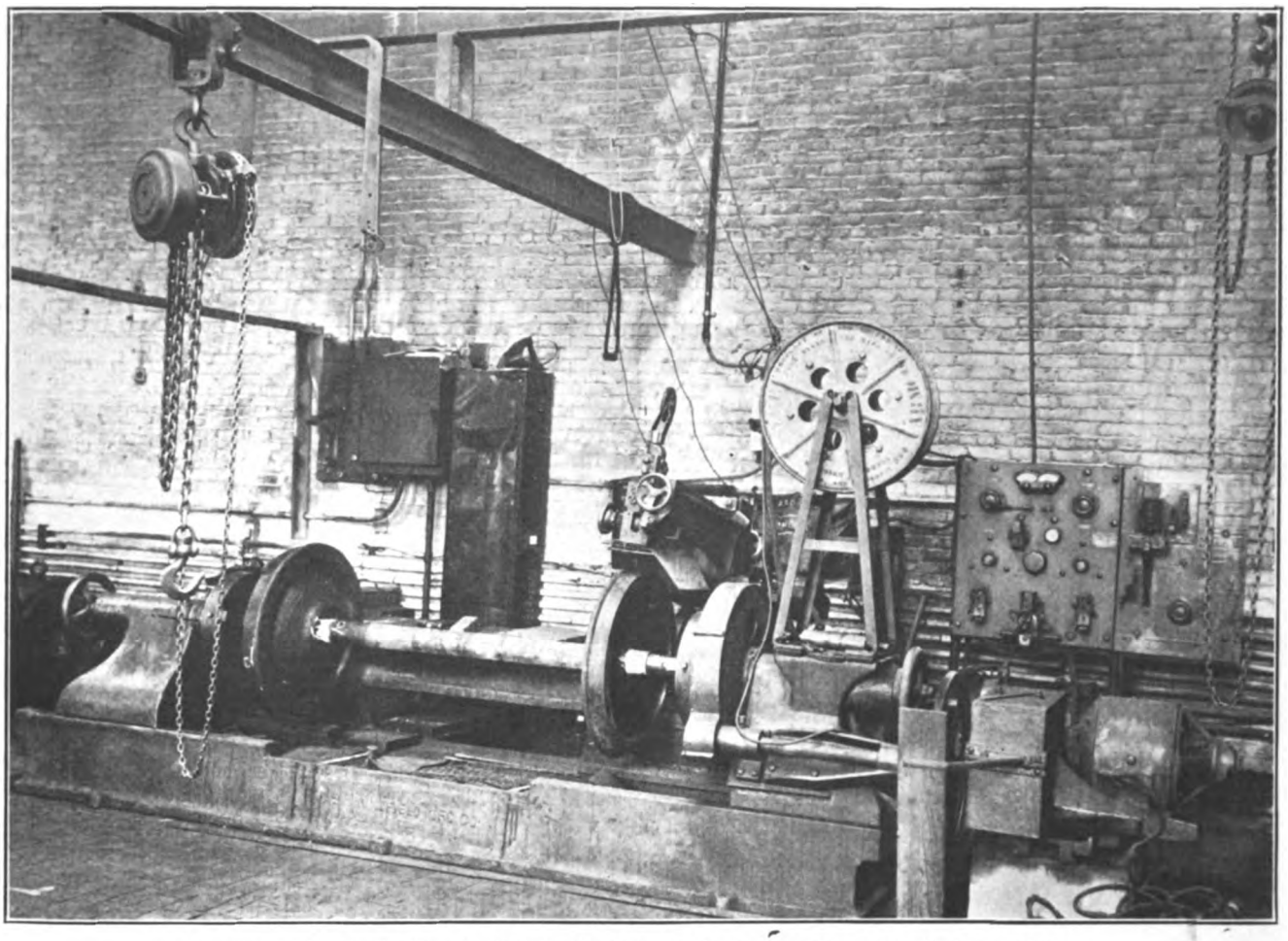
Wheel, Gear and Axle Practice—I

Findings Resulting from a Survey of Sixty Electric Railways in Studying This Subject Are Presented—This First Section Discusses the Mileage Being Obtained and the Costs for Cast Iron and Steel Wheels, the Conditions that Limit Mileage, Schemes for Increasing the Mileage and Other Considerations in Wheel Maintenance—Information Gathered by Personal Call of Editors on 51 Railways and from Material on Hand



Automatic Electric Welding Machine in the Shops of the Eastern Massachusetts Street Railway

ELECTRIC cars must have wheels and axles, gearing is a necessary part of the connection to the motors, and so the maintenance of these parts is of universal interest to electric railway men. A conservative estimate shows that there are more than 800,000 wheels in service under electric rolling stock in the United States, and replacements for maintenance average about 200,000 wheels per year. The actual mileage obtained from wheels varies through quite a large range, depending on service conditions. The wear of wheels resulting from rolling on the rails is very small. Brakeshoes wear away the metal more rapidly, and the loss from chipped and broken flanges, the grinding out of flat spots on chilled iron wheels and the turning down of steel wheels for sharp flanges account for much of the wheel consumption. It is thus quite apparent that the number of stops made has an important bearing on the rate of wheel wear, and likewise the character of the line as regards grades and curves. The amount of special trackwork is also an important factor in the wheel life.

From the information obtained it appears that in city service electric railways are obtaining from 35,000 to 60,000 miles from chilled iron wheels, with an average of 49,000 miles. With steel wheels in city service the mileage obtained from wheels runs from 70,000 to 240,000 miles, with an average of 137,000. In interurban service with steel wheels the information obtained shows a mileage of from 200,000 to 300,000, with an average life in this service of 250,000 miles.

Service Conditions Large Factor in Mileage

A comparison of the data collected shows in a very striking manner that service conditions are deciding factors in the wheel life obtained. In interurban service with few stops 80 per cent greater mileage can be expected from the same type of wheels than in city service. Different lines of the same property show a

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MILEAGE OBTAINED FROM STEEL CAR WHEELS

Name of Railway	Diameter, New, In.	Diameter, Worn Out, In.	Average Mileage Obtained
Boston Elevated Railway (surface cars)	24	22	65,000 to 70,000
Brooklyn City Railroad	22-26-28-33-34	18.5-24-26-29-30	150,000
Capital Traction Company, Washington, D. C.	31-33	28-30	160,000
Chicago Surface Lines	34	30.5	104,000
Cleveland Railway	26	24	40,000 to 50,000
Indianapolis Street Railway	34	31	144,000
International Railway, Buffalo, N. Y.	33	29	80,000
New York Railways	31	28.5	55,000
Philadelphia Rapid Transit Company	33-22	31-19	100,000
Public Service Railway, Newark, N. J.	33	29	70,000
Third Avenue Railway, New York, N. Y.	33	29	80,000
United Railways & Electric Company, Baltimore, Md.	33	31	90,000
Wheeling Traction Company	28	25	130,000

wide variation in the number of stops made per mile and the resulting life obtained from wheels.

Even with the same depth of wear, the larger the wheel the greater will be the metal which can be worn off. A comparison on the basis of wear per inch of depth will show considerable variation as a result. One railway which uses both 33-in. and 34-in. steel wheels in interurban service reports an average mileage of 196,000 for the 34-in. wheels and 150,000 miles for those 33 in. in diameter. A comparison of life or of cost under such conditions, therefore, does not lead to any definite conclusions.

In this survey, figures for wheel life have been obtained from sixty railways. An attempt has been made to determine a satisfactory basis for comparison, such as mileage obtained in comparable service with the same wheel diameters or mileage obtained per inch of wear. The results, however, showed too great a variation to make these comparisons of value. An accompanying table gives data for average mileage obtained, together with new and scrapping diameter of steel wheels for a few railways on which the information available was most complete. A comparison of these figures shows a variation that is quite typical.

Electric railway maintenance men are using many expedients to increase the mileage obtainable in their particular service. Some of these are of interest.

The British Columbia Electric Railway uses its old steel wheels when worn and turned to the limit as centers upon which tires are shrunk. The company uses 34-in. wheels in city service. These can be worn to 29¼ in. and are then turned to 29 in. and fitted with tires, which brings them up to the 34-in. standard again. In city service the average mileage on the original wheels is 245,470 miles. After re-tiring, another 190,000 miles average is obtained from each new tire. Some wheels are re-tired two or three times. The railway uses 3-in. treads so that there will be sufficient metal after turning to support the tire.

The practice of the Ohio Valley Electric Railway, Huntington, W. Va., is to turn down the treads of steel wheels only a sufficient amount to give the required thickness of flange at its base. A groove is thus frequetly left around the flange, as indicated in an accompanying illustration. The company obtains four wears out of the steel wheels and a total mileage of nearly 300,000. This is for 2½-in. wear.

FLANGES BUILT UP TO INCREASE WHEEL LIFE

The Terre Haute Traction & Light Company uses the acetylene torch for turning its wheels, as described in the ELECTRIC RAILWAY JOURNAL for July 21, 1928. The steel wheels are of a three-wear type and instead of turning off the thick flange in a lathe this is cut with the acetylene flame. Thin flanges are built up. This gives economy of metal and makes a wheel lathe unnecessary. In interurban service 34-in. wheels with rims 2.5 in. thick are giving an average of over 350,000 miles. Some 36-in. wheels have made more than 400,000 miles.

A considerable number of electric railways are finding it economical to build up flanges by welding and some are building up flat spots. The New York Central Lines at Depew, N. Y., is building up flanges of wheels. The men in charge of this work state they are satisfied as to its practicability and economy. They are using a mechanical electric process and the new metal is added principally to the flange, little if any metal being built up on the side of the wheel. Enough metal, of course, is put on so the flange can be turned to the desired contour.

The Washington Railway & Electric Company has built up a number of steel wheel flanges by welding and has not found any marked economy. This was done at a time when deliveries of wheels were slow and some emergency measures were necessary. The metal applied by welding is apparently as hard as the original wheel and no difficulty is experienced in machining after welding. The weld is of such a nature that it is difficult to tell where old metal stops and new metal begins.

The Pittsburgh Railways experimented some years ago with renewing flanges on rolled steel wheels by arc welding. Indifferent results were obtained, but the officials believe that with proper equipment and care on the part of the operator flanges may in some cases be renewed with satisfactory results.

The Connecticut Company has experimented somewhat in the building up of axle journals, but it is not believed that there is any great economy in the practice even if the mechanical results prove satisfactory. The greatest economy appears to lie in the building up of wheel flanges on its low-speed cars. Considerable difference is found in the ability of the men who do the welding, which indicates that welding is an art and there are many problems connected with it which are still to be solved by the metallurgist. The company is using an automatic welding machine brought out by the General Electric Company for automatically regulating the amount of metal deposited.

The Eastern Massachusetts Street Railway also uses an automatic electric welding machine for building up wheel flanges in its Chelsea shops. This machine is shown in an accompanying illustration. It is designed so that the wheel being welded automatically starts and stops revolving as contact is made or interrupted at the welding point. The welding metal is fed automatically into the machine by a motor operated head.

The Evansville & Ohio Valley Railway at its Hatfield, Ind., shops uses electric welding for building up flanges. Flanges built up ½ in., or even ¾ in., have proved very satisfactory. In truing up the flanges about ⅛ in. of metal is turned off. In order to provide for welding a groove is left in the flange when the tread is turned

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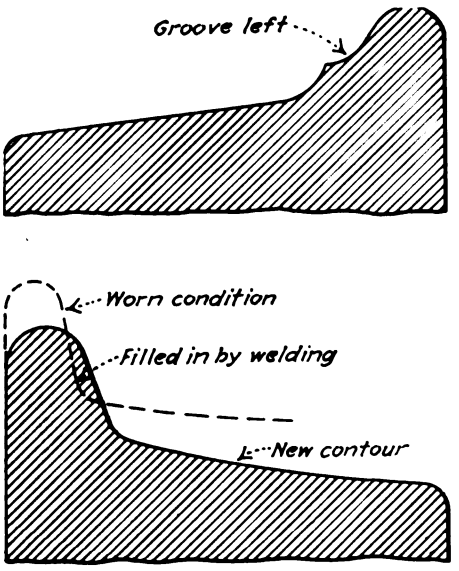
down. This groove is filled in by welding. This has proved economical as it is not necessary to turn off the tread of the wheel to so great an extent, as can be seen from the illustration of this method.

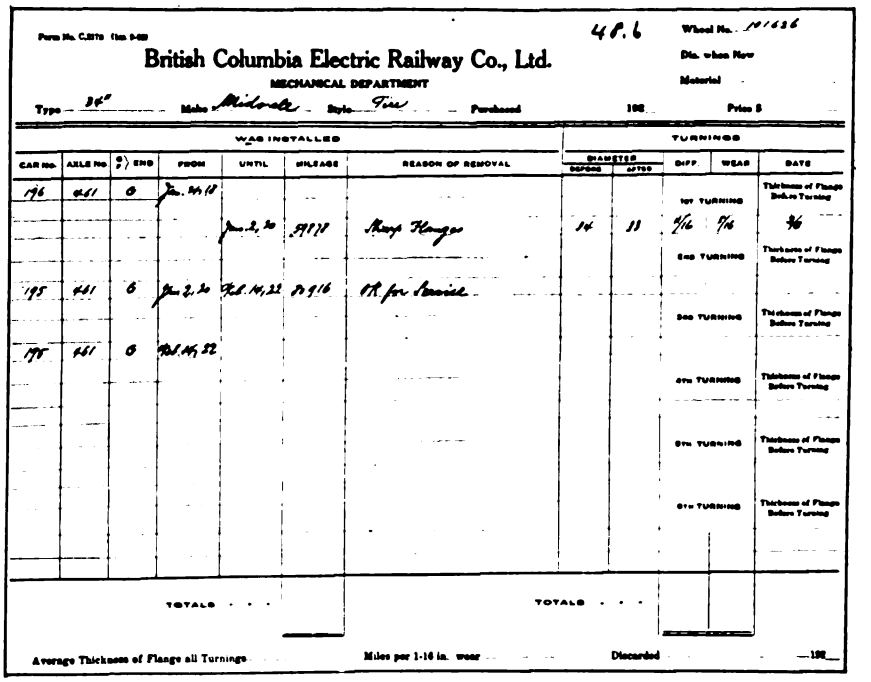
The Puget Sound Electric Railway, Tacoma, Wash., ordinarily runs its rolled steel wheels from 60,000 to 65,000 miles, after which the flanges are welded and the wheels are put back in service for an additional 30,000 to 40,000 miles. This practice is used only on 24-in. steel wheels in city service. On the 33 and 36-in. wheels used in interurban service the flanges are not welded on account of the high speed which these cars make. These wheels are turned when this is necessary and when they are worn to the minimum thickness of tread are scrapped. The 36-in. rolled steel wheels give from 300,000 to 320,000 miles in interurban service.

The practice of the Seattle municipal railway is not to turn wheels for flange wear. Rolled steel wheels are ordinarily run for 200,000 to 225,000 miles before it is found necessary to weld the flanges. The tread is then turned off to give the proper contour and the wheel is returned to service.



Above — Groove is left in the flange of wheels turned in the Huntington shops of the Ohio Valley Electric Railway to reduce amount of metal turned off.

Below—The groove left from turning to correct sharp flanges is filled in by welding in the Hatfield shops of the Evansville & Ohio Valley Railway.


British Columbia Electric Railway Co., Ltd.
MECHANICAL DEPARTMENT

Wheel Record Card of British Columbia Electric Railway

Careful Mating of Wheels on Same Axle Desirable

The general practice of electric railway shops is to have the wheels on the same axle as near the same diameter, or circumference tape measurement, as possible. The various railway mechanical men were asked particularly regarding their practice of mating wheels, and the majority replied that they mated the wheels to as nearly exact diameters as possible. Some allow a maximum variation of not more than two tape sizes. Uneven wear of the flanges is almost certain to result if the two wheels on the same axle differ more than one tape size, and most railway maintenance men feel that this matter is very important. There are some other reasons why one wheel on an axle may wear a flange sharper and quicker than the wheel on the opposite end.

One railway finds that wheels on the gear end wear sharper flanges than those on the opposite end, and that the thrust of the pinion and gear tends to throw the wheel on that side of the axle out of its proper position of perfect parallelism with the car truck. Of course, this effect is greatly increased as lost motion increases in the car axle bearings. It might seem upon first examination that this lack of parallelism would affect both wheels, but it has been found that in actual practice the tendency of lost motion in the car axle bearings combined with the thrust of the gear and pinion is not only to throw the axle as a whole out of its proper position directly at right angles to the track, but it also tends, in most cases, to throw the wheel next to the gear toward the rail, thus putting an extra pressure on the flange and to the same extent freeing the flange of the opposite wheel of pressure against the rail.

Care in Adjusting Braking Pressure Increases Wheel Life

The lines operated by the Seattle Municipal Railway include many very heavy grades. Grades up to 14.95 per cent are operated with standard equipment. In connection with wheel wear a careful study has been made of braking pressure and it has been found entirely feasible to set the brake levers so as to obtain a 100 per cent braking ratio on cast-iron wheels, and 120 per cent braking ratio on steel wheels.

At points where steep grades are encountered it was formerly the practice of motormen to "fan" the air-brake lever before starting the car down grade. This was done in order to cut in the governor and start the compressor, the intention being to get the maximum pressure in the reservoir tank. In order to give more nearly constant braking pressure, whether the compressor governor has just cut out or is just ready to cut in, the company has now installed duplicate air reservoirs of standard size on each car. This increased air storage capacity has made the practice of "fanning" the air unnecessary and has tended to lessen the number of flat wheels.

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SCRAPPING DIAMETERS OF CAR WHEELS USED ON ONE LARGE PROPERTY

(A) Symbol	Design	Plan No.	Original Diameter, Inches	Rim, Inches	Rough Bore, Inches	Scrapping Diameter, Inches	Driver or Trailer	Trucks Used On	Cars Used On and Remarks
E-3-a	Solid Steel	15,497	34¼	3	7½	31	Driver	Am. Loco. E-517 Am. Loco. 07	Loco. No. 5 Car 998 and 1400-Series
E-2-b	Solid Steel	15,496	34	3	6½	30	Driver	Peck-40	700, 800, 1000, 1100, 1200, and 1300-Series and Car-999
E-2-b	Solid Steel	15,496	34	3	6½	30	Driver	Brill	600-Series and Car No. 936
E-2-a	Solid Steel	15,496	34	3	5¾	29½	Trailer	Peck-40	700, 800, 1000, 1100, 1200, and 1300-Series and Cars 999 and 699
E-2-a	Solid Steel	15,496	34	3	5¾	29½	Driver	McGuire	695-98 and Elect. Loco's Nos. 1-2-3. (Wreckers 3150-51)
E-1-a	Solid Steel	15,495	31	3	5	26½	Trailer	Brill	600, 601, 633-682
E-1-a	Solid Steel	15,495	31	3	5	26½	Trailer	Pullman	1-6, 8-56, 58-61, 63-69, 133-271-Trailers. Tool Car 3152. 602-632, and 684 Motors. (Flat and Gondola Cars 3000-16, 3060-61)
E-1-a	Solid Steel	15,495	31	3	5	26½	Trailer	Gilbert	57, 62, 70-81, 83-125, 127-132. Trailers
E-1-a	Solid Steel	15,495	31	3	5	26½	Trailer	Wasson	683, 900-936
E-1-a	Solid Steel	15,495	31	3	5	26½	Trailer	St. Louis-'07	1400-Series and Car-998
E-3-b	Solid Steel	15,497	34¼	3	7	30¼	Driver	A-55	Subway Car
E-1-b	Solid Steel	15,495	31	3	6	27	Trailer	A-55	Subway Car
.....	Solid Steel	B-61-2	32½	1¾	7	31	Driver	A-55	Original Subway Car Wheels
.....	Solid Steel	B-62-5	30	1¾	6	28½	Trailer	A-55	Original Subway Car Wheels
E-4-a	Solid Steel	15,724	36	2¼	6½	32¼	Driver	Baldwin	Cars 900-935 and Loco. No. 4

The practice of various railways in regard to truing up flanges and removing what may be considered an excess of metal from the thick flange of a wheel is interesting. By taping or calipering wheels the Kansas City Railways found that the thick flange wheel is invariably larger in diameter than the thin flange wheel. This company's practice is to reduce the diameter of the thick flange wheel to ⅛ in. below that of the wheel with the thin flange. The thin or sharp flange is trued up, but under no circumstances is any metal removed from the tread except to give proper taper. By returning the wheels to service it is found that the thin flange wheel will, in the ordinary course of wear, reshape its flange. This method, of course, applies to city service only, but might be used to a limited extent in interurban service, if the flange wear is not allowed to become excessive before the wheels are removed. By this method Kansas City has been able to obtain an average of 200,000 miles per steel wheel, the wheels being originally 34 in. in diameter, and removed when worn to 31 in.

Some of the Southern electric railway properties have found that when either wheel on an axle is ground or turned down to remedy defects in the flange or tread, it is desirable to have both of exactly the same tread diameter when the operation is completed; otherwise the wheel that is larger in diameter crowds ahead of its wheel mate, and tends to throw the flange out of alignment. This causes thin flanges or false treads on both wheels.

The practice of whether or not to restore a flange to its full normal dimensions when the wheel is being turned shows some differences of opinion. The Pittsburgh & Butler Railway finds it better to turn a full flange, for in turning only sufficient metal off the tread to establish a flange of proper width from the gage line to ¼ in. above, a groove would be left slightly above the throat. This would leave an offset that would strike frogs, switch points, etc., and in so doing the metal would be crowded down along the gage line and produce a larger throat radius. This changes the contour of the wheels very much and reduces the mileage obtained between turnings.

In Pittsburgh, Chicago and Chattanooga the method of removing just sufficient metal from the tread to give a proper width flange up to ¼ in. above the gage line was investigated. These roads found it best to turn a full flange. In Chicago a small witness mark is left on the flange of one wheel to indicate that excess of metal has not been removed.

Where flange-bearing special trackwork is used, the tops of wheel flanges sometimes become worn while otherwise the tread and flange are in good condition. Some railways believe that it is not absolutely necessary to turn off the tread until sufficient metal is left to form a new flange of full contour for wheels under cars in city service, as this requires the removal of so much metal from the tread that it shortens the life of the wheel.

Use of Steel Wheels Is Increasing

From the information collected regarding properties which are using steel and cast-iron wheels, it appears that the number of railways using steel wheels is increasing. Of the fifty-one properties on which information was collected by personal visits, twenty were using steel wheels, ten chilled iron wheels, and an additional ten were using both steel and chilled iron wheels. The question of whether steel or chilled iron wheels are most economical is influenced, to a large extent, by local conditions. Many railway shops are not equipped for the proper maintenance of steel wheels, and as the number of cars operated is comparatively small, these railways continue the use of the chilled iron wheels rather than go to the expense of purchasing new shop equipment.

In the Pacific Coast states the item of freight is a considerable factor in wheel cost. Thus, the Spokane United Railways can obtain chilled iron wheels from Tacoma, and the freight rate is 56.5 cents per 100 lb. Steel wheels must be obtained from the East, and the freight rate, from Midvale, Pa., is $1.65 per 100 lb. Information obtained from Salt Lake City, Utah, indicates a similar condition, as railways there find that with an average mileage of 50,000 for cast-iron wheels without removal, and by deducting the price received for scrap after the wheels are worn out, the cast-iron wheels are cheaper than steel, principally on account of the high cost for freight and because the steel has no scrap value when worn out.

Another point which affects the economy of using steel wheels is the amount of wear obtained. Some railways have found that, due to truck conditions, and where motors hang low, they cannot obtain the full wear of steel wheels. The great advantage emphasized by most users of steel wheels is the freedom from chipped flanges and from the trouble of removing flat spots from cast-iron wheels.

Local conditions must necessarily govern the relative wear obtained from the two types of wheels and

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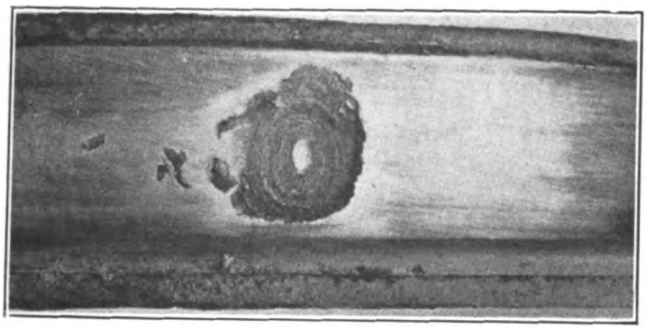
so comparisons of costs on different properties vary considerably. Thus, conditions resulting from truck design and the amount of attention given to wheels, together with the conditions of track and special work, have considerable bearing. With trucks of the older designs, where axles frequently operate more or less out of alignment, the Indianapolis Street Railway finds that flange wear is much less with cast iron than with steel wheels. The amount of flange bearing special work, and operation over worn girder rails, has much to do with the amount of chipping and flange breakage on cast-iron wheels. Some roads have more efficient grinding facilities for establishing the rotundity of cast-iron wheels and equipment for removing flat spots, and the resulting average mileage obtained is thus increased.

The comparison of cost and service obtained for some railways which have kept accurate records of costs is of interest. The Brooklyn Rapid Transit System was a pioneer in the use of steel wheels, which it began to use in 1905. To make certain that the expected economies were realized, accurate records were kept and tests were made. The results were very satisfactory. In



Typical Shellout on Chilled Iron Wheel

the preliminary calculations, it was estimated that a minimum average life of 120,000 miles for rolled steel wheels under surface cars would prove economical. In practice, the average mileage of wheels removed or worn out easily exceeds 150,000 miles. Early records show that four pairs of wheels which were eventually scrapped on account of small diameter gave an average life of 165,140 miles. Figured on the 150,000-mile basis, the cost of steel wheels in Brooklyn was 11.2 cents per 1,000 wheel-miles as compared with the cost for cast-iron wheels of 15.6 cents per 1,000 wheel-miles, the average mileage of the cast-iron wheels being taken as 35,000 miles each. The mileage obtained in Brooklyn with steel wheels under elevated cars was, of course, considerably greater than that under surface cars.

Some of the contributing causes for the excellent results obtained from steel wheels in Brooklyn are of interest. The quality of the wheels themselves was particularly high and the use of a tread and flange exactly suited to the standard B.R.T. rail was undoubtedly a contributing factor in the long life obtained. In regard to shop methods, by concentrating all wheel and axle work at one shop and under the direction of one man, every mile consistent with safety was obtained from the wheels. While wheels are removed at the various maintenance shops, they are sent in to the central shop for wheel repairs or for scrapping, and the individual maintenance foremen do not have the privilege of absolute rejection.

The various maintenance foremen are expected to see that the wheels are worn to, but not below, the various scrapping dimensions which are furnished them in blueprint form for their guidance. When the wheels are received in the central wheel shop, they are carefully checked with gages, to ascertain dimensions and defects, by a special inspector who determines whether the wheels can be returned to service and indicates any work found necessary. If it is found that the wheel will not true up to ¼ in. above the scrapping limit, the wheel is scrapped. The same inspector also examines the finished wheels and axles before they are sent out to the maintenance shops for installation under cars.

The British Columbia Electric Company, Vancouver, is required by law to use only steel wheels on its interurban lines. Equipment for turning and handling steel wheels is, therefore, required in its shops, and the company feels that it is the logical thing to use the steel wheels in city service also. As already mentioned, the wheels are fitted with tires after they have become worn. English wheels and tires are used because of the lower cost resulting from duty and low water freight rates. Records of the cost of cast-iron and steel wheels for this railway shows that the original cost of steel wheels is about $32. A tire costs $25. These costs, plus labor and other work, give a total of $63 for the life of a wheel and tire, which may be expected to give approximately 465,000 miles. The cost for steel wheels and tires is, thus, about 15 cents per 1,000 wheel-miles. These cost figures are averaged over prices for the last ten years. This company's experience with cast-iron wheels, previous to the use of steel wheels, indicates the life of such wheels to be about one-ninth the mileage of the steel wheels, and the cost per mile figures out about double the steel wheel cost. The company's experience in regard to operation with cast wheels was that these are rougher and make more noise than steel wheels and this tends to reduce the life of axles and bearings, unless the wheels are ground smooth when they are first installed. This grinding, however, materially shortens their life. Trouble was also experienced from the tendency of cast-iron wheels to skid and the difficulty of removing the flat spots, so that wheels have to be scrapped. Other troubles are chipped flanges and broken treads, neither of which occur to the steel wheels now used.

Since the principal reason for shopping steel wheels is for worn flanges, the company finds that this condition comes gradually to steel wheels, so they can be shopped at the convenience of the shops; work can thus be bunched and maintenance cost reduced. On the other hand, cast wheels fail one at a time and must be shopped at once. Records show that cars with cast wheels are sometimes sent to the shop five times as often as steel-wheeled equipment. Another point the company makes in favor of steel wheels is that if the flat spots are slight, they disappear in a few days, without requiring attention at the shop. Some comparative cost figures, compiled by the company in 1920, are of interest:

	Cast Iron	Rolled Steel	Tires
Diameter of wheel new	33 in.	34 in.	34 in.
Weight new in pounds	510	600	340
Average life in miles	46,000	195,000	176,000
Average life in months	14	58	53
Weight after removal in lbs.	420 to 460	300	100
Cost when new 1920	$27.00	$54.00	$30.00
Machining, mounting and renewal	$1.00	$1.00	$1.30
Cost of three turnings	.....	$1.65	$1.65
Credit for scrap 1920	$7.00	.....	$0.95
Total net cost per wheel	$21.00	$56.65	$32.00
Total cost for ten years	$175.00	$168.30	$120.00
Average cost per 1,000 wheel-miles	$0.438	$0.421	$0.30

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The preceding is for wheels in city service, and the ultimate cost for ten years is for seven renewals of cast wheels compared with one renewal of steel wheels and two sets of tires on an original set of wheels. For keeping track of the wheel and axle work, a card 7¼ in. x 9¼ in. is used. A reproduction of one of these cards shows how information is recorded.

Some of the information regarding mileage and cost of wheels, in various sections, indicates the great variation that results from different service conditions.

The Winnipeg Electric Railway reports obtaining 50,000 miles from cast wheels and 150,000 miles from steel wheels. The factory cost of cast wheels, per 1,000 wheel-miles, is approximately 40 cents per wheel, and for 26-in. steel wheels approximately 26 cents per 1,000 wheel-miles.

The Portland Railway, Light & Power Company uses cast-iron wheels on all except the heavy interurban cars. All steel wheels wear 1 in. below the diameter of the cast wheels. The cost for the different types was not readily available, but the difference in wearing depth illustrates a condition which occurs on many railways and makes definite comparison difficult.

The Harrisburg Railways obtains about 35,000 miles from cast-iron wheels. Most wheel changes are for broken flanges and shelled out treads. The cost is about 23 cents per 1,000 wheel-miles, for wheels only.

The Empire State Railroad Corporation, Syracuse, averages 180,000 miles for 37-in. rolled-steel wheels. They are 1 in. thick on last turning and the cost is 28.5 cents per 1,000 wheel-miles.

The Androscoggin & Kennebec Railway of Lewiston, Me., uses 26-in. cast-iron wheels on safety cars. These are making an average mileage of 21,000 car-miles, and the cost is $1.24 per 1,000 car-miles, including all charges. With 33-in. multiple-wear steel wheels on interurban cars, the company is obtaining an average mileage of 65,000 car-miles and the cost is $1.17 per 1,000 car-miles. On account of winter conditions on this property, it is frequently necessary to renew steel wheels that have not gone their entire useful life, in order to secure necessary motor clearance. This, of course, reduces the average mileage.

The Washington Railway & Electric Company, Washington, D. C., gives the following average mileage and cost for different types of wheels used during the year 1920. This includes all wheels worn out and scrapped during that year:

Type Wheels	Average Mileage	Cost per 1,000 Wheel-Miles
20-in. cast-iron pony wheels	44,665	$0.150
22-in. cast-iron pony wheels	41,841	0.206
30-in. cast-iron driver wheels	41,009	0.276
33-in. cast-iron driver wheels	41,577	0.304
30-in. Davis steel wheels	48,725	0.688
33-in. Davis steel wheels	65,254	0.559
31-in. two-wear rolled steel wheels	90,000	0.383

With reference to wheel conditions that require maintenance attention, and which are limiting factors in the mileage obtained from the wheels, it is evident that sharp flanges require the most attention with rolled steel wheels. Flat spots are comparatively infrequent, the greatest number appearing in the winter months, when skidding of wheels is most frequent. Chilled iron wheels give trouble principally from chipped and broken flanges, flat spots and shellouts.

The theory of the cause of shellouts, as given by the Association of Manufacturers of Chilled Car Wheels, is that it comes from the heat generated between the wheel and rail during the period that the wheel is sliding. The metal, at this spot, is heated almost to the melting point and is cooled immediately thereafter, which gives it a very high temper. The subsequent pounding on the rail causes the metal to disintegrate. This starts at the surface, in the center, and increases in depth as the disintegration spreads from the center. An accompanying illustration shows a typical shellout, and this condition is apparent.

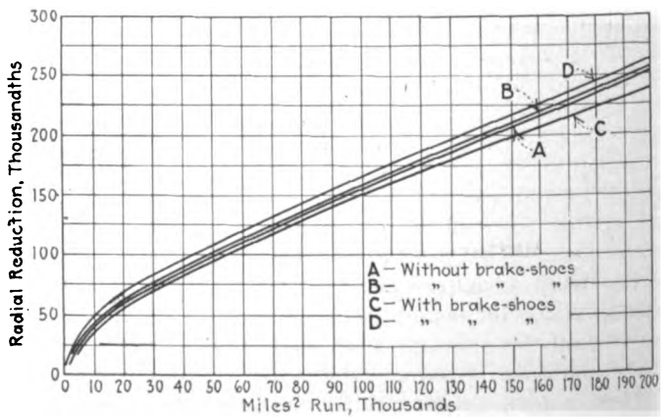
This condition of the wheel is aggravated by improper boring and mounting of wheels and also from irregularities in braking power between different cars, which arise from unequal piston travel, improper brake hangers and other brake adjustments. With these cumulative conditions, the number of slid-flat wheels during the winter months may reach as high as 50 per cent of the total removals. With particular attention given to mating wheels in pairs, to using wheels bored centrally and mounted with care, there should be less irregularity in the manner in which the wheels become worn and an increase in mileage obtained.

In a second section of this survey, to be published in the next Monthly Maintenance Issue, the shop methods and equipment used in the maintenance of wheels, axles and gears will be treated.

Tests to Determine Wear of Steel Wheels

Tests Made in London Show Amount of Wear on Wheel Flanges Operating Over Flange Bearing Special Work, Amount of Wear on Wheel Treads from Brake Shoes and Change in Wheel Contour from Service Conditions

THE results of recent tests made to determine the wear on steel tires on the London County Council Tramways were given by W. E. Ireland in a paper read at the conference of the Tramways and Light Railways Association in June of this year, and published in the



Graphs of Reduction in Tire Thickness with and Without Brake Shoes

June 14 issue of *Tramway and Railway World.* In addition to obtaining data on the wear from brake shoes, these tests also included information in regard to the change of profile from its primary straight line shape to the curved profile corresponding to the rail contour. Investigations were also made into the effect of running over ramps in special trackwork and shallow rail grooves, to collect information on the reduction of flange depth. Accompanying graphs show the results obtained.

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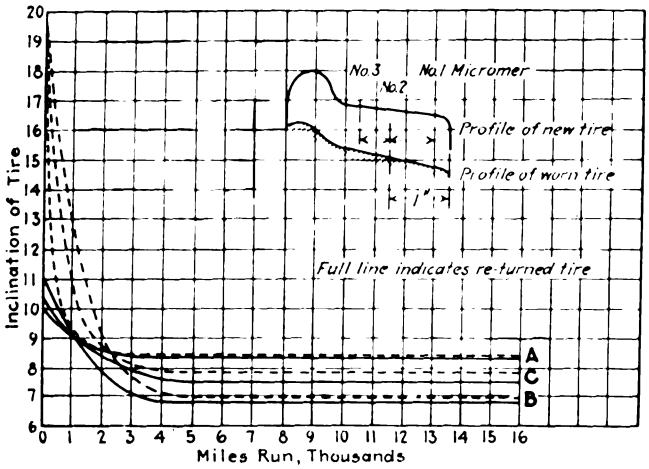
In the tests made to determine the wear from brake shoes 382 miles of tire periphery were rubbed by the brake shoes at full load and double full load. This was assumed as equivalent to all the braking likely to occur in the London County Council service during 5,000 miles of travel.

The conclusions reached in these tests were that the



Change in Inclination of Tire with Mileage Made by Wheel

wear from brake shoe action is very small, and there was no evidence that the brake shoes tend to influence the worn shape of the tire profile. In making these tests a single-truck car was arranged so as to have four wheels mounted on each axle, the outside wheels operating on the rail in the usual manner, while the inside wheels were used only for braking. On the outside wheels of one axle, the standard brake gear was applied and the brake shoes operated in the usual way. On the other axle the braking was transferred from the track wheels to the inside supplementary pair of wheels. Two road wheels on one axle were then subjected to both rolling and brake loads. Two road wheels on the other axle were subject to rolling loads only, and the two supplementary wheels to brake loads only. All of the tires for the tests were carefully selected and had approximately the same Brinell hardness number. By referring to the graphs showing radial reduction in the tires, it appears that all of them were reduced at a closely uniform rate. The supplementary tires were reduced at a rate of about 0.003 in. for each 10,000 miles run.

Methods Used in Making Tests

The tests to determine the effect of flange bearing special work in reducing the height of wheel flanges were made by running a single truck car over a specially equipped crossing. Two of the wheels were arranged to make contact with the top of the ramp each time it was traversed, while the flange of the other two wheels on the car ran clear in a full-depth track groove. The result showed that the flanges which bore on the ramp became flattened, and the steel metal was forced outward toward the outside edge of the flanges, but none of the metal was actually abraided, although the brake shoes were applied to the wheels every time the car traversed the ramp. The original depth of the flanges was $\frac{3}{16}$ in., while the least depth of the groove in the crossing was $\frac{1}{2}$ in. The results showed that the flanges were reduced $\frac{1}{16}$ in., with an average of about 10,000 crossings of the ramp. Tests to determine the reduction in flange depth were also made under actual service conditions, special brake shoes with deep grooves being used so that there was no wear on the flanges from brake applications. Results showed that a reduction of $\frac{1}{16}$ in. in depth took place in an average of about 1,500 miles.

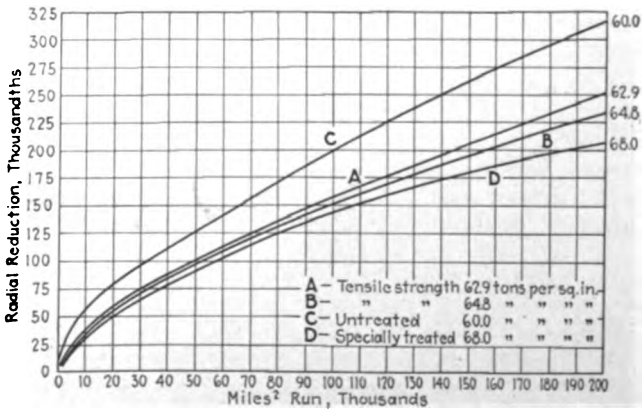
Measurements and tests were also made by Mr. Ireland to show the change in the angle of inclination of treads. The tires used had an inclination of one in twenty at the start of the tests. The results showed a rapid initial increase in the angle of inclination of tire tread and there was considerable change in the actual form of the treads up to approximately 5,000 miles, when the tire had assumed its typical shape, which remained practically constant throughout the remainder of the tests up to 16,000 miles.

Conclusions as to Wheel Life

Among the conclusions reached by Mr. Ireland as a result of these tests are that the life of the tire in terms of radial thickness is governed by its width, by the load per square inch on the area of contact and by the elastic limit of the steel from which it is made. A tire whose tensile strength is 100 tons per square inch, with an elastic limit of 50 tons, would thus give the same results as a tire of 70 tons per square inch tensile strength, whose elastic limit is also 50 tons. The tests also indicate that it is desirable to match tires or the wearing surface of steel wheels by their Brinell numbers, so as to secure tires on each axle of closely uniform hardness. Each tire or wheel should be passed through a suitable hardness testing machine and the hardness number should be stamped on the tire or wheel in a uniform location.

Some railways in the United States are already mating their tires by these numbers and are obtaining very satisfactory and uniform results.

In 1909 a committee of the Master Car Builders' Association had some tests made in the laboratory at Purdue University to determine the wear under repeated application of brakes to both cast-iron and steel-tired wheels. An abstract of this report was published in the ELECTRIC RAILWAY JOURNAL for June 25, 1910, page 1099. The conclusion reached was that none of the ordinary brake shoes in service caused excessive wear on either steel or cast-iron wheels. The wear on steel



Relation Between Average Wear of Tires of Different Ultimate Tensile Strength

wheels is greater than that on cast iron, but in neither case was there any serious wear on the wheel found to occur.

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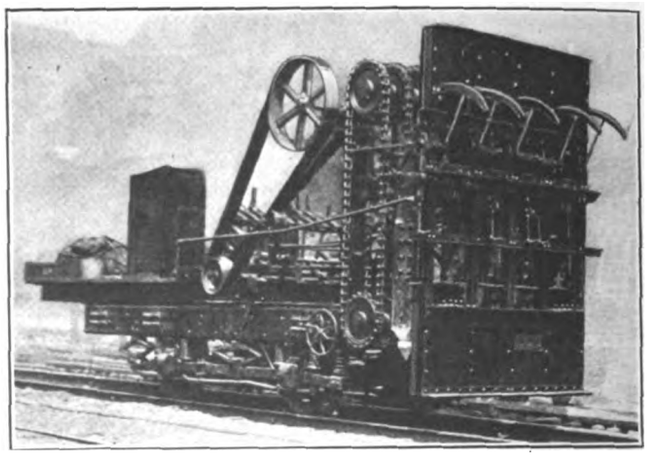
Improvements in Clark Concrete Breaker

Changes Which Have Been Made in This Pavement-Breaking Machine Make It Easier and More Efficient to Operate

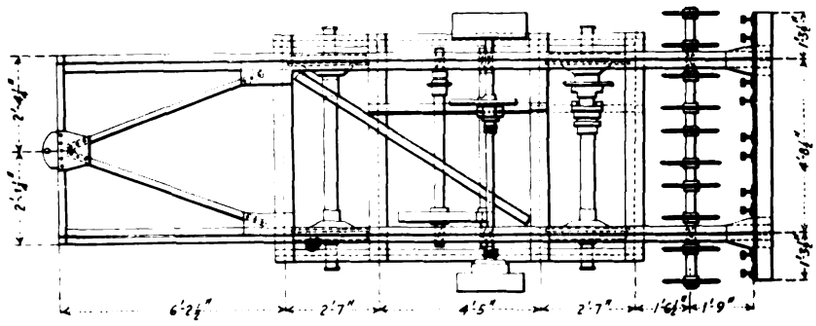
THE construction of an improved type of concrete breaker for breaking up pavements preparatory to track reconstruction has just been completed by Charles H. Clark, engineer maintenance of way Cleveland Railway. Mr. Clark's original design of breaker consisted of a weight which was raised by a motor and dropped on the pavement. This was superseded about two years ago by a breaker with a gang of five pointed hammers dropped vertically, as shown in the accompanying illustration at right. The machinery was arranged so that the hammers could be dropped all at one time or serially. This breaker delivered two blows from each weight in sixteen seconds, or a total of about thirty-eight blows per minute for the five hammers, and would break the pavement between rails at the rate of 50 ft. to 150 ft. per hour. By a separate clutch the operator controlled the movement along the track of the breaker according to the needs of the case. This type of breaker has done excellent work in Cleveland and in some other cities where it has been installed.

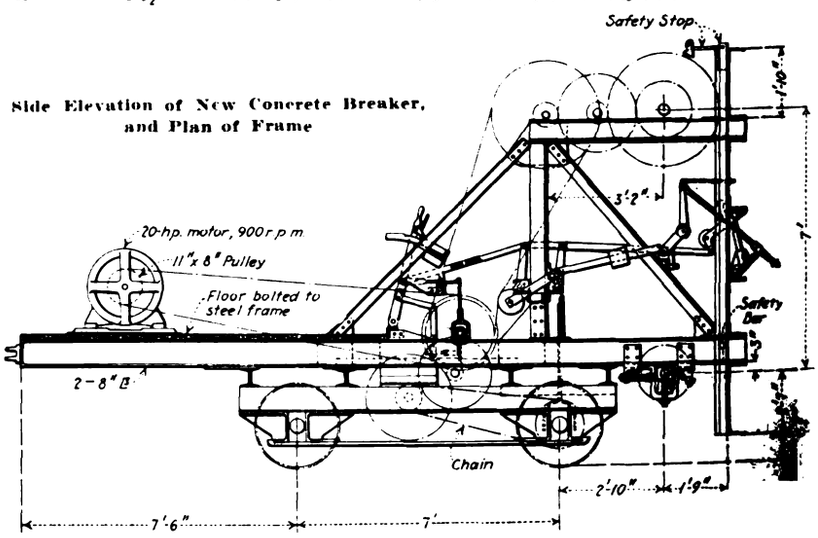
The new breaker designed by Mr. Clark contains a number of improvements suggested by experience. They may be summarized as follows:

The hammers are now fitted with double slides, or slides on each side instead of a single slide. A change has been made in the hammer lock, and a lever has been substituted for a hook to hold the hammers up when the machine is not in use.



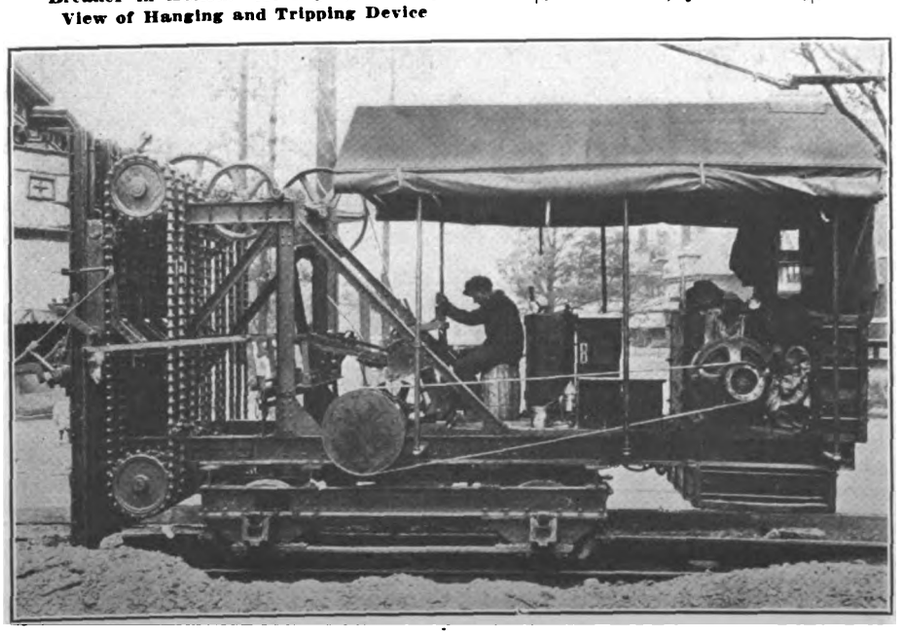
Former Design Had Single Slides for the Breaker Weights

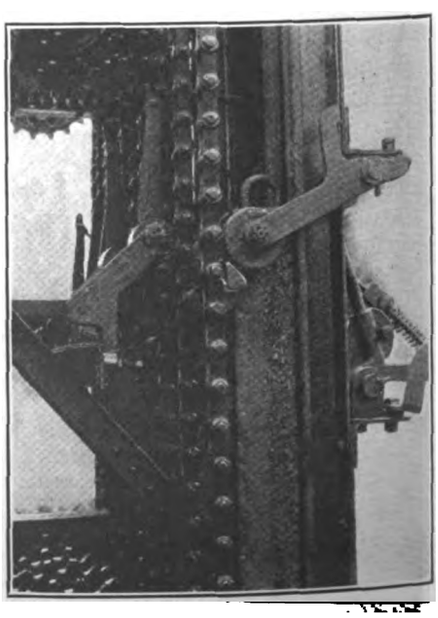




Side Elevation of New Concrete Breaker, and Plan of Frame

At Left, the Latest Design of Clark Concrete Breaker in Action. At Right, Close-up View of Hanging and Tripping Device





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A safety device has been added to catch the hammer in case it drops below the hooking point. This prevents the machine from jamming. The chains and gears have been made heavier.

The car has been made integral with the truck and of steel throughout. The vertical clearance is now 11 ft. 2 in. instead of 11 ft. 8 in. This makes it easier to ship, and by dropping the wheels out from 6 in. to 8 in. more room can be secured for shipping purposes.

The operator has seven levers altogether for controlling the operation of the breaker, and these levers have been arranged within 36 in. of the position of the operator, making it much easier for him to control the machine.

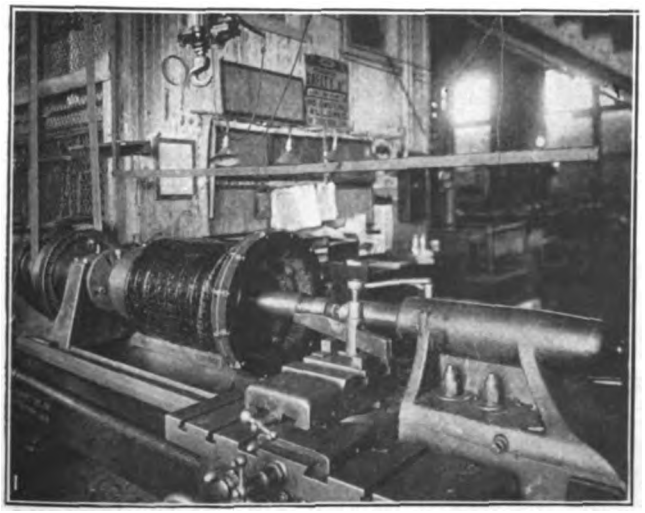
The machine was made for Mr. Clark by the Union Engineering Company of Cleveland. This breaker will have the same speed as previous designs.

Reboring Compressor Cylinders in a Lathe

By Use of a Specially Constructed Fixture Bolted to the Lathe Carriage, Compressor Cylinders Are Readily Rebored

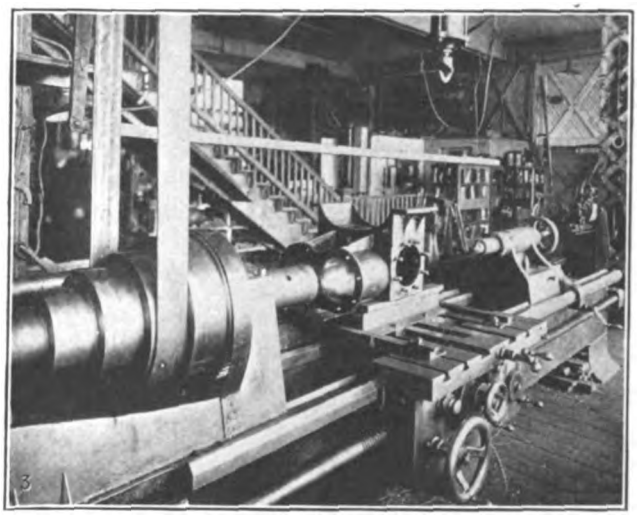
A VARIETY of work may be performed on the standard machine tools of a railroad shop provided a little ingenuity is used in the design and construction of suitable fixtures to hold the work in the machine.

Expensive, complicated jigs and fixtures are not always necessary, as will be seen from the accompanying photograph which shows a fixture made in the shops of the Northwestern Elevated Railroad, Chicago, constructed of T-rails and bars suitable for holding compressor castings while they are being bored in a standard engine lathe. This is a 14-in. lathe having the customary tool rest, compound and carriage. For the application of compressor fixtures the compound is removed and the cross-members of the fixture, which are made up of L-shape section bars, bolted into the bolt



Ordinary Lathe, Shown in Use Here to Turn Armature Shaft, Is Adapted for Compressor Boring as Shown in Illustration Above

groove in the carriage. The T-rails of 5¼ in. height are fastened to the cross-members at the mid-point, these rails being spaced at such a distance that they will hold conveniently the casting of the compressor. The cross-feed screw nut is fastened onto one of the T-rails, so that the cross-beam of the carriage may be used to align the cylinder with the boring tool. Long bolts are used to hold the casting upon the face of the T-rail, which has holes bored in the head matched up with the holes in the casting. The boring tool is placed in the chuck of the lathe, and the casting squared up, when an initial fine cut is made off each cylinder. After one cylinder is



Standard Lathe with Home-Made Fixture in Position for Reboring Compressor Cylinder

bored the bolts clamping the fixture to the carriage are removed and placed in holes so spaced that the other cylinder will be lined up with the boring tool. Transformation of the lathe from one capable of turning down armature shafts, as shown in one photograph, to a lathe adaptable for boring out compressor cylinders, as shown in the other photograph, is accomplished by one man in approximately fifteen minutes. The fixture was made at a nominal cost and, due to its design and construction, has no parts which will wear out.

Market Street Track Reconstruction in San Francisco

THE Market Street Railway of San Francisco on May 1 started the reconstruction of tracks on Market Street, the work to cover a total of 5 miles of single track.

On lower Market Street the grade will be raised and new track put in as well because in this area the street is continually settling, as was described in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 23, 1922, page 967. The grade raise will increase from zero at Sutter Street to a maximum of 2 ft. at Steuart Street. The city will repave the street at the revised grade so that street and tracks will be ready at the same time, for service on the new grade.

The rails used in this reconstruction, the 121-lb. special section designed expressly for this work and described in the ELECTRIC RAILWAY JOURNAL, issue for July 29, 1922, page 163, are already on hand. The crossings are being built up in the company's own shops at San Francisco.

The track now being rebuilt has been in service for fifteen or sixteen years, having been restored to grade and rebuilt in 1907 and 1908. All four tracks will be reconstructed as far up as Sutter Street, and from there out to Twelfth Street the two inner tracks will be rebuilt. The plan of construction will be to work nights

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only, tearing up each night only such track as can be restored before the traffic of the next day begins. Thus the work is to be done without any interruption to regular service.

The reconstruction is under the direction of B. P. Legare, engineer maintenance of way and construction.

Window Posters Tell Fare Story

AN ATTRACTIVE window poster is being used by the Georgia Railway & Power Company to tell passengers what becomes of the 7 cents which they pay for carfare. The story is told in the form of a tabulation which classifies items in a rather unusual way, as follows:

Cash fare received		7.00 cents
Costs paid		
Ticket discount	0.18 cents	
Free transfers, reduced fares	1.40	
Wages	2.35	
Supplies	0.44	
Power	0.61	
Injuries and damages	0.40	
Maintenance and renewals	0.56	
Taxes	0.46	6.40 cents
Balance		0.60
Other railway revenue per passenger		.12
Net returns per passenger		.72
Required for return on investment on minimum basis fixed by Georgia Public Service Commission including interest on debt		1.33
Loss per passenger		.61 cents
Total passengers		92,172,664
Total loss		$565,536.29

At the bottom of the poster the company says: "These losses, unless eliminated, will prevent expanding transportation service, and are the result of traffic congestion and other causes which only public opinion can remove."

London Underground Ventilation

THE Central London Railway has recently published some interesting facts concerning its ventilation arrangements for deep-level subways. The air in the tube is entirely changed every hour and the air at each station is changed every twenty minutes. An analysis of the air in the subway of the Central London Railway shows that it contains considerably fewer bacteria than does the dust-laden air of the street.

Twelve "Ozonair" plants supply the huge volume of air required. Approximately 4,000 cu.ft. of purified air is provided daily for each passenger, and the quantity of air pumped into the stations of the railway amounts to about 110,000,000 cu.ft. per day.

The air-purifying plants draw into the stations a supply of outside air which passes into a mixing chamber where it is washed, filtered, purified and ozonized. It is conveyed by ducts to the various parts of the subway, as required. The plants were originally installed in 1911 and have been working steadily about fifteen hours a day since that time. It is estimated that the total energy which has been used in air operation would equal the power of Niagara Falls for one and one-half hours.

Seattle Trailers Rebuilt Into Motor Cars

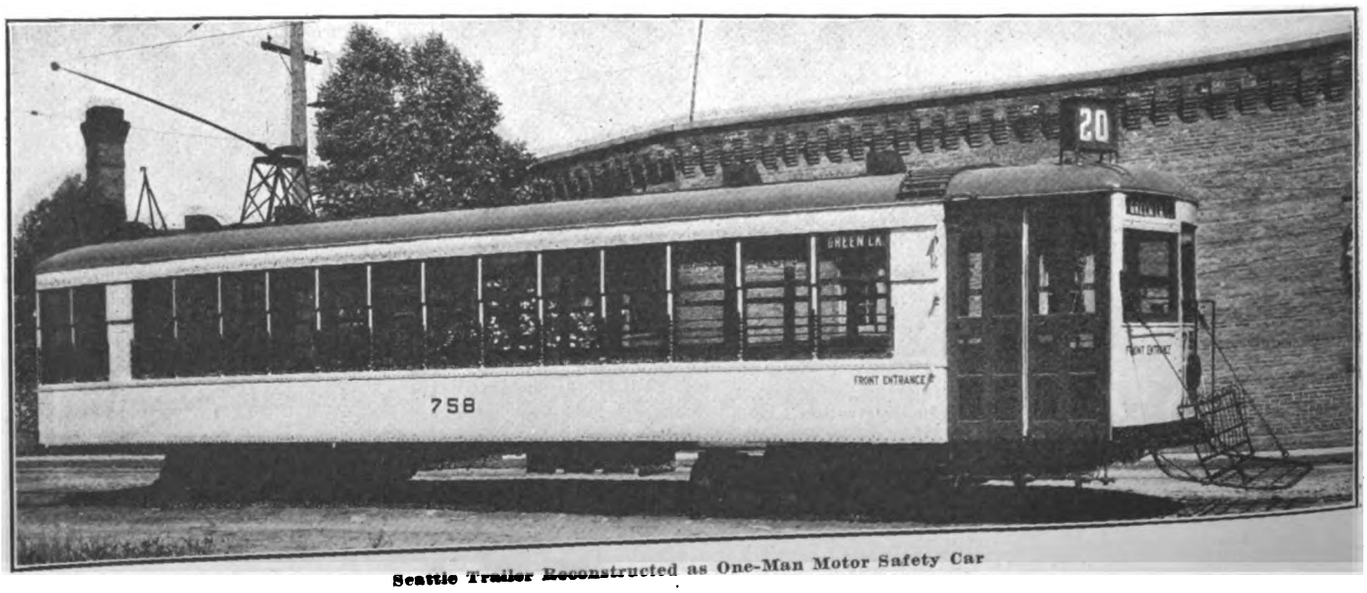
IN NEED of new equipment for the Green Lake line and without funds with which to buy it, the Seattle Municipal Railway decided to convert into motor cars ten trailers heretofore used for special heavy service, such as baseball games, beach events, etc. The new cars were reconstructed in the Seattle shops and placed in service May 15. According to General Superintendent D. W. Henderson, "the new cars are very satisfactory and the public is very much pleased with them."

The cars were originally put in service in August, 1918, as trailers of standard type, built by the American Car Company. They have two trucks, a length over all of 46 ft. and a body length of 34 ft. They have Brill 77-E-1 trucks with 5-ft. 4-in. wheelbase and 24-in. wheels. The weight of the original trailer body was 13,680 lb. and the total car weight 22,680 lb.

As reconstructed with four G. E.-258 motors, the total weight is increased a little less than 6,000 lb., being distributed as follows: Body, 13,880 lb.; trucks and wheels, 8,960 lb.; motors, 3,840 lb.; other equipment, 1,760 lb.; total weight, 28,440 lb.

As reconstructed the cars are arranged for single-end, front exit and entrance, and one-man operation. They have a full complement of safety devices and are provided with folding steps and automatic door control.

As trailers, the cars seated sixty-five. As rebuilt, the seating capacity is sixty. The two steps were reduced 1 in. each in rebuilding, so that they are now 12 in. and 15 in. respectively.



Seattle Trailer Reconstructed as One-Man Motor Safety Car

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Better Inspection Will Bring Lower Maintenance Costs

Three Systems Used for Inspection Are Described—Good Working Conditions and Surroundings Lead to Better Work and Attract a Higher Grade of Men — Selection of Foremen Is Important — Opportunities in Reclamation

*By Henry S. Day**
Railway Department, Westinghouse Electric & Manufacturing Company

GOOD inspection of electric railway equipment has the purpose of anticipating and preventing failures in service by cleaning, adjusting or replacing parts that have become dirty, out of adjustment or worn to the danger point before trouble occurs. To accomplish this it is vital to know accurately when equipment has performed to a point when it is likely to fail. It should then be removed from service well within that time. New equipment will run many months with little attention, because it is clean and carefully adjusted. As it becomes older the necessity for inspection increases.

Three Systems of Inspection in Use

There are three systems in general use for determining the proper time to inspect a car. These are, first, "period inspection," under which a car is brought in at regular intervals, irrespective of how many miles it has run or the class of service in which it has operated since the previous inspection; second, "mileage inspection," when a car is brought in at the end of a predetermined number of miles; and third, "watt-hour consumption inspection." Any of these will bring results if properly carried out; but the last is preferable because the car is inspected at the time when such important parts as the motors and control equipment have performed work up to the point when they require adjustment, lubrication and cleaning regardless of the service they have been operating in or miles they have run. The period inspection is the most uncertain of the three because, while all cars receive the same attention, some are pretty sure to be in continuous service while others will be used intermittently.

Mileage inspection will come nearer accomplishing the result desired, but the method does not take care of the different classes of service in which cars may be placed. Another cause for uncertainty in mileage inspection is the difficulty of correctly keeping the records, and in having the figures compiled soon enough to order cars out of service before some cars have run beyond the mileage when they should have been over the inspection pits. To overcome this difficulty, mileage frequently is compiled up to a certain point and the balance, or the remaining time, estimated. This really results in a combination of mileage and period methods with consequent irregular results.

The indicating watt-hour meter gives direct results and cars can be checked daily, if necessary, by the carhouse force, and inspected at the proper time. This may eliminate costly records, but in any case it insures the inspection of cars when this is due. Unless this is done, results cannot be good and maintenance costs will increase.

*Formerly superintendent of equipment, Kansas City Railways.

The correct period, mileage or watt-hour consumption on which to base inspection depends entirely on local conditions; and a rule for one road may not by any means work out on some other.

The possibilities for low maintenance costs have not yet begun to be attained. They lie not so much in the system followed as they do in the quality of the work performed and the thoroughness with which it is carried out. Many good systems of inspection will obtain real results if they are lived up to, but on numerous properties this seems to be an impossibility. It comes from many causes. Sometimes it is from a false idea of economy in holding payrolls at a point lower than is consistent with the work that must be performed. Payrolls for carhouse forces should not be considered a liability, as there is no place on an electric railway property where money will show as quick returns as when well spent on the upkeep of rolling stock. Other influences aside from payrolls, such as shortage of equipment, poor supervision, insufficient facilities and inefficient carhouse and track layouts, and sometimes unsuitable working conditions, all contribute to produce unsatisfactory and costly results. To change all this will cost money and effort, with careful planning; but the possibilities are there for the operator who will go after them.

There are at least three definite means whereby payrolls and material and supply charges can be constructively reduced. These are by providing clean, light and comfortable carhouses planned to handle cars efficiently, by raising the standard of operatives and supervisors, and by prevention of waste.

Poor Working Conditions Lower Standard

Many carhouses are simply a group of pits with a roof above. In cold weather the temperature where the men are performing their work is the same as it is out of doors, which means that when equipment needs the best possible care it is getting the worst. Not much of the work will be well done, and some will not be done at all. For example, the proper inspection of a controller requires a reasonable amount of close adjustment that cannot be performed properly by a workman wearing heavy gloves, but if the weather happens to be cold enough it is a safe bet that he will have them on.

Car repairmen are human, and where physical discomfort is a daily experience a poor grade of performance will follow. While it may be true that many mechanical operations can be carried on successfully out of doors in bad weather, it is much cheaper if this work is performed inside, and better results can always be obtained.

The time lost daily caused by men leaving their

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work for short periods solely due to their physical discomfort amounts to a considerable sum at the end of a year. This is added to by slowing down work done in poorly lighted pits, using poorly designed and badly worn tools, slow methods of handling parts and material, and waiting for slow switching movements caused by poorly planned track layouts and congestion. A good foreman can do a lot to overcome these difficulties, but he is human just as his men are, and aside from his greater interest and loyalty he can become a victim of circumstance just as they can.

This question of unsatisfactory working conditions is partly responsible for an inferior grade of carhouse repairmen. The rest of it probably is due to the tradition that high-grade mechanics are not needed in a carhouse. If a check-up is made of the average force engaged in the inspection of cars it is doubtful if many members can be found who ever have served an apprenticeship at a regular trade. Usually a man has drifted into a carhouse and been put to work as helper. By sticking to the job, principally because it was a job, he has through years of service been promoted to be a repairman or gang leader. Such men never had any real training. They learned their work from the man they were helping, and if he was doing it wrong they simply perpetuated incorrect methods. Today they frequently are paid as well as men working in other industries who are tradesmen—but they could not qualify for the tradesman's job.

On the other hand, invite the tradesman into the carhouse and he won't come because he does not like the conditions. It probably will be said that car inspection does not need highly skilled mechanics. To a certain extent this is true. A considerable part of the work necessary properly to inspect a car can be executed by semi-skilled labor; but experienced mechanics and electricians with previous experience and actual training would know whether work was being done right or wrong and would prevent failures of apparatus due to incorrect execution by repairmen.

Supervision an Important Factor

It sometimes develops that the foreman is simply the unskilled helper who has worked his way up by steady service and application. He probably is a good deal more competent than any of his men, yet he usually has obtained what knowledge he possesses by a hit-or-miss method, and knows comparatively little about correct practices for maintenance or for handling men, and is wholly without technical training. Of course many such young men, who are intelligent and ambitious, enter the mechanical department of electric railways and succeed. These are of the type, however, who would succeed anywhere; and they are the exceptions.

Although a good many industries besides street railways have been slow to realize it, the foreman is the key man where supervision over groups is necessary. He actually controls production and interprets to the workers the policy of the man at the top. An incompetent and injudicious foreman is the most costly feature of an organization, but few roads spend much effort or time in selecting or training the right kind of men.

There is little incentive for the young college man to enter this field. The idea is more or less prevalent that "practical" men are the only ones who can produce results. This idea is wrong. An injection of technically trained men, not only into the engineering department but also into the shops and carhouses, will show lasting benefits. Before this can happen, however, the salary and future must be made comparable with other industries.

Further opportunities for big economies lie in conservation and reclamation of supplies and renewal parts. An inspection of the storeroom and scrap bin of the average carhouse should prove this. Unquestionably waste on a busy system is hard to control. The difficulties increase with the size of the system, but effort and money expended judiciously will show results well worth while. Several properties at the present time have placed this matter in the hands of competent specialists and the returns have been beyond expectations.

Co-operation with Transportation Department Is Essential

One other feature presents itself as an aid to better inspection. This is the need for the transportation department to realize the necessity for whole-hearted co-operation in living up to the rule that cars should be removed from service and sent in for inspection when they are due, and at no other time. This is admittedly a hard thing to do, but it is done on some roads. It is the first and most important step in dependable operation of cars. The transportation department frequently takes the view that it is in a better position to judge when cars should be taken out of service than is the mechanical department. The decision, however, really does not lie with either department, but in the equipment itself. If good judgment has been used in determining when a car is due for inspection it should not be allowed to remain in service beyond that time.

Inspection at its best is one of the hardest games in the world, but on good inspection largely hangs low maintenance cost. No matter how well the shop turns out cars after overhauling, or how carefully the transportation department operates them, results will be uncertain and costly if the inspection is not of a high quality.

Safety Pedal on Circular Saw

MAKING use of the cultivated instinct of a man to push down a foot lever in order to stop a machine, an ingenious device has been applied to the circular saw in the shops of the Northwestern Elevated Railroad, Chicago. The saw has an individual motor drive with the fuse and controller mounted directly on the frame. For emergency, a pedal or treadle, mounted on a simple lever attached to the saw frame, serves as the medium by which the operator may effect a quick stop. Between the pedal and its fulcrum, a trigger has been mounted in such a manner that depression of the pedal causes the trigger to "kick out" the main fuse. A spring keeps the lever up when not in use.

While this method would not be good for ordinary starting and stopping of the machine, on account of arcing at the clips, which would soon burn them off, and because replacing the fuse after every stop would require time, the device is very satisfactory for emergency in case the saw becomes wedged. An attachment of this kind can be installed upon any separately motor-driven machine by merely mounting the fuse and fuse clips in a position which can be readily reached by a trigger on a foot lever.

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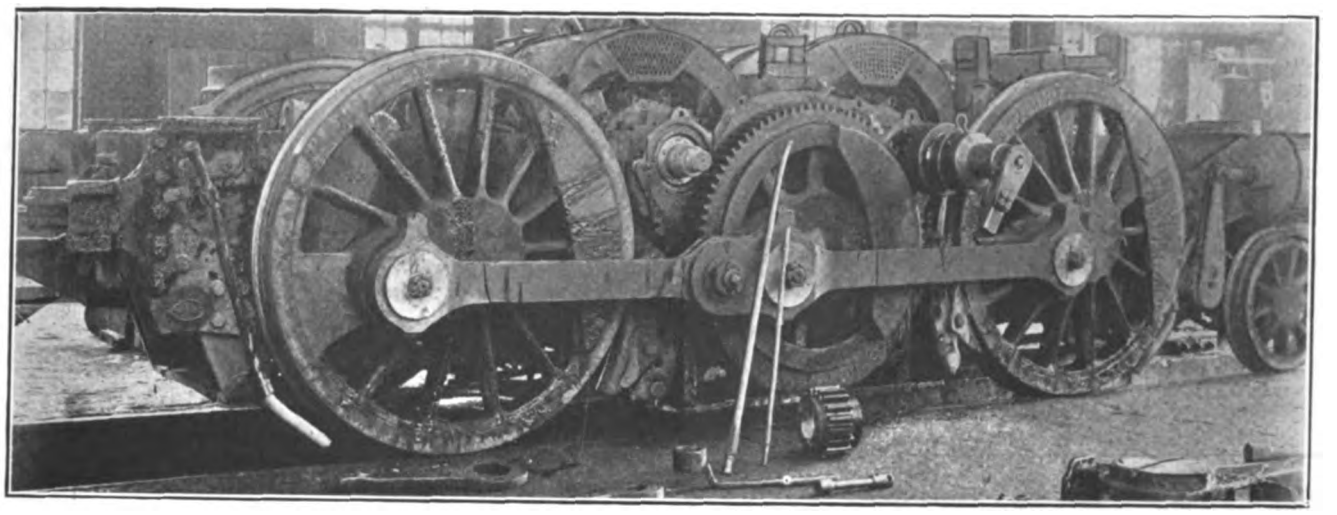
N. & W. Electric Shop Practices

How Maintenance Shops of Electric Division at Bluestone Junction Handle Repair Work on Twelve Electric Locomotives—Shop Equipment and Maintenance Methods Are Well Adapted to Minimizing Upkeep Costs



Here Is a Truck View Showing Several Features Mentioned in This Article

FOR a railroad handling the volume of traffic in heavy trainloads that the electrified division of the Norfolk & Western does, its maintenance practices are exceedingly simple. A description of the original electrification was given in this paper June 5, 1915, and the later construction, by which the single-track mileage was increased to a total of about 200, was described in last week's issue. The repair work on the twelve double-unit electric locomotives is done principally at the electric division's shop at Bluestone Junction, while a small amount of heavy work is sent to the main shops at Roanoke. The repairs consist mainly of turning tires, lining up rods, pins and brasses, changing pinions and rewinding electrical parts.

All electrical maintenance work is done in one large shop excepting blacksmithing, winding, and tin work, for which small outside buildings are provided. The maintenance force comprises 18 machinists, 17 electricians, two pipe fitters, two cranemen, 21 helpers, a bronze and babbitt man, and a blacksmith. These numbers include a small force which is kept at the shop at night, and also the maintenance force at the Bluefield motor pit.

The principal machine tools which are used in this work are the following:

A 30-in. planer which is used for shoes, wedges, driving boxes, etc.

A 36-in. boring mill, used for boring rod brasses, jackshaft bearings, driving boxes, etc.

A 60-in. horizontal boring mill, which is used for boring air compressor cylinders and other small work.

A 72-in. vertical boring mill used mainly for tire work.

A 20-in. shaper used for miscellaneous work.

Three lathes, respectively 18 in., 25 in., and 36 in., used for any work that comes up.

A 36-in. slotter used for keyways, miscellaneous smoothing work, etc.

A 30-in. radial drill.

A pipe-threading machine.

A bolt-threading machine.

No axle work is done in the shop, for the reason that no axles have required attention. None has been replaced since the hollow axles originally installed on the locomotives were replaced with solid ones during the general overhauling of the locomotives.

Locomotives Kept Constantly in Good Repair

Each electric locomotive is given a careful monthly inspection, requiring from one to two days. This corresponds to a mileage of about 3,000. There is no general overhaul of the locomotives, repairs being made in accordance with need as developed by the regular inspection. At inspection time all parts of the locomotive are thoroughly blown out with air, and men trained with respect to the several kinds of apparatus go over their respective sections of the locomotives, making the necessary repairs. Locomotives are brought in for inspection in accordance with a posted schedule.

After each man has made his inspection he reports to the foreman of the locomotive shop.

In the overhaul work all heavy parts are transported by means of a 30-ton Whiting traveling crane with a 5-ton auxiliary hoist. This crane has a span of about 60 ft., covering one of the two tracks in the shop as well as the machine sections.

Tires Turned at Moderate Cost

The wheels on the locomotive are steel tired, and the shop at Bluestone Junction is equipped to turn and change tires. They are turned in a boring mill. With this mill five tires can be turned in eight hours at a cost of about $2.50 each. One man does this work, using the traveling crane in handling the tires into and out of the mill.

A tire runs for about eighteen months for the first turning and one year for the second turning, giving a total life of about 100,000 miles.

All tires are finish-bored to a pin gage, with a tolerance of 0.005 in. They are bored 0.001 in. under size per inch of diameter to allow for shrinking on the

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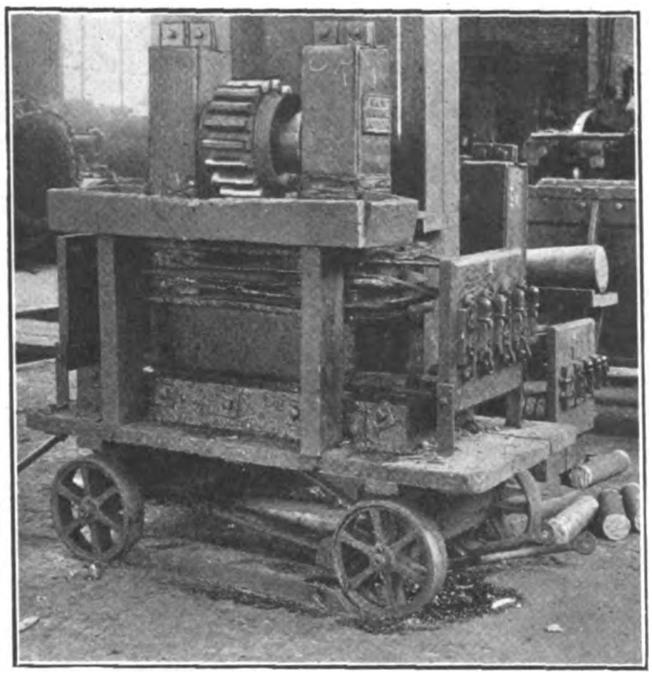
spider. A gasoline tire heater is used in expanding the tires before shrinking.

When a spider rim wears below size, it is built up with the electric arc welder, the current being supplied from a motor-generator set. About ⅛ in. of metal is put on. Since the shop at Bluestone Junction is not equipped to turn down the spiders they are sent to the main shop at Roanoke for this purpose, where the welded metal is turned down to leave about 3/32 in.

The operation of changing the tires on an engine occupies about one day. What can be done along this line is shown by the fact that in November, 1922, all tires on the entire twelve engines were changed in eight days.



This Special Transformer Provides Quick and Convenient Heating of Pinions

When tires are being turned, the opportunity is taken to fix the hub liners, bore out the driving boxes, and line up the shoes and wedges.

Flange wear determines the time of shopping locomotives for tire changing. It is regular practice with the railway to build up flanges to gage with the electric welder.

It is a shop rule that all tires on the same or connected axles must be exactly of a size. The diameters of those in different groups may, however, differ up to ½ in. It is found as a practical matter that this difference is permissible, even with the constant-speed motors, before any material difference is shown in the load on the motors. In case it is necessary to use wheels on the same locomotive with a diameter difference greater than ½ in., the load can be distributed uniformly by adjustment of the rheostats, which is done when the tires are being changed.

Bushing of Crankpins Is Successful

Next to the wheel tires, the crankpins are possibly the most interesting feature of the maintenance work. Wear of the crankpin is compensated for by means of a bushing which is shrunk on after the pin has been trued up. This truing is done in place by means of a machine driven by an air motor which revolves the cutting tool around the pin, being clamped on the end of the pin in such a position that the cutting is bound to be a concentric.

The bushing, shrunk on the pin is 3/16 in. thick, and is bored 0.00125 in. smaller than the crankpin for each inch of diameter. This is the same difference in diameter which is prescribed for the crankpin and the bore in the crank into which it fits. The pins are forced in with about 150 tons pressure.

As a result of the care with which this work is done, no bushings have as yet come loose, nor have any crankpins had to be changed.

For heating the bushing before it is shrunk on the crankpin, the bushing is set on end and there is lowered over it a larger bushing, which clears it by 1 in. to 1½ in., and which is heated to a cherry red. The heat radiated inward from the larger bushing brings the smaller one to a uniform temperature very quickly, and without danger of causing dirt or scale to adhere to its carefully finished interior surface.

Other Truck Maintenance Work Is Simple

An important feature from the maintenance standpoint is the connecting rod. Connecting rods are interchangeable, hence all of the rod brasses are standard, with one size of bore for the driver crank and one for the jackshaft crank. The connecting-rod bearings are bored to fit a plug gage. A connecting rod replacement on a locomotive requires only twenty minutes.

The jackshaft bearings are babbitted. They last about two years, while the motor bearings, which also are babbitted, last about one year. The babbitt metal used for these bearings has a tin base, the composition being approximately 85 per cent tin, 10 per cent lead, 3 per cent antimony and 2 per cent copper.

One of the regular features of the maintenance work is the welding of a wearing plate ½ in. thick on the side of the driving box next to the wheel. This is knocked off when worn and a new one is put in its place, permitting the use of one standard thickness of hub liner. Similarly flat plates are welded in the pedestal ways, being welded at top and bottom and at two spots midway.

Pinions Heated Electrically Before Shrinking On

Pinions are heated electrically by means of a transformer similar in principle to those used for testing field coils. The transformer consists of a U-shaped core, with the primary windings on the vertical limbs. Between the poles is a removable core, tapered to fit the bore of the pinion. This tapering prevents rattling of the pinion while the transformer is in action.

Obviously when the pinion is in place it becomes the secondary of the transformer, and a current circulates in it nearly equal in magnitude to the product of the current and the number of turns in the primary circuit.

With 110 volts impressed on the primary winding, the transformer draws about 100 amp. with a pinion of 11½ in. diameter, 4½ in. across the face and bored out 6 in. at the larger end of the bore. The pinion heats to 185 deg. C. in twenty-five minutes. A thermometer is placed close to the root of the tooth and is packed with putty to get an accurate record of the temperature.

Electric heating of the pinion for installation on the motor shaft insures uniformity of temperature, as the current is distributed almost evenly throughout the cross-section below the teeth. It is also regular in operation, as a particular consumption of power corresponds to a definite rate of heating. The plan is also expeditious and economical. There is no danger of

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affecting the previous heat treatment and the pinion teeth are especially well protected as they are slightly cooler than the body, due to the fact that little or no current circulates through them.

On account of the large size of the pinions and the necessity for removing them without disturbing the motor in the truck, an unusual type of puller had to be devised. The general design is shown in the accompanying halftones and diagram. It consists of two cylinders placed end to end, one with 8 in. bore, the other with 3 in. Each contains a piston packed with a cupped leather, and the smaller cylinder opens into the large one. The space between the two pistons is filled with oil. The small piston is forced toward the large cylinder by means of a threaded rod operated by a ratchet wrench, the force being multiplied in proportion to the ratio of the squares of the piston diameters, or about 7 to 1. Screwed onto the end of the large cylinder away from the small one is an internally threaded ring which screws onto a correspondingly threaded projection turned on the pinion for this purpose. Projecting from the large piston is a cylindrical extension which, in action, presses against the end of the motor shaft.

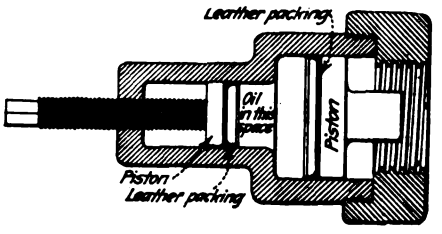
The whole shell of the puller is made in one piece, and it weighs, when filled with oil, about 125 lb. Its operation is highly satisfactory, and it is able to remove the most obstinate pinion without difficulty.

Equipment Maintenance Situation Is Well in Hand

The effect of the rebuilding of the locomotives and the careful maintenance methods is reflected in a marked reduction in the number of cases of equipment trouble.

For example, in 1920 there were 368 cases of motor trouble, in 1921 the number was reduced to 107, and in 1922, it came down to 91. Eight spare motors are kept always available, so that no locomotive need be kept out of service for any considerable length of time on account of motor trouble.

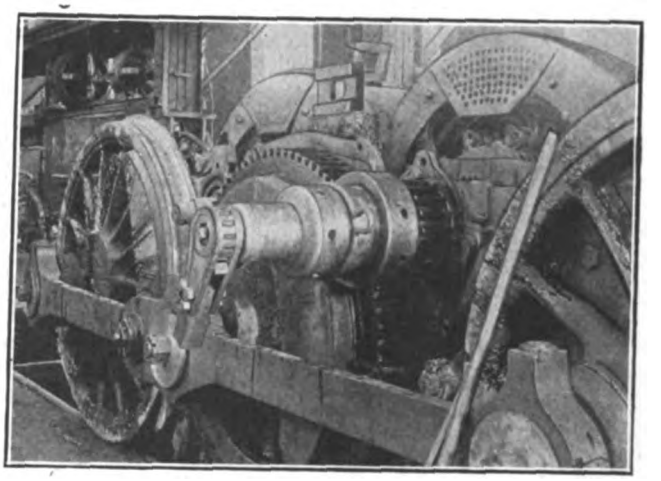
The greatest difficulty with the motors has been due to their "throwing solder," which is caused by overheating. There was considerable difficulty of this nature during the strike, but it is not serious now. The bar windings of the rotor and stator give practically no trouble. Another way in which motor troubles have been reduced is through the elimination of welding to build up the motor-shaft fits. Heat-treated shafts are used, and the effect of welding was to cause frequent breaks. Since the abandonment of this method there have been practically no breaks. Maintenance of motor bearings has been improved by the use of solid in place of split bearings. This insures better lubrication and therefore less wear.



Diagrammatic Longitudinal Section of N. & W. Pinion Puller

Some typical rotor and stator records are the following:

To select a bad example as one extreme, rotor No. 1,505,073 is one of the worst offenders. This has been in service since 1915, but no record is available prior to Oct. 30, 1919, when it was in for rewinding. On Dec. 26, 1920, it came in again, this time for throwing solder. It was resoldered but came back for the same cause on May 6, 1921, and June 22, 1921. It gave a good account of itself until Jan. 26, 1922, when it came in for a short circuit between phases, requiring the putting in of two new coils. Then it got to throwing solder again and was in for this purpose June 22, 1922; Aug. 22, 1922; Oct. 17, 1922, and Feb. 12, 1923. It came in on account of roasting out on Feb. 24, 1923, and was rewound. Since then it has given a good account of itself. This is a very unusual case.



The Pinion Can Be Removed with the Motor in Place by Means of This Puller

By way of contrast here are some average good records: No. 1,505,001 had no trouble recorded up to Jan. 17, 1921, when it was rewound and has caused no trouble since. No. 1,505,003 had a collector grounded Jan. 29, 1921, while No. 1,505,017 came in for a loose collector on May 5, 1923. No. 1,505,019 had to be rewound Jan. 15, 1920, but has had no attention since, while 1,505,021 was rewound Jan 20, 1920. No. 1,505,025 has caused no trouble since Dec. 1, 1919, when it had to be rewound. That is, this motor has been in extremely heavy service for three-and-a-half years without giving the slightest trouble.

Now for the stators: Of the 106 in service, no trouble has been reported for thirty-two since the record was started Sept. 1, 1919, nearly four years ago, and no winding work has been done on any of them.

A typical case of those on which work has been done is No. 1,505,002, which was rewound at Bluefield on April 26, 1920, on account of a short circuit between phase coils. On April 21, 1921, eight coils had to be repaired. Another typical case is that of No. 1,505,052, which on account of a broken shaft had its windings badly abraided, requiring the replacing of thirty-two top coils.

Next to the motor, the most important piece of electrical apparatus is the phase converter. This is of particular interest because it was a novel device when adopted for use on these locomotives. There are few troubles with the phase converters, and these few are being brought rapidly under control. In 1920 there were twenty-one troubles, in 1921 seventeen, and in 1922 eleven, or practically one-half the number two years earlier.

Grounding in the slots has been the principal phase converter trouble, but this has been reduced by the use of all-mica insulation, with special reinforcing at weak points.

Reverser trouble has been practically eliminated. The only serious difficulty was the breaking of the con-

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tact fingers, and this has been disposed of by a simple change in the design.

The water rheostats cause no maintenance difficulties. This cannot quite be said of the transformers, but out of a total of twenty-four transformers, only three a year, on the average, require repair.

Records Play an Important Part in Maintenance Work

An element in the reduction of maintenance cost on the N. & W. has been the careful recording of all equipment performance and close study of the records.

The general foreman keeps records of equipment troubles in day-book form. As the total number of units is not large, while the individual features of apparatus which are sources of trouble are of considerable size, it is possible to keep records of individual parts.

Each month the troubles for the different kinds of apparatus are posted up in detail, and the records of important pieces, such as phase converter stators, phase converter rotors, main motor stators, main motor rotors and transformers, are bound up independently. Records of dipping and baking are kept separately, as are also those of renewals of parts. Tabular summaries are also made of such items as application of crankpin bushings, rewinding of phase converters, etc.

Railway vs. Bus to Radio Audience

"Journal" Editor Gives Fifteen-Minute Talk from WJZ—Place of Railway and Bus Outlined for Layman

Upon invitation from the Radio Corporation of America, Harry L. Brown, editor ELECTRIC RAILWAY JOURNAL, gave a fifteen-minute talk from Broadcasting Station WJZ, Aeolian Hall, New York City, Aug. 11, on the subject, as announced, "Is the Street Railway a Back Number and Can the Bus Replace It?" With the limitations of a fifteen-minute period and the layman-type audience, it was necessary to eliminate all details and endeavor to establish only certain general impressions in the hearers' minds. The purpose was to leave the thoughts that the railway is not to disappear; that there is a proper place for both bus and railway, and that the public will be best served by keeping both forms of transportation under one management. As it was thought Mr. Brown's talk might carry a suggestion for possible use of railway men when confronted with the task of making a short talk on this live topic, it is published herewith.—EDITORS.

BECAUSE of the frequent agitation of the bus question in the newspapers in all parts of the country and the recent trolley strike in New Jersey, particularly, much attention has been focused on the "Battle of the Bus and the Street Car," as the situation is popularly conceived. Perhaps the radio audience may be interested in hearing a few thoughts dispassionately expressed on this lively contest. Every one of us should be interested in this controversy because we all have need to use transportation and because the whole business activity of any community is entirely dependent upon transportation. I want to say at the outset that there is a proper place for both the street railway and the bus, and then briefly outline for you where each can best serve.

We all want comfortable, fast service, and we want it at the lowest possible cost. Yet as good Americans we are willing to pay for what we get, including a reasonable profit. With these public requirements in mind, we then must answer the question of whether the bus will or can displace the street railway, by showing whether the bus can give more comfortable service, more rapid service, more economical service. Of course it is one thing for the bus to provide a little piece of the service, which it can often do well, and quite another story for it to furnish all the service, assuming the trolley were displaced.

In considering the relative comfort of the two vehicles, we must remember that the motor bus is by no means the equivalent of the private automobile. For hauling large numbers of people in the city it cannot be provided with deep-cushioned, roomy seats and light, flexible springs. It must be built to carry thirty people or so. This requires heavy springs and every possible saving of space within the limited body dimensions. Thus the aisle is narrow, the knee room between seats is short and the standing room available for use in getting the rush-hour crowds home is very limited. Then the bus is subject to all the irregularities of the pavement, which obviously cannot compare in smoothness, even when brand new, with the road of steel on which the street car runs. Furthermore, the street car can be built much larger with wider aisles and more generous seat spacing, making the movements of passengers within the vehicle much easier. Some present bus systems are operated on the basis of carrying no standing passengers, which is fine from the standpoint of comfort, but which could not be carried out on a fare as low as the trolley fare and could not possibly be adhered to in the rush hours under any fare, if the trolleys or other rail transportation were not available to carry the great bulk of the riders. So, this hope of greater comfort that we like to associate with the bus would be largely a disappointment if the bus were put into heavy city service to displace the street cars.

On the matter of speed, the bus can hardly equal the modern street car. The gasoline engine is inherently poor in supplying large overload starting power; that is why we have to favor it by shifting gears. The electric motor, on the other hand, will withstand enormous overloads temporarily, which makes possible a much more rapid get-away than with the bus. After it is under way, the street car can run at least as fast as the bus and do so with probably greater safety because of less likelihood of skidding and the ability to sand the rails in emergency, though the bus has the advantage of being able to change its course and possibly avoid collision that way.

Economy of Bus and Railway Compared

The most vital considerations in this matter are those of economy and the sheer ability of the bus to handle by itself the full transportation service. These are both entirely questions of the volume of traffic to be handled. When the number of passengers to be handled is so small as to require only one car every half hour or so, then it is more economical to give the service with buses than with street cars. But wherever the number of passengers to be handled requires that street cars be operated every ten minutes or oftener, then without question the service can be provided more cheaply with cars than buses. The point of this is that the cost of carrying the very much higher investment in the railway is offset by its lower operating cost, as compared to the bus, where there are enough passengers to require a car over the line, say, every ten minutes.

To illustrate, let me give you two or three figures

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comparing the investments and expenses for trolley and bus, with thirty minutes between cars or buses as one case and traffic such as would require a car every six minutes as another. On the thirty-minute basis, the investment required per mile of route is, for street cars, $70,600, and for buses, $5,800. The total annual cost of service, including interest and taxes and operating expenses, is $13,600 for the street car as against $10,800 for the bus. This is an annual saving in favor of the bus of $2,800 for each mile of route.

Now making the same comparison on the basis that the number of passengers to be hauled requires a car every six minutes, we find a totally different situation. The investment required per mile of route is, for the street cars, $283,000, and for the buses, $115,000. The total annual cost of service is $85,000 for the street car and $148,000 for the bus. This is an annual saving of $63,000 for each mile of route in favor of the street car. In other words, for this amount of riding, the cost of bus service is nearly double the cost of street car service. This may not seem to be borne out by the present rates of fare on buses and on street cars in some places, but the bus industry is so young and its accounting methods so undeveloped that one must look beyond the immediate situation to see what the relative fares will be when the bus becomes a settled institution and is bearing its fair share of all public burdens.

So I repeat that passengers now have to pay a fare just about half as high on the street car as would be the case with buses in moderately heavy city service. And of course we are all interested in having the lowest possible fare, unless, perchance, some of you may be like the Scotchman who was very happy when the street car company raised the fare, because he didn't have to walk so many times to save a quarter. The saving for the passengers in favor of the street car increases steadily as the space between cars narrows from ten minutes to six minutes or less. Thus the economy of the matter would indicate that there is not much likelihood of the bus replacing the street car, except on very light traffic lines.

From what has just been said it will be seen that there are some street car lines extending through sparsely settled communities that will gradually give way to the bus in the next few years as the present track and trolley and cars become worn out and must be replaced. It was possible to operate them economically a few years back when wages and materials cost about half what they do now, but present high costs are leaving insufficient net earnings to pay the investment charges and set aside a reserve for replacements. The bus can supply such light traffic services more economically.

Now, taking up the question of street congestion, if street cars were displaced by buses in average city service, three thirty-passenger buses would be required for each car displaced in order to transport the same number of people during the rush hour.

We can all imagine what it would mean to have three times as many vehicles for hauling the general public in addition to all the automobiles, taxis and motor trucks and wagons now using the streets. Even now the capacity of our main streets is so taxed that all vehicles are greatly slowed up. In fact, relief of traffic congestion is one of the foremost problems of the day. Hence when one considers the substitution of a form of transportation that would require three times as many units in the busiest hour as at present, there arises the serious question of whether it would be physically possible to get that many vehicles over the street without causing traffic jams that would so delay movement as to defeat the whole value of the bus.

A Place for Both Bus and Railway

From what has been said, it is evident that there is a place for the bus and a place for the street car. Each in its place can perform a service better than the other. Which means that they are natural allies and should not be competitors. As allies, both can make money; as competitors, neither will do well, and the public will be the loser. And here is where we, the public, have a vital interest in the coming of the bus. We do not want to have our present transportation facilities wrecked by competition, particularly when it seems apparent that the new form of transportation cannot perform as well the major service now being rendered by the railway. What we do want is to see our present facilities expanded, and that is where the bus comes in. In other words, the field of the bus is in supplementing the railway in sparsely settled territories and in supplying various kinds of auxiliary service such as a de luxe service guaranteeing a seat for every rider with, necessarily, a higher rate of fare for this special comfort.

Such co-ordination of bus and railway, to develop the most advantageous services for the public, can best be assured by keeping both forms of transportation under one management. This has been the policy followed in Toronto, Milwaukee, Baltimore, Connecticut, Rhode Island and elsewhere.

The railway companies have organizations trained and experienced in the work of mass transportation, and would thus seem to be the most logical people to supply this co-ordinated bus service. The bus people have nearly always been without organization and without financial means to do the task in a big way. One thing is sure. We cannot expect to have any very satisfactory bus service as long as it is supplied by a lot of individuals, with no capital and no particular responsibility, and banded together only by some loose agreement or governed only by such supervision as the state supplies. None of us can afford to put money in property improvements unless the transportation serving that community is of a permanent, dependable character. For these reasons, we should urge the existing transportation companies, that is, the street railways, to take up the bus as an adjunct to the railway, thus insuring the maximum service at the minimum cost to us who must pay the bill. That is all. Thank you.

Use the Rails and Save the Roads

AN ARGUMENT in favor of the use of the electric railway to prevent excessive road taxes is being advanced by the Buffalo & Lake Erie Traction Company. On the back of envelopes used by the company for general correspondence the following statement is printed:

> YOU PAY TAXES for STATE HIGHWAYS and their REPAIRS
> There is Adequate Electric Service
> ERIE to BUFFALO
> Ship Electric Travel Electric
> SAVE THE HIGHWAYS

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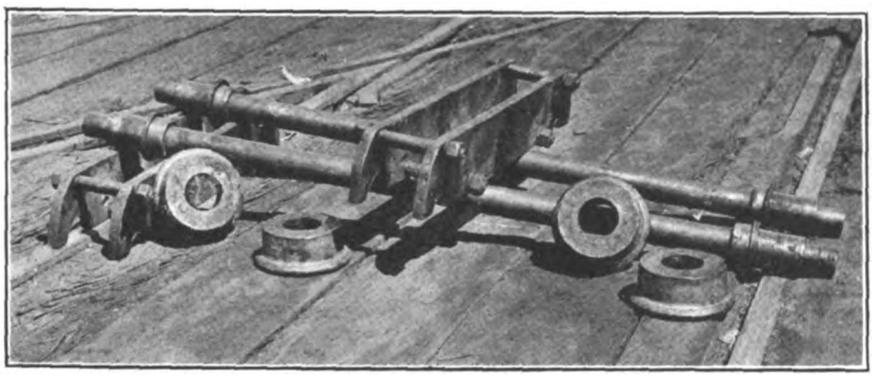
Equipment Maintenance Notes

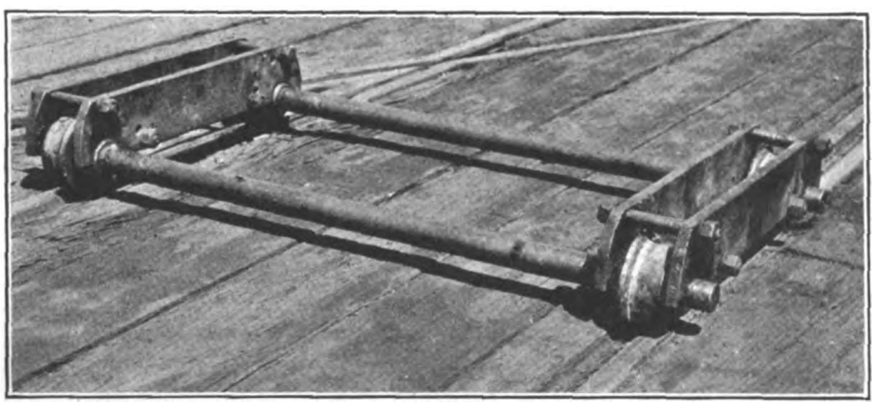
Dolly for Cars with Broken Axles

IN ORDER to provide a convenient means of bringing into the shop cars with broken axles, the British Columbia Electric Railway has built a device in its shop which has proved very effective. The device is made of very low construction, so that the truck in which the broken axle is located requires jacking up but a short distance in order to place the dolly underneath. With the device installed, the car can be operated to the shop under its own power The dolly parts can be readily put in an automobile in emergency, rushed to the location of the breakdown and assembled directly under the broken axle.

The accompanying illustrations show the dolly assembled, ready for service, and also taken down for transportation. No bolts or screws are used in assembling the various parts, and the weight of the truck, when once placed, holds the dolly together firmly. Four bolts in each of the side frames of the dolly are located so as to form a cradle on which the wheels of the broken axle can rest. The two axles of the dolly are made of cold rolled steel shafting, as it was found that a substantial high grade material was necessary should the equipment strike high spots in the pavement.

The axles are fitted with bosses which fit just inside the frame. These prevent the wheels from coming off. These bosses are shrunk onto the axles. The wheels used are about 8 in. in diameter and are turned down from old locomotive pinions. They have brass bushings for bearings. This type of dolly has been found entirely satisfactory in taking switches. All the emergency trucks of the company are equipped with these dollies, and a spare axle is also carried in case of damage due to striking high pavement. With this arrangement, cars with broken axles have been brought into the shop with less than a half hour delay.





Dolly Used in Vancouver, B. C., for Bringing Cars with Broken Axles Into the Shop
Above, dolly taken apart. Below, ready for service

Testing Multiple-Unit Control Jumpers

CONTROL jumpers used between cars with multiple-unit equipment are particularly subject to open circuits, short circuits and grounds, due to the constant bending and vibration of the cables. Sometimes a portion of the strands of a cable will break, and although the remainder of the wires will carry a small amount of current and show a complete circuit when tested, they will overheat and cause a failure in service. To guard against this an apparatus has been devised in the Wilson Avenue shops of the Chicago Elevated Railroad for testing the seven-conductor control jumpers.

The jumper to be tested is plugged in two receptacles which are mounted in convenient position beneath the operator's bench, as shown in the illustration. The leads from the receptacles are wired so that the separate conductors of the cable under test will be in series. Testing current is supplied from a 4-volt, 500-amp.-hr. storage battery, and the circuit is completed through an ammeter.

With a new jumper, having fresh cable and new terminals, a reading of approximately 90 amp. will be obtained. This may be taken as a standard. A lower reading will indicate broken strands in one or more of the conductors, or a faulty contact between the jumper terminals and the receptacle. If several strands of a conductor are broken the current flowing will cause the jumper to overheat at that particular point. The 4-volt current will not, however, arc over a break in the conductor and give a false indication as would the 600-volt circuit used previously.

Grounds and shorts are tested for with one of the receptacles shown in the cabinet above the ammeter. One of the prongs is grounded, while the others are connected to the 600-volt trolley circuit. By rotating the jumper sockets, a difference of potential of 600 volts may be established between any of the conductors in the cable. A short-circuit will be indicated by the lighting of the lamp bank at the right of the cabinet.

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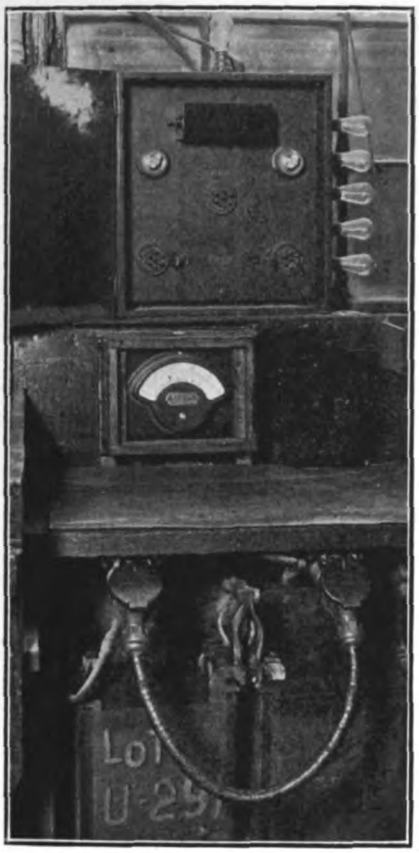


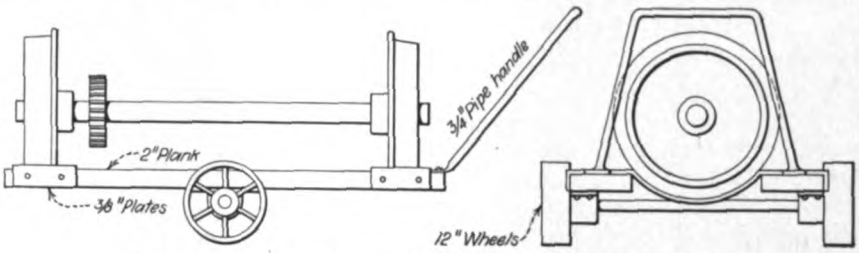
Faults in Control Jumpers Are Found Quickly by This Equipment

Another receptacle indicates shorts between the conductors and the socket shell. A clip touching the shell is grounded, and the receptacles for the conductors connected to the 600-volt circuit. Lighting of the lamps in this case indicates a short between the shell and the conductors. Open circuits are indicated in a similar manner by connecting the jumper to the lower receptacle. In this case a failure of the lamps to light indicates the conductor in which the open has occurred.

Since the installation of this testing apparatus the time of testing has been cut down, and the work has been done much more efficiently, so that failures in service due to this branch of the control system have been reduced materially.

Wheel Wagon Used in Spokane

THE accompanying illustration shows a wagon used in the shops of the Spokane United Railways for moving wheels from one operation to the next. The floor of the machine shop is made of cedar blocks and there are no rails in the floor of the machine shop where the wheel work is done.



Convenient Wheel Wagon Used by Spokane United Railways

The wheel wagon is made with an iron and wood framework and has but two wheels. The axle is located in the center of the wagon so as to balance the load. The wheels are loaded from the side, and the strap-iron cross-pieces which support the wheels are made in the form of a cradle so that there is no tendency

Checking Up on Trolley Breaks

General Manager Decides that It Is Better to Remove Trolley Wire Before It Is Dangerously Worn than Take a Chance of Serious Delays from Breaks

"I HOPE it's nothing serious," said William Redfield, general manager of the Jinxville Electric Railway, to Gainway, the general superintendent, as they hurried downtown one evening recently to investigate a reported tie-up of service in the center of town. "There has been too much of this sort of thing lately and we've got to get at the root of the trouble."

"Our big trouble now, chief, is with trolley wire breaks. There seems to be a regular epidemic of them. It seems as if every time we get some special rush on, our trolley wire breaks in the most unfortunate place."

"If that's so I'll get after John O'Neill. John is pretty new yet at our overhead work. I'm not sure he is quite on to his job."

"Well, give him a chance, boss, he's had lots of experience on other roads and probably will find himself here soon."

"I like your spirit, Bill, but results are what we're after, you know. There's a limit to good nature, and I'm kind of reaching it in these frequent delays."

"John has had a bad mess on his hands, but there's this to his credit: he is not afraid to get out and help his men make repairs under any conditions. He is out on this trouble now."

"We'll wait here until he's through," said the G. M., "and have a talk with him. Here he comes now, I'll ask him a few questions."

"You're having hard luck tonight, John, old man," said Redfield. "It seems to me we're having more trolley breaks than we ought to. What's the trouble?"

"I guess our trolley wire is pretty well worn out," said O'Neill, "or it wouldn't be breaking so often."

"How do you know when it is reaching the limit, John?" asked Redfield.

"Oh, I just kind of size it up with my eye; of course, if I get too many breaks then I know it's wearing out."

"But it's too late then, John. Do you realize what a serious thing a broken trolley wire may be?"

"Yes, I think I do," said O'Neill, "but I hate to take down good wire when there's still some life in it."

"You ought to have a rule, somehow, that would enable you to replace the wire in time to prevent these nasty breaks. I think there's an instrument that some railways use now that indicates when the wear is too far gone, isn't there?"

"I guess you mean the Wireograph. I've heard of it," said O'Neill.

"How about using alloy wire in some of these important sections. Wouldn't that pay us, John?"

"Yes, I think it would. And there's another thing that would help us, Mr. Redfield, in this matter, and that is if we could eliminate these bad trolley wheels that get lopsided and burn the wire. At least some of this trouble is up to the shop, I think."

"I don't doubt that," said Redfield, "but you're in charge of the overhead, and it's up to you to keep the trolley wire up. We can't afford to have these frequent interruptions."

Turning to Gainway, Mr. Redfield said: "Bill, I see plainly that this is a co-operative matter. Your job is to keep the cars running; John's is to see that the cars are supplied with power, and the shop must have the equipment in good shape. Suppose you fellows get together somehow and work out some kind of a plan for closer co-operation and bring it to me the first thing tomorrow morning. Then I want some definite recommendations as to what to do to get this trouble under control. We will buy new wire, instruments, or anything to help it, but we must stop these trolley breaks."

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for the wheels to roll off the wagon. These plates are ⅜ in. thick. The side frames are of 2-in. planking. The end of the wagon is fitted with a ¾-in. pipe handle which is brought up at an angle to a convenient height for moving the wagon. The wheels are 12 in. in diameter.

Satisfactory Home-Made Wheel Grinder

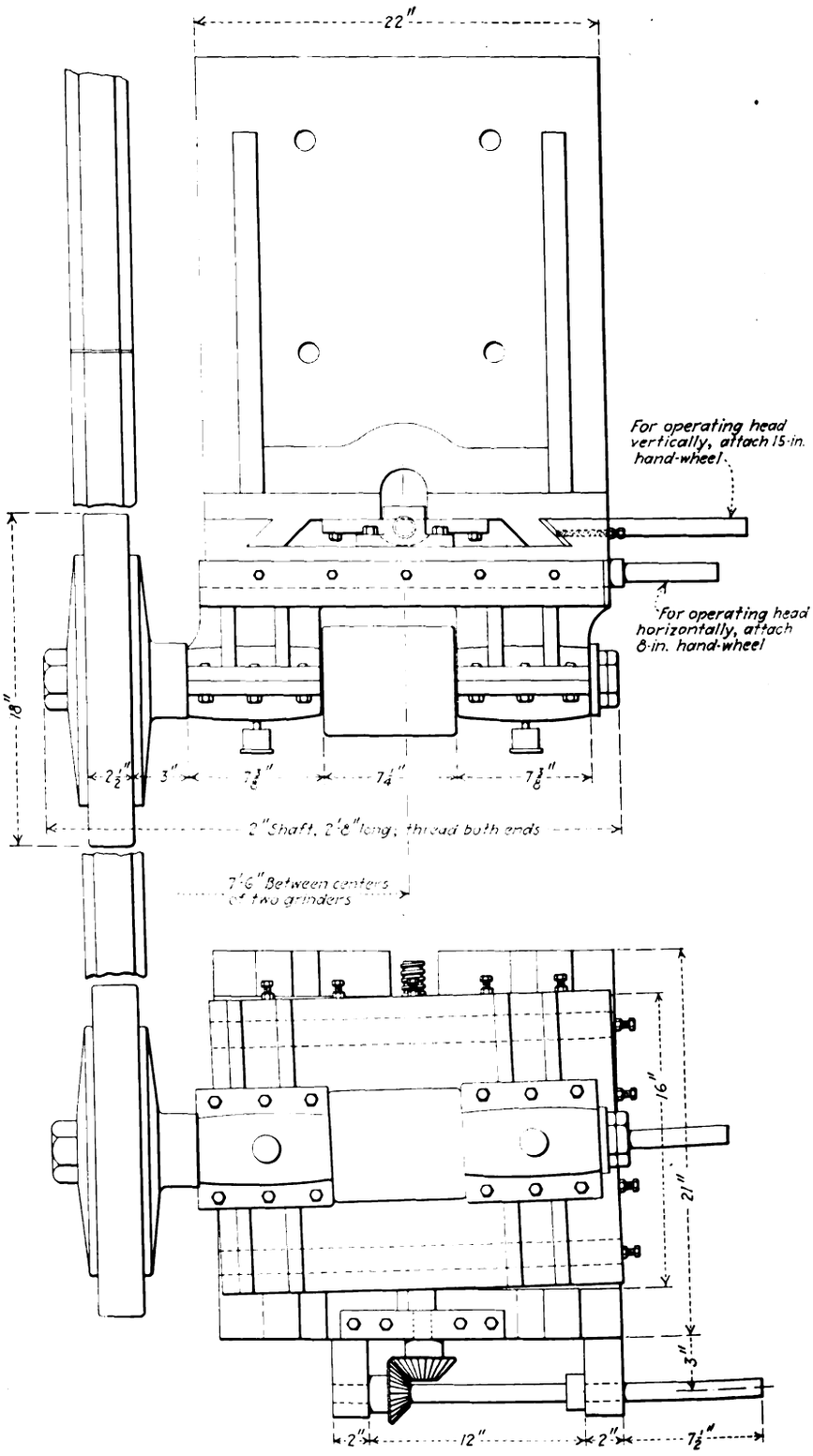
A WHEEL grinder installed in the carhouse at Tacoma, Wash., in 1912 according to designs prepared by the company's engineering department has not required any material changes or replacements to date and is still rendering regular and effective service. The arrangement, as shown in the accompanying drawings, involves separate mountings for each grinding wheel and hence no shaft extends across the pit at the grinding wheel level. This gives free access to the underside of the trucks and allows accurate adjustment of each grinding wheel separately. The design proved so satisfactory that other electric railways of the Northwest have secured copies of the plans and have made similar installations.

By using a pair of 10-ft. belt drives between the common driving shaft and the grinding wheels the shaft is kept back out of the way and down at a desirably low level. The motor, which also operates a belt drive, is still farther back and is well clear of the grinding dust. The I-beam which ties together the two concrete pedestals on which the grinding wheels rest is bonded into the central concrete pier on which are placed the jacks that raise the motor and with it the wheels to be ground. Before grinding begins other jacks are set between the floor of the carhouse and the body of the car to minimize vibration.

The grinding wheels are of carborundum, 18 in. in diameter and 2½ in. wide. They are operated at a constant speed of 1,800 r.p.m., and by the use of the motor on the car axle, the wheels being ground are turned in the reverse direction, first at the rate of about 50 r.p.m., increasing to about 200 r.p.m. as the work is well under way. The operator controls the speed of the car motor through a K-type controller and resistance mounted in the pit.

The grinding wheels are mounted on the vertical portion of a bedplate made of 1½-in. cast iron and shaped like a section of angle-iron. The mounting of the bedplate is off the vertical on an incline of one in twenty-five so as to give the desired inclination to the face of the wheel tread. By means of hand wheels and worm gears on the bedplate, the grinding wheels are moved up and down or right and left. Access to the wheels to be ground from below is afforded by making a 3-ft. section of each rail removable when the wheels are lifted from it by the jacks. It is then only necessary to raise the grinding wheels and start operations.

The dust accumulating under the grinding machine is in great demand as a fertilizer among employees who have gardens, particularly those who specialize on roses.



Wheel Grinder Used by Puget Sound Electric Railway. Each Grinding Wheel Has Separate Mounting and No Shafting Extends Across the Pit

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Grinding Compressor Cylinders in New Haven

THE work of grinding the cylinders of the air compressors of its cars is performed by the Connecticut Company at its reclamation shop in New Haven. For this service the company put in about a year ago a grinder made by the Heald Machine Company, Worcester, Mass. The practice with this grinder is first to grind the cylinders to 5 in. in diameter, next to grind them to $\frac{1}{16}$-in. oversize and the next time to $\frac{1}{8}$-in. oversize. The third time the cylinders need boring, they are bored out for the installation of $\frac{3}{8}$-in. wall bushings.

The same machine is used to very good advantage in grinding engineer's valves.

New Equipment Available

New Device for Heat Treating Metals

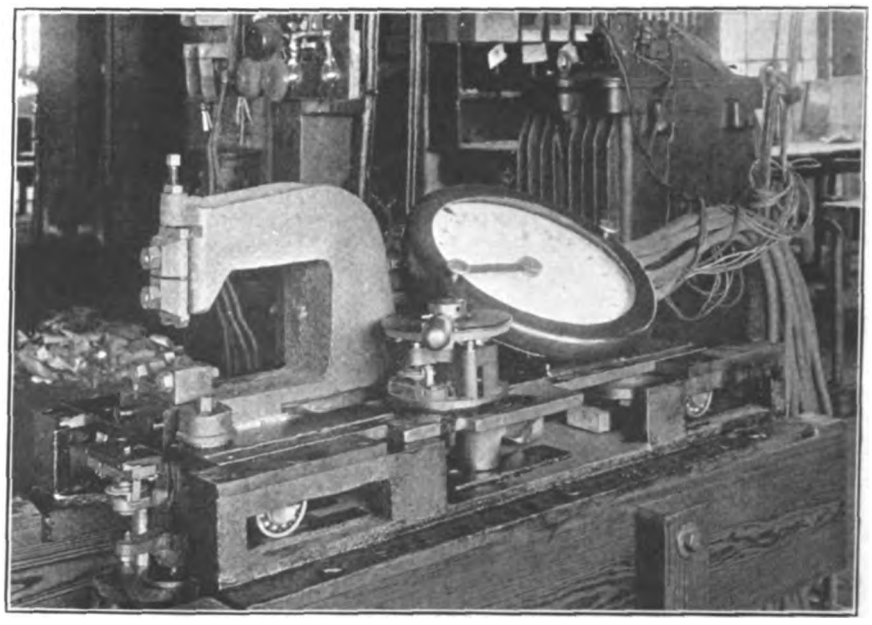
Greater Speed in the Process and a More Uniform Product Are the Advantages Claimed for a New Electrical Method

APPARATUS recently put on the market by Snead & Company, Jersey City, N. J., for heat treating metal is claimed to have several advantages over furnaces customarily used for such work. Fundamentally the process consists of passing an electric current through the metal to be treated, the electrical resistance of the material causing the current to produce sufficient heat to bring the metal to the required temperature. This process is particularly applicable to pieces having a uniform cross-section and considerable length. It is equally effective for normalizing or tempering steel and for annealing non-ferrous metals.

The piece to be treated is placed between the jaws shown in the accompanying illustrations. These jaws, which are operated by electro-magnets, are electrically insulated from the rest of the machine and connected to the secondary of a transformer. After the piece is placed in position the jaws are clamped by throwing a handle controlling the electro-magnets. The heating current, supplied from a stepdown transformer, is passed through the circuit formed by the jaws and the piece itself, connection being made by a remote-control switch.

The carriage at the right is free to move horizontally as the piece of metal expands upon being heated. The expansion of the metal and the movement of the carriage is translated to the pointer of the dial. This dial is calibrated in a manner corresponding to expansion tables for various metals and alloys and is equipped with a movable contact. The contact may be placed in any position corresponding to the temperature desired for the piece being treated. When the pointer reaches this contact an electrical circuit is made which rings a bell and automatically disconnects the main circuit from the piece of metal.

After the rod has attained the proper temperature and the current has been shut off in the manner already described the jaws may be opened by simple movement of a lever and the piece may then be rolled sideways into a bath of water, if it is to be tempered, or may be simply rolled to one side if it is being drawn or annealed. A treadle returns the movable head to its zero position.



The Adjustable Carriage Moves on Roller Bearings

An interesting feature of this process is the fact that the critical temperature of steel need not be known beforehand as it is automatically indicated by the motion of the pointer, which not only ceases to advance but moves backward and then advances again as the metal passes through the transformation period.

For certain types of work this method possesses many advantages. The piece may be heated very quickly, usually in less than one minute. It may serve as a means of inspection because any variation in the section of the metal will be shown up by uneven heating. The chief advantages, however, are freedom from scaling, the uniform quality of the product, and the simplicity and speed of the treatment. The ultimate tensile strength of steel heated by this method has been found to be considerably greater than that treated by the ordinary methods as the material is not exposed to the action of deleterious furnace gases.

The matter of cost is an important one, and with this method, as with all others using large quantities of electrical energy, the price of the current is a major item. However, with this equipment it is possible to obtain a high degree of efficiency, due largely to the fact that the machine has a small thermal capacity. Nearly all the energy used goes to heat the piece itself. Practically the only losses to be contended with, aside from those of the transformer and the conductors, are due to radiation from the piece under treatment and since the time is very

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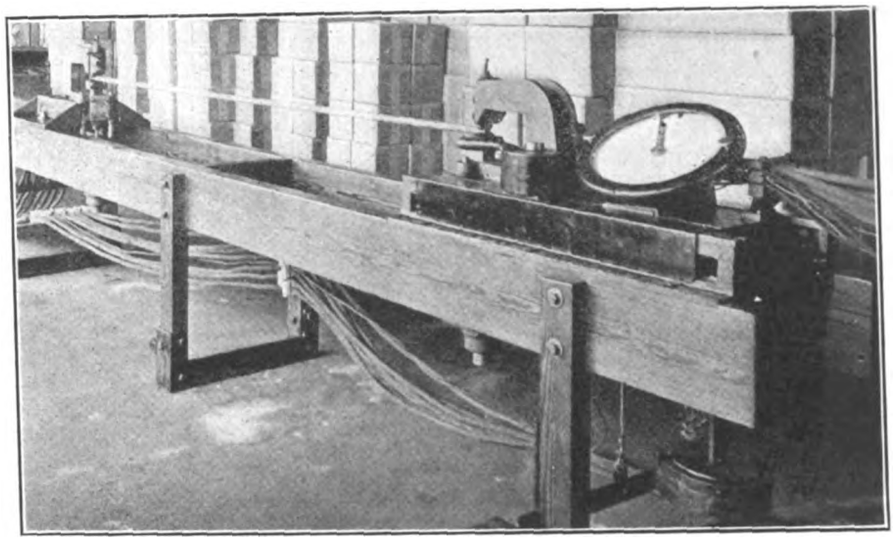


The Left-Hand Jaw May Be Moved to Accommodate Rods of Different Lengths

short these losses are comparatively small.

For the heating of steel through the critical range approximately 0.1 kw.-hr. is required per pound of material. At the usual commercial rate for electric power the process will compare favorably with the ordinary furnace method on an over-all cost basis. This is even more true where the work is put through in small lots at irregular intervals. There are no stand-by losses, the machine being put into service and taken out of service with all the ease and economy of an electric motor. The apparatus can be operated by comparatively unskilled labor and the working conditions are favorable, the process being clean and free from objectionable gases and excessive heat.

Although the proper heating would not normally extend to the extremities of the rod due to the method of gripping the piece at the ends, this difficulty has been overcome by heating the jaws, and satisfactory annealing of brass tubes to within $\frac{3}{16}$ in. of the ends has been accomplished. Successful heat treating of steel has been done for the automobile and aircraft industries. Annealing non-ferrous metals, such as brass condenser tubes, has been similarly satisfactory.

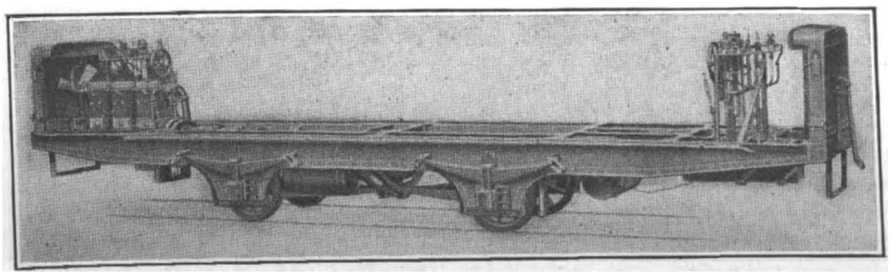
Rustproof Rule

THE Brown & Sharpe Manufacturing Company, Providence, R. I., has just placed a new stainless steel rule on the market. The material in this rule is rustproof and will not stain or discolor. As it retains its bright finish, the difficulty experienced in reading graduations on rules that have become rusty or blackened from use is eliminated. The rule is made in 6-in. and 12-in. sizes, and is graduated in $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$ and $\frac{1}{64}$ in.

Gasoline Motor Car for Tramways

A GASOLINE motor car for tramways has been brought out by the Allgemeine Elektricitäts Gesellschaft of Berlin. It is one of a series of five cars, running in weight from 9.1 metric tons to 21 metric tons, and designed for street railways, interurban lines and trunk-line railroads. The tramway car is the lightest in the series, has seats for twenty-four passengers, weighs 836 lb. per seat and is equipped with a 50-hp. motor.

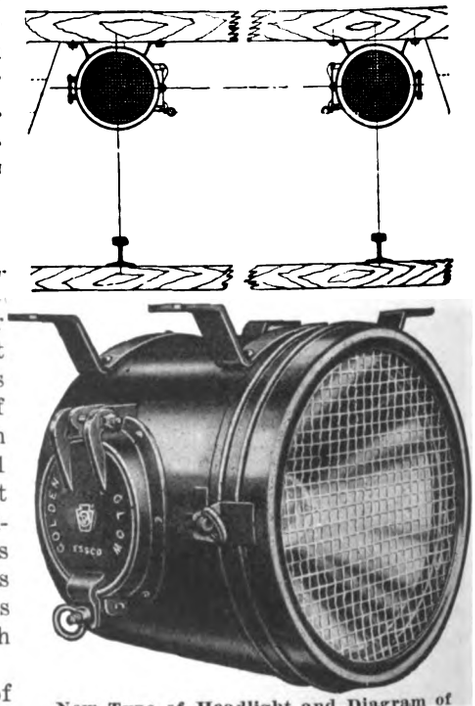
Two of these cars with a gage of 1,067 mm. (3 ft. 6 in.) have been built for the Quito Tramway Company in Ecuador. They seat twenty-five passengers and have a weight of 11.6 metric tons. A view of the chassis is shown in the accompanying illustration. As will be noted the car is double ended and has a radiator and control at each end. Owing to the severe grades both axles are driven.



Chassis of Gasoline Car for Quito

Headlight Designed for Platform Suspension

AN INSPECTION car type of headlight, which uses the "Golden Glow" type of reflector, has just been placed on the market by the Electric Service Supplies Company, Philadelphia, Pa. This headlight is designed for suspension from the inspection car platform in a location over the center of each rail, as shown in the accompanying diagram. By training each beam of light along its rail very complete illumination is secured of the entire roadbed, so that detailed inspection of track conditions can be made at night. These headlights are fitted with extra front door rings having



New Type of Headlight and Diagram of Platform Construction

heavy wire screen to protect the front glass and reflector from breakage. This outer screen door can be opened independently of the inner door, thus permitting the cleaning of the front glass. This method of suspending headlights from the platform has been found desirable because the eyes of the observer do not need to penetrate the beam to such an extent as when the lights are installed on the car roof or railing.

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Association News & Discussions

Air-Brake Maintenance on the San Francisco & Sacramento Railroad*

An Analysis of the Cost of Maintaining Air Brakes on Cars, Divided in Work Necessary on Pipes, Valves, Etc.

BY F. A. MILLER
Superintendent of Power and Equipment,
San Francisco & Sacramento Railroad, Oakland, Cal.

THE San Francisco & Sacramento Railroad operates between San Francisco and Sacramento, a distance of 91 miles. At Sacramento it connects with the Sacramento Northern Railway, which runs 90 miles further north to Chico, through cars being operated from Oakland to Chico. Standard steam-road rules and practices are used throughout and all motormen are experienced steam engineers before entering this service.

Motor, trail, observation, and dining cars are used. Motor cars are equipped with four 120-hp. motors, operated on 1,200 volts. Double end AMM air brake equipment with M-24-A brake valves are used with 14-in. cylinders and automatic slack adjusters. Trail cars are equipped with controllers and brake valves, which provide a very convenient arrangement as it permits them being added at any point in the train.

Each motor car has two dynamotor compressors of 25 ft. capacity which also provide 600 volts for control circuits and lights when operating on 1,200 volts. Each dynamotor compressor has a constant running armature and the compressor section is connected and disconnected during its operating period by means of a multiple-disk clutch, pneumat cally operated.

In the maintenance of foundation brake gear, all level holes and links have case-hardened bushings and all truck brake rigging has case-hardened shoulder bolts with nuts and cotter keys. All brake adjusting bars are of the bolt and pin type, no turnbuckles being used. Air hose on the ends of cars have steel armor 8 in. up from the lower end to prevent wear by chafing. Hand brakes have independent levers and rods which run to the truck equalizer so that if a brake rod should break the hand brake would still be effective.

Main reservoirs are equipped with automatic drain valves and empty themselves whenever pressure goes below 8 lb. This feature has reduced the maintenance considerably as this water causes a great deal of trouble in the equipment. Dynamotor compressors have extra large strainers to prevent suction of oil by packing rings. Brake cylinders are equipped with composition packings, no expanders being used.

The tracks have many curves and there is 20 miles of 2 per cent grade and a maximum of 4.6 per cent. This maximum grade is in a very critical position as it ends in the streets of the city of Oakland. Trains of two to six cars are operated in the through service, the number being limited by the use of a ferry boat in the middle of the line which has a capacity of but six cars. The maximum combination which has been used is sixteen cars; ten to fourteen cars being quite regularly used on Sundays and holidays. In order to perform this service there are long braking periods; and braking percentages of 118 on motors and 100 on trailers at 50-lb. equalization are used.

In making up trains, regular terminal tests are made by terminal men from the rear ends of trains. Train crews are required to make running tests after leaving the terminal and at the tops of the grades. Terminal tests are required from the rear end each time cars are put on or cut off.

Terminal men are required to look after the changing of brake-shoes and the adjustment of brakes. They also repair defects reported by trainmen if they are able to care for them. If not, they are reported to the shop and an air-brake man is sent out. Terminal or shop men are not permitted to mark reports O.K. but must show the trouble found, if any, and the repairs made and sign the same with their initials. Where trains are delayed due to defects of an electrical or mechanical nature, separate cards known as trouble reports are required and these show the cause of the trouble as well as the repairs made.

Cars are inspected on a 2,500-mile basis. General overhauling takes place each year and at this time the main reservoirs are subjected to a hydrostatic test of 150 lb.

The mileage made by these cars during the past five years was 7,845,642, and 871,173 passenger car-miles were made for each time a train arrived at a terminal late due to a delay caused by air-brake equipment, or had one of these defects while in service. The maintenance costs for this five-year period were $0.0015 per car-mile, the inspection costs being $0.0002 per car-mile.

The distribution of these costs was as follows:

	Per Cent
Hand brakes	5.4
Train stop	3.0
Train application valves	0.79
Air hose	13.6
Brake valves	5.4
Triple valves	5.7
Double check valves	4.8
Feed valves	5.1
Air piping	45.6
Governors	7.7
Double cut-out	2.6
Angle cock	1.1

It will be noticed from this that approximately 50 per cent of the maintenance was for repairs to piping. As each of these cars has between 400 and 500 ft. of piping together with the necessary fitting, it can readily be seen that the most important maintenance feature is the piping.

*Abstract of paper presented before the Pacific Railway Club, June 14, 1923.

World Power Conference in London

A WORLD power conference, initiated by the British Electrical and Allied Manufacturers' Association, but participated in by many technical and scientific institutions in Great Britain and other countries, will be held in London in July, 1924. The announced purpose of the conference will be to consider how the industrial and scientific sources of power may be adjusted nationally and internationally. The president of the conference is the Earl of Derby, president of the British Electrical and Allied Manufacturers' Association, and the vice-presidents and grand council include many prominent engineers and scientists. There will be four sections of the conference, as follows: (1) Power resources; (2) power development; (3) power applications; (4) power, economic and financial.

In response to invitation for American participation, some twenty American engineering, technical and industrial organizations have appointed representatives to a committee of arrangements, which has planned an organization to represent American interests in this conference. The honorary chairman is John W. Weeks, Secretary of War and chairman of the Federal Power Commission, and the general chairman is O. C. Merrill, executive secretary of the Federal Power Commission, who is now in London gathering information as to the scope and details of the participation of America.

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The News of the Industry

Detroit Arbitration Progressing

Increase Asked by Municipal Railway Men Would Add $2,250,000 to Annual Pay Roll

Many interesting points are being brought out before the arbitrators in the wage dispute between the Department of Street Railways in Detroit and the municipal platform employees.

Ross Schram, assistant general manager of the municipal system, told the arbitrators that the increase asked by the platform men, of whom there are about 3,200, will add $2,250,000 annually to the cost of operating the railway.

The first session was marked by the disagreement between W. D. Mahon, president of the amalgamated, and Mr. Schram relative to the significance to be attached to a resolution adopted by the commission on Feb. 7, outlining wage scales and working conditions for the platform men. The men, through their international president, stated their desire that it be clearly set forth at the beginning just what the terms of arbitration were to be. The resolution of Feb. 7 is regarded by the men as a contract. According to Ross Schram this necessitates referring the whole matter back to the commission.

Testimony of employees brought out the fact that the earnings run from $36 to $42 a week under present conditions working seven days a week. It was cited that the department had granted vacations of one week with pay at $5 a day to all employees of six months service and over and had established the eight-hour basis voluntarily, but had withdrawn free caps, tickets and extra time for checking in that had been previously allowed. It was further brought out that only men in full uniform ride free. Testimony was to the effect that the men preferred the vacations with pay to an increased wage equivalent to the vacation money now allowed voluntarily.

The men are asking $5.60 a day for eight hours for the first six months for motormen and conductors and $6 for eight hours for operators of one-man cars for the same period; $5.80 for eight hours for regular men and $6.20 for one-man car operators during the next six months of service; $6 for regular men and $6.40 for one-man car operators for eight hours service after twelve months employment. Other demands include 90 cents an hour for overtime on week days and $1 on Sundays and holidays instead of the 75 cents an hour received under the present wage scale. In general the increase asked is about 20 per cent. It is also asked that 50 per cent of week-day runs be completed within eleven consecutive hours, not more than 15 per cent over thirteen hours and the remainder under thirteen hours.

It is contended that the wages asked by the men are lower than the prevailing scale for other workmen whose craft requiries less skill.

The men want the wage scale as fixed by the arbitrators now considering the wage and other questions to be retroactive to last May 1.

New Jersey Company Ordered to Restore Service

Commission Indicates Disappointment at Outcome of Public Hearing at Which Railway Stated that a Comprehensive Plan of Settlement Would Be Forthcoming Shortly—Board Considers Company's Attitude Indefensible

COURT action was taken on Aug. 17 looking toward termination of the suspension of service by the Public Service Railway of New Jersey on account of the strike on its lines. On that day Supreme Court Justice Gummere at Newark granted a writ of mandamus on the application of the Board of Public Utility Commissioners to compel the company to obey the board's order to restore service. The alternative writ says that the company shall obey the order or certify to the court why it does not obey. The return under the court ruling is to be made within ten days of the service of the order. It was expected that the order would be certified Aug. 17 and served immediately. This action by the commission before the court followed the failure of the railway to restore service on the morning of Aug. 17, after the commission had served an order of its own on the railway on Aug. 15 requiring the company to start up again.

Service on the lines having been suspended for a period of nine days the Board of Public Utility Commissioners late on Aug. 9 ordered a hearing on Aug. 14 in Newark on the question "whether the company is complying with the laws of the state and the municipal ordinances relating thereto, and conforming to the duties imposed upon it thereby * * * and whether the company is furnishing safe, adequate and proper service and keeping and maintaining its equipment in such condition as to enable it to do so." Municipalities and other interested parties were afforded an opportunity to be heard at that time.

So far as the commission is concerned the outcome of the hearing was plainly disappointing. E. W. Wakelee, vice-president, who represented the company, announced that the officers were working on a plan which would involve a comprehensive proposition for the settlement of the difficulties confronting the company, of which the differences with the employees is only one, and that this would be submitted at an early date. He stated in short that pending the development and consideration of this plan resumption of service would be impossible. He also admitted that since the strike began no attempt had been made by the companies to adjust their differences with their employees.

The commission's formal decision states that the company's position appears to its members to be that the company will develop a plan embodying its ideas as to what would be a solution of competitive traffic conditions; of the differences with its employees, and of other difficulties confronting the company. As the commission sees it the company apparently does not intend to operate if the details of this plan are not acceptable to the public, the railway employees and others interested. In the view of the commission a position such as this is not only indefensible but in violation of the laws of the state. The commission states further that the utility is not relieved of its duty to supply a continuous service "when it suspends service with the announced intention of making no effort to resume it except under conditions acceptable to the utility." In consequence the board indicated at the conclusion of the hearing that it would issue an order calling upon the company to restore service on Aug. 17. This it did as previously indicated in an order formally served on the company on Aug. 15 supplemented with a warning that that board had instructed its counsel to apply for a writ of mandamus.

This in brief is the recital of the events leading up to the statement made at the start of this story, to the effect that court action by the board was impending. As for the events at the public hearing the session was a lively one. More than 140 municipalities are suffer-

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ing more or less on account of the suspension of service, and the attendance of opponents and proponents of one side or the other to the controversy was so great that the hearing room of the commission was found to be entirely too small to accommodate the crowd and adjournment had to be taken to quarters in the Chamber of Commerce Building.

The hearing was presided over by Judge Harry V. Osborne. After reading the call for the hearing he called on E. W. Wakelee vice-president of the company for an answer. Mr. Wakelee stated that the company was not unmindful of the seriousness of the situation. The company recognized that the board had great power in such an emergency as the present. The problem, however, was much bigger than the mere question of the wages to be paid the trainmen. It must be settled in the interests of the public of New Jersey. The question was, Do the people of New Jersey need or want the service of the trolley company? If they do, the situation must be adjusted so that the company would be permitted to live. The railway was considering carefully the letter sent to it by the commission. The company recognized its duty in the case. It had experts in every department ready to act. A plan for settlement of the present difficulty was being prepared and the company expected to present it to the board in a very short time. Mr. Wakelee was sure that this plan in its fairness would meet the demands of the public.

Mr. Osborne said that the trouble with the company's position was that it was too indefinite. There was nothing to show when the company intended to resume, or even if it intended to resume at all.

Mr. Wakelee stated that while the company had not employed strikebreakers, the plan proposed included the operation of cars.

Mr. Osborne stated that the company had not tried to find out if the men had changed their views and had made no offer to them. He asked what the company had done toward a resumption of service.

Company Promises Plan Soon

Mr. Wakelee replied that the plan to be made public soon was a move toward resumption of service, as also were the company's conferences with the board. Mr. Osborne stated that this was not a satisfactory answer. He asked if the company was in a position to state when it would resume service.

Mr. Wakelee stated that it was not.

Judge Osborne then asked what the company had done to end the strike.

Mr. Wakelee replied that he had conferred with Mr. Osborne, and had worked on a plan.

Mr. Osborne then stated that the company had not followed the recommendation in his own proposition that it confer with the men, and asked if the plan proposed by the company contemplated no resumption of service until the matter was worked out in detail by it.

Mr. Wakelee replied that he could not say as to this, and did not think he should be catechised until the plan was ready for presentation. He said the board might order the impossible, which he felt the resumption of service now and under present conditions would be.

Representatives of the public were then permitted to be heard.

Views of Public Representatives as Given at Hearing

Thomas J. Grogan, corporation counsel of Jersey City, stated that his city was not served adequately now, and that if trolley service was not resumed arrangements would have to be made to secure some other means of transportation. He recommended that the board order resumption of service at once.

Commissioner Raymond of Newark said that the city was ready to support the board in any step leading to a solution of the problem, but he felt that the time had come for immediate action by the commission. No threats seemed to terrify the company.

City Counsel Ellis of East Orange suggested service be restored immediately for a week or ten days at the increased rate demanded by the men until the company's plan is ready.

The City Counsel of Paterson stated that the public in his city were satisfied with the jitney service. So far as Paterson was concerned residents there did not care whether the trolleys ever resumed.

George F. Seymour, Jr., representing the bus owners of Essex County, stated that in his opinion the railway thought the buses could not carry the business. If the company did not resume he stated his association was ready to shoulder the load. The added buses were now operated by emergency men who have free licenses for fifteen days. If the strike continued after Aug. 15 the Newark bus owners would have to pay for licenses, insurance, etc., for the temporary men and guarantee them receipts. In a sense they thus were being made the goats in the situation.

George L. Record, representing the state bus association and the bus owners of Hudson County, believed that the ulterior motives of the company were to get a 10-cent fare and to drive out the jitneys. He maintained that the company had not lived up to its obligations, and had not provided for the growth of population in the territory it served. He also believed that trolley service in general was breaking down, and that ultimately it would give way to the bus.

A representative of the Elizabeth bus owners' association stated that the people in his city were satisfied with jitney service, and that the buses were carrying the people "nobly well." From Camden it was reported there was a rush in the afternoon lasting about forty minutes when service by bus was inadequate, but otherwise the service was good.

John S. DeHart, Jr., chairman of the Maplewood Township committee, stated that just prior to the strike the township was ready to sign a contract with the railway to pave streets at a cost of about $25,000. The company has about 3 miles of track in the town. If the company did not do the paving the town would be forced to pay for it. Public Service in 1922 paid $30,000 for taxes, licenses, etc., while the most liberal estimate he could make for the payments from buses was about $1,800. The question was what the costs to the community would be with the two forms of transportation put on an equal footing.

A representative of the city of Passaic stated that the jitneys were handling the business there adequately and that residents there did not care whether the Public Service ever resumed.

Lucius T. Russell, publisher of the Newark Ledger, asked if the thing to do would not be for the company to try to get into the good graces of the public by giving service. He could not see the wisdom of the company trying to hold a club over the heads of the public, as people do not negotiate fairly in this manner. It may be that the company cannot continue to do business under the present conditions, but no one believed that the company could not resume service, at least temporarily.

Mayor Folsom of Irvington said that business there was beginning to be affected by the strike. Business men wanted the strike settled. He thought if the company would meet the men half way the two could be brought together.

Mayor Breidenbach of Newark said that he did not think any one man should be in a position where he could shut down transportation in a city the size of Newark. He had invited Mr. McCarter to join conferences at his office with the men before the strike was declared, but Mr. McCarter had turned aside these opportunities. As Mayor of the city he resented that attitude. He felt that the first duty of the board was to set the trolleys moving again.

Chairman Osborne asked Mr. Wakelee if he had experienced any change of sentiment following the expressions of opinion at the hearing. Upon Mr. Wakelee's answer that he had not, Mr. Osborne asked if he had any reason to advance why long-term licenses should not be given the jitneys. Mr. Wakelee was non-committal.

As stated previously, Mr. Osborne, after conferring with the other members of the board, stated that the paramount question was the resumption of railway service. Unless it was resumed forthwith the board would act in accordance with the law. As to the plan proposed by the company, the board could take no action at the present time, as the plan was not before it.

Municipal officials responsible for the operation of buses have been asked to confer with the board on Aug. 22 with a view to planning for the immediate future.

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Cincinnati Wage Increases Effective

Increases in wages amounting in the aggregate to $250 000 a year have been granted to the 1,000 employees of the Cincinnati Traction Company by the award of a board of arbitrators, which was announced Aug. 11. The award, under the agreement reached, is retroactive to July 1, 1923. It will continue in effect until June 30, 1924.

Motormen and conductors are to receive an increase of 5 cents an hour, from 48 to 53 cents. Operators of one-man cars are to receive an increase of 2 cents an hour, or from 53 to 55 cents; inside gatemen are to receive 54 cents, or a 10-cent increase. Substitutes are to receive a minimum wage of $90 a month, which is an increase of $15 a month over the former minimum of $75. This is equivalent to five and one-half hours pay. The regular runs are fixed at nine and one-half hours a day. The platform men are to be allowed five minutes to turn in reports, instead of three minutes; ten minutes to make accident reports and a three-minute lay-over at the end of the line. The question of time allowed for meals was not brought up. Platform men demanded 65 cents an hour and the substitutes asked for $100 a month.

The award was agreed upon after an all-day session of the arbitrators. Former Federal Judge John Weld Peck represented the company, James H. Vahey, Boston, represented the men's union and former Judge Joseph W. O'Hara was selected by the two other arbitrators to act as referee.

President W. Kesley Schoepf of the company said that the award was higher than all the facts in the case would seem to him to justify. Judge Peck acquiesced in the findings only after fully analyzing for the board the effect a large increase would have on the costs of operation. He said that the whole award would mean a $250,000 increase in expenses and that as things now stand and without any offsetting savings this would undoubtedly mean an increase in the rate of fare. Further, that the payment of a fixed sum of $90 a month, whether or not compensatory work is given therefor, was particularly unfair to the car-riding public.

Terminal Railroad Proposed in Los Angeles

The California State Railroad Commission held a hearing at Los Angeles, on July 17, based on the petition of the Los Angeles Junction Railroad for permission to issue $1,000,000 in common stock and $250,000 in notes for the purpose of carrying out an extens.ve program of industrial development at Vernon, a suburban industrial town near Los Angeles.

The junction railway is to connect with the tracks of the Southern Pacific, Santa Fé, Union Pacific and Pacific Electric Lines and Rionde switching terminal yards to industries which will be located in the district. The primary purpose of the entire plan is to establish an extensive industrial center at Vernon by affording connections with transcontinental railroads. Approximately 30 miles of trackage, sidings and spurs are now being laid. As the railway is engaged in handling only freight cars of other lines its total equipment will consist of locomotives.

Baltimore Company Buys Coal for Employees

Following along the lines of the plan suggested by L. S. Storrs, president Connecticut Company, as noted in ELECTRIC RAILWAY JOURNAL, issue of April 28, 1923, C. D. Emmons, president of the United Railways & Electric Company, Baltimore, reports that 1,150 employees have taken advantage of the company's offer to buy their next winter's supply of coal during the summer months. Employees purchase their winter's supply of coal from their customary local dealer, and the company pays the bill and discounts it. The saving thus obtained is turned back to the credit of the employees. The coal purchased for any individual is collected for by taking 75 cents per ton out of each pay check until the indebtedness has all been paid. The average amount purchased by an employee is three tons. The coal is delivered in the usual way, the railway not buying in quantity nor storing nor handling in any way.

Newspapers Will Carry Ottawa Electric News

The Ottawa Electric Railway, feeling that it does not reach enough people through its own publication, started on Aug. 4 the publication of its safety and service hints in an Ottawa newspaper. In other words, the *O. E. R. News* will no longer be published as an independent paper but will appear simultaneously in the Saturday editions of two English papers and one French paper. The company says that it is not enough to talk to its immediate family. It wants to go outside and talk safety to every man in Ottawa. For this reason it believes that it can do a greater service both to itself and to the community by "bringing the need of safety precautions home to the people of Ottawa, through the columns of the Saturday papers."

The railway promises, however, not to let up on its service program. Whatever it finds of interest to car riders, whether within its own experience in Ottawa or in other cities, it will be passed on to the public in the column appearing every Saturday. Justifying its move to the daily newspaper, the Ottawa Electric Railway states that if there is a reason why this newspaper gives pages on Saturday to matters of interest to hundreds of automobile owners, there is surely need then for a column to the interests of the trolley riders. The company feels that the adoption of this method has advantages which far outweight the loss of the company's identification as a separate publication.

Veto of Louisville Mayor Set Aside

The lower board of the City Council of Louisville, Ky., a few days ago decisively overrode Mayor Quin's veto of two ordinances, one providing for the building by the Louisville Railway of a connecting line from Floyd Street to Oak Street, thence over St. Joseph Street to Brook Street, and for the building of a switch between Second and Fourth Street on Avery. The members of the Board of Aldermen were to vote on the matter on Aug. 7. Should the Avery Street switch plan eventually be nullified by aldermanic approval of Mayor Quin's veto, an access to the ball grounds of the Parkway Field will be denied. In view of this, one of the Aldermen known to be in sympathy with the Mayor's views stated that he would confer with the trustees of the University of Louisville in reference to the renting by them of a space within the University grounds to the railway for the building of a loop, that access to the ball park may be had. This would necessitate the laying of tracks across two streets, to which it is believed the Aldermen would readily consent.

Pacific Electric Denied Grade Crossing Plea

The California State Railroad Commission on July 27 reaffirmed its order of Feb. 9, 1923, embodying its opinion in opposition to dangerous grade crossings and outlining in its decision that the application of the Pacific Electric Company to extend its line from Glendora to Lone Hill will be granted only on the condition that it construct a separated crossing at Foothill Boulevard, known in the city of Glendora as Minnehaha Avenue. The order directs the company to erect said elevated crossing to cost approximately $75,000, in the event that the railway company proceeds with the construction of its extension.

The Pacific Electric Railway for some time has had pending before the commission its application for permission to cross certain streets at grade in connection with the proposed construction of its electric interurban line extension from Glendora to Lone Hill, a distance of some 6 miles. The proposed extension would give the railroad an additional through line from Los Angeles to San Dimas, whence the present through line of the company extends to San Bernardino.

The decision refers to the bad grade-crossing situation in Los Angeles County. An investigation of the facts led the commission to the conclusion that the Minnehaha Avenue crossing should not be constructed at grade and that the applicant's prayer should be denied. The applicant was therefore directed to construct, at its sole cost and expense, its track across Minnehaha Avenue at separated grade according to plans and specifications which shall hereafter have been approved by this commission.

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Protest Launched Against Staley Electrification Scheme

A recent newspaper despatch says that the Southern Pacific Railroad has protested against the Interstate Commerce Commission's approval of William L. Staley's application for authority to construct an electric railroad system in Colorado, New Mexico, Arizona and California. The complainant contends that the project could not be successful and that the territory would receive no material benefit from a failure. Further, it is contended that the applicant has not legally qualified in that he has not secured any act of Congress permitting him to bridge the Colorado River; that he has not applied to the California or Arizona Railroad Commissions for authority to issue securities. In conclusion, it is charged by the complainant that the applicant seeks to interest people in investing $150,000,000 in a system which experienced railroad engineers consider improvident.

The Staley system of electrified railways was referred to in the ELECTRIC RAILWAY JOURNAL of Sept. 2 and Oct. 28, 1922. The plan, as proposed, involves a comprehensive scheme for opening up the vast coal fields of Colorado and contemplates the development of the agricultural resources and manufacturing facilities in Arizona, Colorado, New Mexico and California. A power plant would be erected near Peaceland, N. M., and another in southern Arizona, near the point where the railroad enters the Republic of Mexico.

In connection with the traffic to be handled, the scheme called for a connection at eighteen points with other common carriers. The project involved the construction of 1,307 miles of main line and branches at an estimated initial cost of more than $76,000,000.

Suit Started Against Buffalo Electrification Order

The New York Central Railroad has started an equity action in the Supreme Court at Buffalo for a permanent injunction to restrain the municipal authorities from enforcing an ordinance forbidding the use of steam locomotives within the city limits and requiring complete electrification of the terminal yards at Buffalo. One action for $1,000 penalty for failure to comply with the new ordinance already has been started against the railroad. If judgment is secured the railroad is liable to penalties exceeding $1,000,000.

The electrification ordinance was enacted by the City Council of Buffalo in 1921. The railroads were given until Jan. 1, 1922, to file plans for electrification and until Jan. 1, 1923, to abandon the use of steam locomotives in the city. The railroads did not comply with either of these provisions. A penalty of $250 for each violation is provided in the ordinance. The railroads contend the ordinance cannot be enforced and that it is illegal. Counsel for the railroads say it would involve an expenditure of more than $15,000,000 to electrify the lines of the New York Central alone in Buffalo.

Men at Lima on Strike

Employees on the Lima Street Railway, Lima, Ohio, on Aug. 10 served an ultimatum on the local company demanding that an agreement be signed between the company and the employees before midnight on Aug. 11 or the men would go on strike. The workers demanded that an agreement be entered into between the company and the Amalgamated Association. The officials declared they would deal with the employees, but would not treat with men not in the company's employ. The question of wages is also involved. The men want an increase of 11 cents an hour. They put their threats against the company into effect at midnight on Aug. 11 by going out.

Wage Increases for Electrical Workers Approved

Contracts providing wage increases of 3 to 5 cents an hour have been approved by the 175 members of Electrical Workers' Union No. 2 employed by the United Railways, St. Louis. The workers, consisting of linemen, power house and shop men, recently went on strike to enforce their demands for an increase of 14 cents an hour. Col. Albert T. Perkins, manager for Receiver Rolla Wells, declined to meet the demands, but finally prevailed upon the men to return to work and accept the offer made by the company prior to the eight days unsuccessful strike. The contract, dated to expire one year from July 25, must be approved by United States District Judge Faris. In the meantime Col. Perkins plans to hold wage conferences with various other shop crafts employed by the United Railways, including blacksmiths, machinists, carpenters, painters and metal workers. The company has already offered these workers, who number some 1,000, slight increases in wages and better working conditions. Later Col. Perkins will also confer with the motormen and conductors who have demanded increases in pay for the lower paid classifications.

Disputes Extension Order

The street railway controversy in Madison, Wis., is not settled yet. Represented by its vice-president, Dudley Montgomery, the Madison Railway will file a suit in Dane County Circuit Court to have the Wisconsin Railroad Commission reconsider its order requiring the company to extend its tracks. The order complained of was one issued on May 11, 1923, requiring the railway to extend its tracks on Monroe Street from Harrison Street to Crandall Court, the extension to be placed in service not later than July 1, 1924. The company in its complaint against the extension charges that the order is unlawful and that the commission has no authority to make such order. The complaint further declares that the order takes away the property of the company without a just compensation in return, and that it is in direct violation of the Fourteenth Amendment to the Constitution. Just what the outcome will be is difficult to forecast. Since the commission's order was issued a private bus line has been formed serving the same territory over which the controversy arose.

Transit Referendum Bill a Law

Although Mayor Moore of Philadelphia was in possession of the transit referendum bill for ten days, he neither signed it nor vetoed it, with the result that it automatically became a law. At the September primary the voters will express their wishes with regard to carrying out step No. 1 of the proposed transit plans, which provides for a four-track Broad Street subway from Olney Avenue to Spruce Street, the Ridge Avenue Loop and subway lines in Chestnut and Walnut Streets to West Philadelphia.

Some time ago the Mayor announced that he proposed giving careful consideration to the bill and that he would confer with the city commissioner at the next meeting. The message, it is understood, was prepared, but at the last minute he changed his plans. The only explanation was that he "preferred to discuss the measure with the people rather than with those who combined to put it over." The transit referendum bill was passed by the City Council of Philadelphia on July 26. The various steps in the proposed transit plans for Philadelphia have been reviewed previously in the ELECTRIC RAILWAY JOURNAL.

Employees Form Life-Saving Team

Girl employees of the Chicago, North Shore & Milwaukee Railroad have organized a life-saving team. An eight-girl team, believed to be the first in the country, has been formed and is studying the Schafer prone-pressure method of artificial resuscitation. As soon as they become proficient in the life-saving method the girls will act as instructors for other women employees of the electric line. The team was organized at the request of the girls themselves by J. W. Oliver, safety engineer of the railroad, assisted by L. J. Wertzler.

In telling about the formation of the new team Mr. Oliver said that the company also had a first aid team of twelve men who were drilled in this method together with other forms of first aid work. A former team has graduated in the work under the supervision of the chief surgeon, Dr. Hart Fisher. It was from this work that the girls got their idea of a team of their own. He believed that the teaching of this method of resuscitation to women was doubly valuable as many cases had developed for its use in the home, where outside help was unavailable.

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Increase of Three Cents an Hour in Grand Rapids

A decision has finally been reached in the wage controversy between the employees of the Grand Rapids Railway, whereby the men will receive an increase of 3 cents an hour over the prevailing schedule. The controversy over higher pay has been going on in Grand Rapids since last April. The present scale in cents per hour will be as follows: Men employed less than 6 months, 49 cents; more than 6 months, 51 cents; operators of one-man cars, 5 cents more than the regular rate.

The new scale is considerably lower than the employees sought, the demand being 70 cents and 75 cents respectively. Before the controversy came to arbitration the company offered the men an increase of 2 cents an hour, but the offer was declined. The new scale is retroactive to May 1. No provision is made for an increase for extra or overtime or any change in the present rule regarding intervening time. The decision was signed by two of the three members of the board of arbitration. The representative of the men refused to sign.

Louis J. DeLamarter, vice-president and general manager of the company, said the award would mean an increase of approximately $30,000 a year in expenses. He hoped that under the service-at-cost contract the company would not be compelled to go to a higher fare, which it was entitled to do whenever there was a deficit of $50,000 in the equalization account.

News Notes

Seek Increase. — Employees of the mechanical department of the Denver Tramway have asked for an increase of pay, from 2 to 18 cents an hour. The State Industrial Commission will hear the case on Aug. 20.

Commission Will Govern Motor Industry.—The Corporation Commission of Oklahoma has promulgated an order adopting in full Senate Bill No. 341 of the Ninth Legislature. This establishes regulation by the Corporation Commission of the motor transportation industry in the State of Oklahoma.

Same Carhouse Wins Prize. — The carhouse at Twenty-fifth and Market Streets has for the third time in succession won the prize offered by the Louisville Railway for the smallest number of accidents. The winner's enviable record for the month of July was only one mishap per 6,300 miles.

Grade Crossings Under Consideration.—D. L. Bronson and L. Segoe of the Technical Advisory Corporation of New York went to Louisville recently to survey the questions of grade crossing elimination, a union railway station and city planning. The engineers have offices on the second floor of the City Hall.

Wants Improvement Made.—The village trustees of Tarrytown, N. Y., are considering the question of taking action to force the Westchester Street Railway to move its tracks from the center to the side of three of its principal streets, which will form part of the proposed Tarrytown-White Plains Road. The Westchester Street Railway is now in the hands of a receiver. The company claims that this improvement will cost $200,000. It asks the town to bear the expenses of making the change.

Demands Under Consideration.—Demands of linemen, carmen, railway shopmen, track workers and repairmen on the Seattle Municipal Railway lines for wage increases are under consideration by the City Council, along with a request by the men for one day off in eight. Decision has been reserved. The various railway and light department workers ask a $6 a day scale. Railway department officials state that the one-day furlough would increase the payroll $200,000 to $300,000 a year.

Recognizes Service of Brooklyn City Railroad. — The Brooklyn Chamber of Commerce has issued to the Brooklyn City Railroad a "Certificate of Recognition" for the company's contribution to the prestige and advancement of the community by a long period of continuous service. With the seal of the Brooklyn Chamber of Commerce affixed, the certificate states that the Brooklyn City Railroad began operation in 1853 and for a period of seventy consecutive years contributed to the prosperity and progress of Brooklyn.

Reduction in Service Likely.—It was brought out at a recent hearing before the New York Transit Commission that the Interborough Rapid Transit Company wanted to curtail service on local tracks during non-rush hours for the next eleven months. George Keegan, assistant to President Hedley, stated that the total number of passengers handled was 20 per cent less than during last winter. Chairman McAneny of the commission intimated that the commission might consider a reduction of service during non-rush hours for the next two and a half months.

Completion of Line to Lake Lillian Celebrated.—The Electric Short Line has celebrated completion of its line westward 90 miles from Minneapolis to Lake Lillian, Minn., by an excursion party for Minneapolis business men. The terminus for some time has been 53 miles west at Hutchinson. The road expects to complete the line soon to Clara City, 120 miles, at a cost of $500,000. In 1925 a push will be made westward to Montevideo, Minn., where connection will be made with the Chicago, Milwaukee & St. Paul Railroad. At Clara City the Great Northern road is crossed. The company has six motor cars, five steam locomotives, twenty passenger cars and 250 freight cars.

Comments on Thirty-two Years Service.—The long and constructive services of John F. Usener, chief engineer of the Houston Electric Company, was recently made a subject for comment in the Houston press. Thirty-two years ago Mr. Usener entered the employ of the company as chief engineer—the same year when the Allis-Corliss cross-compound engine of 270 hp. started making current to run the cars. At that time there were only twelve cars. Mr. Usener's father is said to have been the first white boy to see the light of day in Houston.

No Agreement Reached.—Following a meeting on Aug. 6 with A. Bennett, international representative of the International Brotherhood of Electrical Workers; William Rogers, former president of the West Virginia State Federation of Labor, and officials of the Monongahela-West Penn Public Service Company, at Fairmont, it was announced that the parties to the conference had failed to reach an agreement in the dispute between the company and the union. The traction company has made an offer to groundmen of an increase of 2½ cents an hour, raising their wages to 45 cents an hour. The union insists on a wage of 50 cents an hour for the first three months of employment and 60 cents an hour after three months.

Thirty-five Years Old.—The Virginia Railway & Power Company recently celebrated the thirty-fifth birthday of electric railways in the city of Richmond. *Public Service News*, the organ of the company, issued a special number, in which the pictures of the president, Thomas S. Wheelwright, and John T. Wilson, now president of the Bank of Commerce and Trusts, appeared together with that of the first type of street car operated. Mr. Wheelwright was a public stenographer when Frank J. Sprague built the first electric street railway in Richmond in 1887-88. He was engaged to write the necessary documents and letters which put the industry in motion. Today he is head of a system operating the largest mileage in Virginia of any electric railway. Mr. Wilson was one of the first motormen to operate a car on the streets of the city.

Union Depot for Electric Railways Wanted.—The Chamber of Commerce of Sacramento, Calif., has filed a complaint with the California Railroad Commission against three electric railroads that enter the city of Sacramento. The complaint represents that loading the cars of these roads on the city streets interferes with other transportation and with the use of the streets by the public. The commission is therefore petitioned to order the roads to establish at some central point a union passenger station with tracks used by cars waiting to take on passengers located inside the station. The three roads named in the petition are the Sacramento Northern Railroad, the Central California Traction Company and the San Francisco & Sacramento Railroad.

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Financial and Corporate

Interurban Earnings Increase

Indiana Union Traction Results Still Below a Reasonable Return, but Showing for 1922 Improved

Stockholders of the Union Traction Company of Indiana, in recent annual session at Anderson, Ind., learned that revenue from operations for the last calendar year showed an increase of 3.37 per cent over the previous year. Operating expenses decreased 2.85 per cent and the net income amounted to $210,163, an increase of $167,893 over 1921. The largest gain made among the various sources of income in the transportation department was from freight, 16.92 per cent, against 15.87 per cent in the preceding year. Passenger receipts were 75.51 per cent of the income; express, 2.98, and milk, 0.58 per cent. All other sources of income were below 0.50 per cent. In that class the income from the parlor, chair and special cars led with 0.46 per cent.

In revenue from operation other than transportation the largest item was power, 2.34 per cent, against 2.15 per cent the previous year. Items of income account were as follows: Revenue from transportation, $3,712,507; revenue from operation other than transportation, $123,239; total operating revenue, $3,835,747; net operating revenue, $1,376,003; taxes, $264,000; net operating revenue less taxes, $1,112,003; other income, $15,337.

MORE THAN $250,000 SPENT LAST YEAR

A total of $257,055 was expended last year for additions and betterments to the company's property, including $25,295 for extensions by the Traction Light & Power Company, the light and power subsidiary of the company. Twelve one-man cars were bought and financed through an issue of $66,000 of 7 per cent car trust notes. It also was explained that $138,311 was expected for improvements in power generation and transmission, which will enable the company to generate all its power at its North Anderson plant and shut down the plants at Winchester and Eaton with the prospect of effecting material economies in operation.

The Traction, Light & Power Company during the year extended its service to Cassville, Ingalls and Sulphur Springs. It was explained that the Union Traction Company owns all the $100,000 outstanding general mortgage fifteen-year 6 per cent bonds of the Traction, Light & Power Company and all of the $50,000 capital stock, except five shares to qualify directors.

Concerning the sinking funds and dividends, the report says:

The results of operation for 1922 show an improvement over the last several years. These results still are far below a reasonable return on the fair value of the property actually used and useful for the convenience of the public. They may, however, indicate, it is hoped, a gradual return to a condition that can be depended on to provide uninterruptedly a service of maximum efficiency and safety with sufficient earnings to insure the prompt meeting of fixed charges, including sinking fund requirements and the payment to stockholders of a fair return on their investment. All surplus earnings for 1922 were used in reducing the floating indebtedness incurred to carry the property through the war and after-war period and in making important deferred improvements. For obvious financial reasons, the company has been unable to meet any sinking fund requirements of mortgages since 1917 and has paid no dividends since April, 1914, on the $1,000,000 of 5 per cent cumulative first preferred stock, representing actual cash paid in and expended on the property. Also it has paid none of the dividends on the second preferred stock. The problem of dealing with these accumulations, aggregating a large sum and being in part contractual, is receiving the careful attention of the board of directors.

The Union Traction Company operates a total of 453 miles of interurban and city lines, of which 316½ are owned and 136½ leased.

New Road Plans Improvements

C. G. Taylor, vice-president and general manager of the Lima & Defiance Railroad, has announced a program of rehabilitation. The program includes the following items:

Investment of $110,000 in new equipment, including new ties, rails and cars.

Betterment of service to provide a four-hour schedule immediately and a two-hour schedule ultimately.

Extension of service into the heart of Defiance and construction of a new terminal in that city.

Improvement of all stations along the system.

The officers of the company, which was formerly a branch of the Indiana, Columbus & Eastern Traction Company, are as follows: George Bayly, president; C. G. Taylor, vice-president and general manager; D. A. Glover, secretary, and C. S. Carl, auditor.

It is said that gasoline cars will be placed in service. Until the gasoline cars become available, the company has contracted with the Ohio Power Company to operate the electric cars now in service and with the Lima City Street Railway for rental of the local tracks.

London "Common Fund" Properties Meet

Slightly Lower Gross but Increased Net Over Last Year—Competition Not Considered the Best Method of Regulation

THE first combined meeting of the stockholders of the Metropolitan District Railway, London Electric Railway, City & South London Railway, Central London Railway and London General Omnibus Company, was held in Electric Railway House, London, a short while ago. Previously these companies, which were organized under the London Electric Railway Company's facilities act of 1915, and are associated together with a "common fund," have held separate annual meetings.

The chairman reported that there has been a decrease in passengers carried by the railways of 14,000,000 or about 4 per cent, while there has been an increase in omnibus passengers of 85,000,000. This latter was attributed to the larger number of omnibuses in use and to the larger size of those put in service last year. There was a decrease in gross receipts for the combined properties of 2 per cent and a decrease in expenses of 4½ per cent. The omnibus-miles increased 8 per cent and the car-miles 1¼ per cent.

54 PER CENT FOR SALARIES

The chairman said that of the operating expenditures 54 per cent goes for salaries and wages and 16 per cent for power, either electrical energy or petrol, 11 per cent for other materials and supplies and 19 per cent for taxes, compensation, insurance and miscellaneous. Compared with the pre-war standard, railway operating expenses have increased 172 per cent and omnibus expenses 150 per cent, while fares have advanced only about 70 per cent, or from a pre-war average fare of about 1½d. to 2½d.

The chairman said that the policy now for the company was a forward one. The sum of £1,334,000 had been spent by the five companies last year on improvements and additions and a program had been prepared for extensions representing a further expenditure of £8,000,000. Competition in the omnibus service had been begun in a small way, and while not serious it is disturbing and would be prejudicial to the interests of the public as it would discourage the bus company from making improvements. In the opinion of the chairman, what is needed is some responsible and judicial authority, able to say what is required stage by stage for the development of London's traffic facilities and able to secure these requirements, either from those already engaged in the business or from others willing to enter in as they are needed. Other metropolitan cities, like New York, Paris and Berlin, have adopted this course, he said.

In commenting on the subject of competition in the omnibus field Lord Ashfield, the chairman, said in part:

Competition is a dangerous weapon. It may seem to offer immediate gains, but they are at the expense of future losses. This is the universal experience. Competition causes congestion on the more remunerative routes, destroys reliable services on the less remunerative routes and curtails the unremunerative routes. Competition weakens the undertakings so that the fresh capital required for progress cannot be obtained on reasonable terms, and therefore becomes a greater burden upon the passengers who ultimately have to meet the interest charges in the fares paid. The improvement which your companies are now making, as I have pointed out, is a sure consequence of the measure of prosperity which has at last come to them. Is it all again to be cast away? Competition ends in obsolete vehicles being retained in service when they should have reached the scrap heap, and this means a poor slow service instead of a fine fast one. It is a question for Londoners to decide; it cannot be a question for us. We shall do our best; we cannot do more.

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We are willing and have always been willing that some reasonable measure of control should be enforced. We do not seek inordinate profits. We seek no more than a reasonable return upon the capital invested. We do not permit extravagant management. We are concerned to give the most economical service that can be made fully effective. We are not afraid to offer services ahead of the public requirements, because we are confident in our expectation of the traffic multiplying. In all these matters we are prepared to account for our conduct and policy, and in return, in all these matters, we should be left undisturbed, not altogether because it is of advantage to us but because we know it is of advantage to the public. We are willing that it should not mean any special advantage to us at all. When we fail let others take our place, but while we are efficient and progressive, do not, for the sake of this specious notion of competition, let others come in to weaken and prejudice the orderly progress of London transport.

Fortunately we are in a strong position to meet any competition. We have ample reserves in the Omnibus Company; the accumulated reserves of all companies which are available now amount to £3,500,000. We have a new and powerful fleet of omnibuses coming upon the streets. Circumstances are favorable to us. But it is regrettable if, instead of being able to give our whole attention, to devote our whole resources to meeting the public requirements, we have to waste a part of them because of this needless competitive service.

At the close of 1922 there was an amount of £51,423,000 invested in this group of undertakings. It is all money raised by private enterprise to supply a public utility. It is our duty to protect this investment and to maintain its financial integrity. We feel it a heavy duty in these days, and we are entitled to look not only to the shareholders for support and confidence, but to the public whom we serve. I hope faithfully and well. If we have the support and confidence of the public, all is well. We shall not fail to deserve it.

Cities Service Company Earned More in 1922

The pamphlet report of Cities Service Company, New York, N. Y., for 1922 shows an increase in net earnings from $12,944,716 to $14,205,674. Preferred dividends of the company were earned 2.41 times against 2.23, and the earnings on the average amount of common stock outstanding during the year amounted to $14.88 a share, as compared with $13.04 a share in the preceding year. Gross earnings of Cities Service Company in 1922 were $14,658,971, as compared with $13,461,770 in 1921.

The earnings of the public utility properties increased 20.65 per cent over the preceding year, or from $6,918,741 to $8,347,546. This was sufficient to pay not only all Cities Service Company interest charges and the preferred dividends, but showed a comfortable return on the outstanding common stock. This is evidence of the stable condition of Cities Service Company, with its greatly diversified interests and earning power therefrom.

The itemized and explained consolidated balance sheet of Cities Service Company and its subsidiaries also shows marked improvement. On the assets side, total capital assets are $384,017,910, as compared with $347,637,972 in the preceding year, while total current assets were $58,075,238, as compared with $42,438,113 in the preceding year. Of the total current assets in 1922, the cash item was shown at $12,189,883, as compared with $4,904,222 in 1921. Total current liabilities are shown in the consolidated balance sheet at $20,730,120, which compares with $18,532,347 in the year before, giving the company a working capital as of Dec. 31, 1922, amounting to $37,295,118, as compared with $23,905,766 in 1921.

$1,741,012 Net Income for American Water Works Company

The American Water Works Electric Company, Inc., New York, N. Y., has issued its report for last year, consolidating, for the first time, the earnings of the West Penn companies. The report shows net income of $1,741,012 after taxes, interest, depreciation and other charges, against $1,320,488 in 1921, and after charging out a special savings fund of $79,685 and allowing for preferred dividend requirements there was the equivalent of $6.44 a share earned on the $10,000,000 common stock.

The income account follows:

	1922	1921
Gross oper. earn.	$24,351,179	$19,796,313
Exp., tax, etc.	14,533,061	12,265,247
Net	$9,818,118	$7,531,066
Other income	903,320	777,954
Gross income	$10,721,438	$8,309,020
Interest, amortization, etc.	7,439,310	5,674,026
Balance	$3,282,128	$2,634,994
Depreciation	1,541,116	1,314,506
Net income	$1,741,012	$1,320,488

Final surplus for the year was $1,244,361 against $859,303 in 1921, an increase of $385,058. In 1922 $416,966 was distributed as dividends on the first preferred stock against $381,500 the year before.

Another Utility Offers Stock to Employees

The Columbia Gas & Electric Company, controlling the Cincinnati, Newport & Covington Light & Traction Company and other properties, is offering to sell to all its employees a limited amount of its no-par-value stock at $32.50 a share on a partial payment basis involving the payment of as little as $1 a month. Announcement to this effect was made on Aug. 13 by P. G. Gossler, president. More than 4,000 men and women employed in the public utility companies operated or owned by the company in Ohio, West Virginia and Kentucky are eligible as purchasers. Employees will be advised not to invest more than 15 per cent of their monthly salary in monthly instalments for the stock of the company bought on this plan and help and advice will be given to all applicants for the stock to the end that they may not contract to buy amounts not in keeping with their earnings capacity.

The plan involves the creation of no new stock as the shares which will be distributed among the employees have been or will be acquired by the company from the amount already outstanding A group of trustees consisting of officers and employees has been chosen to hold this stock for sale to employees on the instalment plan until employees have paid in full.

The company recently changed its capitalization by issuing three shares of no-par-value stock in exchange for each share of the original $100-par-value capital stock, and at the same time placed the stock upon the dividend rate of $2.60 a share. At the offered price of $32.50 per share the return is at the rate of 8 per cent.

Plans for the purchase have not yet been worked out in final detail, but assurance was given to prospective employee-purchasers that at their own option payment might be made in full or in regular instalments to be deducted from the monthly salary at the rate of at least $1 a share or from the weekly salary at the rate of at least 25 cents a share. This will enable every person to participate.

$147,638 Increase in Net Earnings

The annual meeting of the stockholders of the Kentucky Utilities Company, Somerset, Ky., was held recently. The directors were re-elected and they in turn re-elected the officers. Harry Reid, president of the company, presented a very interesting report of the year's operation, showing financial progress and going into the other activities of the company. The sum reported as available for dividends for the year 1922 was $441,671, with a surplus of $128,320 after the payment of dividends. The net earnings for the year 1922 are greater by $147,638 than for the year 1921. This is an increase of 20 per cent. The gross income in turn was increased in amount of $152,663 and the operating expenses by $18,903.

The growth of the company within the period of twelve years has been remarkable. Today the company is serving more than 100 coal companies in the two coal sections of the State. Last year it completed 121 miles of additional high-voltage power lines and now has 504 miles of such lines in service. During the year it showed an increase of 10,802 kw. in load.

STATEMENT OF EARNINGS OF THE KENTUCKY UTILITIES COMPANY FOR YEAR ENDED DEC. 31, 1922

Gross earnings	$2,282,610
Operating expenses, including taxes	1,400,289
	$882,321
Miscellaneous income	2,285
Net earnings	$884,606
Interest on funded debt	385,070
	$499,535
General interest and amortization of bond discount	57,864
Available for dividends	$441,671
Preferred stock dividend paid and accrued	63,350
	$378,321
Common stock dividend paid and accrued	250,000
Balance carried to surplus	$128,321

It is believed in some circles that a super-power system will eventually be developed tying the western Kentucky coal fields with Louisville and the eastern Kentucky coal fields through central Kentucky to Louisville and Cincinnati. Louisville is already tied to Indianapolis via the Interstate Public Service Company lines and eventually Indianapolis will be tied to Chicago.

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Commonwealth Power's Surplus Increased

For the year ended Dec. 31, 1922, the Commonwealth Power Corporation reports surplus of $4,022,597 after charges and taxes, but before depreciation and depletion. This compares with surplus of $3,483,343 in 1921. The income account for the year 1922 compares as follows:

	1922	1921
Gross earnings	$26,383,030	$24,863,983
Operating expenses and taxes	16,290,487	15,711,330
Net earnings	$10,095,543	$9,152,653
Fixed charges	*6,072,946	*5,669,310
Surplus	$4,022,597	$3,483,343

*Includes preferred dividends of subsidiaries.

In his letter to the stockholders President Hardy says in part:

Improvement in business conditions last year brought about increased demands for light and power with the result that earnings of the company and its subsidiaries showed substantial gain over 1921. The demand for electric energy in particular developed very rapidly as the year progressed, sales of the company for the last quarter exceeding those of any previous corresponding period.

During 1922 a total of $6,154,046 was expended for property additions and improvements, the greater part of which was for the amount of the electric department and the full effects of this increased capacity for service should be manifested in future earnings.

Your subsidiaries were never in better financial and operating condition to supply the present demands on them for service. These demands are constantly growing and in order to continue to be able to meet them promptly, an extensive construction program is in progress which includes a 27,000-hp. steam plant on the Saginaw River, completion of a 10,700-hp. water-power development on the Au Sable River at Alcona and a 53,000-hp. steam plant on the Illinois River opposite Peoria.

Completion of these developments will add approximately 30 per cent to the present electric generating capacity of the Commonwealth properties, and while all of the work will not be finished until some time in 1924, it is expected that some of the units will be in operation during the current year. In addition to the foregoing, expenditure will be made for the erection of a large coke oven gas plant to supply additional service to Saginaw, Bay City and vicinity.

Dividend Increased by Brooklyn City Railroad

As a result of continued gain in net earnings the board of directors of the Brooklyn City Railroad has increased the dividend rate on the common stock. On Aug. 15 it was decided to declare a quarterly payment of 25 cents a share, thereby placing the stock on a $1 per annum basis, compared with 20 cents quarterly, or 80 cents per annum previously. The dividend is payable on Sept. 1, to stock of record Aug. 20.

The road was separated from the Brooklyn Rapid Transit Company by a court order in October, 1919. Since that time marked progress has been made by the company. For the twelve months ended June 30 last the surplus, after charges, amounted to $2,256,025, equivalent to more than 18 per cent on the $12,000,000 capital stock outstanding. This compares with a surplus of $1,812,581 in the previous year. The company recently adjusted employees' wages by granting increases of 4 to 5 per cent.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were no sales of electric railway securities this week.

Hearing on Stock Issuance Postponed.—The date for the hearing on the application of the Lima City Railways for authority to issue $100,000 of capital stock has been postponed indefinitely, according to an announcement made on Aug. 11 by the Ohio State Public Utilities Commission. The hearing had been scheduled for Aug. 13.

Increase in Net Income.—For the year ended June 30, 1923, the Brooklyn Rapid Transit Company (eleven months and fourteen days), Brooklyn-Manhattan Transit system (sixteen days) realized a total operating revenue of $36,899,295, against $34,544,093 for the year ended June, 1922. The net income in 1923 was $3,587,753 and in 1922 the net was $3,087,419.

Receivership Application Filed.—Application for the appointment of a receiver for the Galesburg & Kewanee Electric Railway, Kewanee, Ill., has been filed in the Circuit Court at Cambridge by bondholders. The line has been operating at a loss for some time. The company operates the city service in Kewanee and the interurban between Galva and Kewanee.

Another Common Dividend in Washington.—The directors of the Washington Railway & Electric Company, Washington, D. C., have declared a dividend of $1.25 a share on the outstanding common stock, par $100, payable on Sept. 1, to holders of record of Aug. 18. This is the second dividend declared on the common stock since March, 1919, a dividend of 1¼ per cent having been paid June 1, last.

Deficit Reported in Providence.—The United Electric Railways, Providence, R. I., for the six months ended June 30, 1923, reports net income of $42,386 before dividends and after charges, as compared with $352,153 in the same period a year ago. The 1923 period, however, showed a deficit of $163,880 as a result of dividend disbursements during the first six months amounting to $206,267. During the first six months of 1922 the surplus was $269,760.

Hearing on Abandonment Postponed. The hearing scheduled for Aug. 13 before Public Service Commissioner Parsons at Oneonta on the petition of the Southern New York Power & Railway Corporation for approval of the proposed abandonment of its East End line was postponed until a later date to be announced by the commission. It is understood the company is considering the abandonment of other portions of its line in Main and Broad Streets in Oneonta and that an amended petition will be filed later.

Suspends Operation.—The Piedmont Power & Light Company has suspended operations of its 2-mile railway from Burlington to Graham and Haw River, N. C. No announcement of the reasons for the suspension has been made, but it is generally understood that the line has not been paying expenses for some time. It is rumored that a new company is being formed to take over the line, shorten it by eliminating unnecessary curves, put in new equipment and try to make it pay.

Petition to Abandon Line. — The Scranton Railway has petitioned the Public Service Commission for permission to abandon its Moosic-Pittston line. A hearing will be held by the commission on Sept. 13. The line is 6 miles long. It passes through the Greenwood section of Lackawanna township, Avoca, Moosic, Dupont, Pittston township and Pittston. Several causes are said to have contributed to the decision of the company with respect to petitioning for this abandonment. They were failure of the line to pay for its maintenance, the "break" in the road at Moosic, where the location of a grade crossing makes the transferring of passengers necessary, and litigation resulting from the position of the company's tracks in Dupont Borough.

Deficit in Tacoma in June.—According to a report filed by the State Department of Public Works by the Tacoma Railway & Power Company, the records of the month of June show that the railway carried 2,588,807 passengers with the net result, after figuring taxes and depreciation, of a deficit of $935. For the first six months of the year results ran $35,119 in the red, instead of $58,526 to the good, as for the similar period last year. Of the 2,588,479 passengers carried over the lines, the cash fares were 506,479, as against 1,279,891 carried on weekly passes. The number of passes in use shows little variation from week to week, the number throughout June not varying more than 200 either way from 12,000. Of the remaining passengers, 197,698 were on tickets sold at the rate of twenty-five for $2, 4,165 on tickets twelve for $1, and 62,140 school children tickets at forty for $1 and commutation. City and company passes covered 98,304 rides and transfers 272,975.

Suit Sustained in Which Receivers Were Appointed.—Litigation which resulted in the admitted insolvency and appointment of a receiver for the United Railways, St. Louis, has been sustained by the United States Court of Appeals. That body has over-ruled a motion of intervention which asked that the receivership order be set aside. The motion for intervention was brought by E. Caplan, an attorney, on behalf of Henry F. Mueller and other bondholders. Mr. Caplan had brought the original suit for receivership against the road on behalf of Joseph Seaman, a stockholder. A second suit for receivership was then brought by counsel for Samuel W. Adler, a bondholder, and the Adler suit was declared to be the main suit in litigation. In answer to it the United Railways admitted its insolvency. Mr. Caplan in his intervention suit contended that the Adler suit was not the main issue in the litigation, and that it should be subordinated to the Seaman suit, the original receivership action.

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Traffic and Transportation

Buses Must Pay Fees in Milwaukee to Defray Pavement Expenses

The Common Council of Milwaukee recently passed an ordinance designed to force buses to compensate the city for the cost of making repairs and maintaining pavements and bridges and for expenditures incurred in the regulation of street traffic.

The ordinance provides that a motor vehicle must procure the consent of the Common Council before operating on the streets of Milwaukee. The operators of such motor vehicles, which include motor buses and jitneys, must pay $5 a year for each motor vehicle with a seating capacity of four passengers or less. The fees vary from that amount to $150 in accordance with the seating capacity of the buses. The ordinance provides for one-way operation on streets that are 30 ft., or less in width from curb to curb. It also provides that in the exclusive upper east side residential section only one company may operate, and only one way along any one street, streets having street railway tracks excepted.

The Wisconsin Motor Bus Line, a subsidiary to the Milwaukee Electric Railway & Light Company, has already been operating double-deck and single-deck buses since May, and had operated buses of other types in the city for several years as feeders to its street railway system and in interurban service. A majority of the committee on public utilities of the Common Council had several times recommended so-called "grants" to the two outside concerns, but the Common Council had, in each case, over-ruled the committee. The new ordinance was finally evolved as a compromise, but the Council promptly adjourned for the summer and no grants were made under the new measure. The Wisconsin Motor Bus Lines will of course continue to operate under the terms of its present rights.

Election Set on Birmingham's Jitney Status

The election commission of Birmingham, Ala., has ordered an initiative election to be held on Aug. 28 to vote on the question whether jitneys will be allowed to continue to operate in Birmingham. Under the law the names of 1,500 legal voters are required to be signed to a petition before an initiative election can be called. The jitney men presented a petition with the required number of signatures.

As told in a previous issue of the ELECTRIC RAILWAY JOURNAL, the City Commissioners some time ago adopted an ordinance in the nature of an agreement with the Birmingham Railway, Light & Power Company which put the jitneys off the streets of Birmingham, the ordinance reading that jitneys could not operate on streets where there were street car lines or within four blocks of a street car line in the downtown districts.

At the time the jitney owners secured a temporary injunction against the city, putting the ordinance into effect on July 1. Later this injunction was dissolved. Attorneys for the jitney owners appealed to the Supreme Court for a reinstatement of the injunction against the city. A decision from the Supreme Court is not expected until November. The decision of the Supreme Court and the decision of the initiative election now ordered will not conflict with each other, it is stated. Whichever way the election and the Supreme Court decision go, jitneys will continue to operate in Birmingham until November.

Railways Cause Only Twenty-five per Cent of Traffic Congestion in St. Louis

Commenting upon recent suggestions by Miller McClinton of the Department of Municipal Research, Harvard University, that St. Louis give preference to street cars in any plans for traffic congestion relief, Col. Albert T. Perkins, manager for Receiver Rolla Wells of the United Railways, stated that approximately 49 per cent of traffic congestion in the downtown district of St. Louis is due to passing automobiles, 26 per cent to trucks and wagons and 25 per cent to street cars. He also pointed out that street car passengers represent three-fourths of those moving into and out of the congested district.

There are thirty-nine arteries of travel leading to and away from the congested district, which embraces fifty-four city blocks or an area of about one-fourth of a square mile. On a normal day 118,500 to 120,000 street cars, automobiles, trucks and wagons enter and leave the district between 7:30 a.m. and 6:30 p.m., and of this number 12,342 to 14,000, or 10.4 per cent are street cars; 58.5 per cent are automobiles and 31 per cent trucks and wagons.

Mr. McClinton said that the parking of automobiles in the congested district was the source of the greatest inconvenience and delay. He and other experts who have considered St. Louis' problems had suggested that parking downtown be abolished entirely.

The City Plan Commission and the Citizens' Traffic Committee have many traffic problems under consideration and a number of new traffic regulations will probably be enacted when the Board of Aldermen reconvene in October.

Injunction Order Remains in Schenectady

Supreme Court Justice Edward M. Angell, sitting in a special term at Glens Falls on Aug. 11, refused the application of attorneys for the Schenectady jitney men to have set aside the injunction issued by him on July 9, which restrains them from operating in competition with the Schenectady Railway.

Attorney Judge, for the Emergency Taxi Operators' Association, had secured an order from Justice Henry T. Kellogg of the Appellate Division, which called upon attorneys for the railway company to appear and show cause why the jitney injunction should not be set aside. The order was returnable before Justice Henry V. Borst at Saratoga Springs.

Justice Borst asked to be excused from hearing the argument and made an appointment for the attorney with Justice Angell, who issued the original order, at Glens Falls.

At Glens Falls the attorney for the jitney men contended that the papers on which the injunction was issued were insufficient in that they were based on information and belief. He said that the paper stated there were 3,000 automobiles operating and the injunction named only 900 defendants.

Judge Daniel Naylon, arguing on behalf of the railway company, declared that the defendants had never secured a certificate of convenience as required and therefore had no business in court.

Judge Angell ruled that the jitneys had no right to operate without a certificate of convenience and necessity from the Public Service Commission. He said that the papers supporting the injunction showed there had been no public hearings in Schenectady before the licenses were granted, a procedure required under the law. He refused to entertain Attorney Judge's application for a stay of execution and denied the motion.

In the interval during which all the various moves have been made in court proceedings the jitneys continue to operate in and about Schenectady with renewed vigor. Meanwhile the effect of the strike is seen in the Schenectady Railway's report for June and for six months ending June 30 last. Operations for June resulting in a deficit of $157,831, compared with a surplus of $10,442 for June, 1922. Cost of the strike to the company is indicated by operating expenses of $155,776 required to produce a gross of only $5,457 for the month of June against a gross of $136,769 in June, 1922, with expenses of $118,046. The total deficit for the month, after charges against income had been deducted, was $107,667, compared with a deficit of $1,819 in June, 1922. The net corporate loss of the company for the first quarter ended March 31 amounted to $36,735.

Operations for the six months ending June 30 show a deficit of $294,292 against a surplus in 1922 of $21,324 for the railway.

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Buses Replace Withdrawn Cars

Eighteen buses are now in operation over a route which includes Ecorse, Ford Village and River Rouge, Mich. The establishment of this service followed the attempt of the Detroit United Railway to collect higher fares on the Wyandotte and Trenton line, on which franchises have expired. The first move in connection with the matter was the obtaining of an injunction by the city of River Rouge stopping the D. U. R. from operating its cars. Then buses furnished by the Stoughton Transportation Company, Saginaw, were brought in to replace the cars.

It was charged by Mayor Thomas J. Bresnahan of River Rouge, that on Aug. 1 the railway began charging straight 5-cent fares on all lines for one trip within the River Rouge limits, whereas the company previously had been selling ten tickets for 10 cents on city lines and three tickets for 10 cents on Wyandotte & Trenton Interurban cars passing through River Rouge. It was further charged that conductors on all lines beginning on Aug. 1 refused to accept old tickets and told passengers their money would be refunded at the general offices.

The fare on the buses is less than that demanded by the D. U. R.

At a meeting in Wyandotte to discuss possible terms of agreement, Elliott G. Stevenson, president, and E. J. Burdick, vice-president of the D. U. R., explained that service would not be resumed until the company was assured at least 4 per cent on its investment. In response to the statement that the D. U. R. was making good returns on the fare charged before the expiration of the franchise, Mr. Stevenson indicated the willingness of the company to pay the cost of having its books examined by auditors appointed by the municipalities affected.

Jitney Violators Fined

As a result of the campaign being waged by the United Traction Company against jitney drivers who continue to operate between Albany and Troy in violation of the Hinman injunction issued in 1921, fifteen of such drivers were fined $150 each by Justice Ellis J. Staley in special term of the supreme court at Albany on July 28. Unless the fines be paid the violators face the option of a thirty day jail sentence. A number of additional violators of the Hinman injunction have been summoned into court to answer contempt charges as to jitney operation in the face of the court's order.

Buffalo Hearing Postponed. — The Public Service Commission has postponed to a date to be announced after Sept. 1 the complaint of the Mayor of Buffalo against the present fare rates of the International Railway in that city. The postponement was at the request of the city because its principal witness, Milo R. Maltbie, New York, will be unable to attend the Buffalo hearing at this time as he is engaged in a similar proceeding elsewhere.

Will Operate Bus.—The Madison Street Railway, which contemplates extending its tracks from Monroe Street to Crandall Court, will run a bus line along this line for the present. A bus, it is planned, will operate from Harrisson Street, where the present line turns, to Crandall Court, which will make connection with cars going to and from the city. A check will be made of the traffic along this line and when conditions warrant it an extension will be made.

Bus Project Held Up.—The proposed establishing of bus lines by the Berkshire Street Railway, Pittsfield, Mass., is in abeyance, pending an adjustment between the company and Emil Tremblay, proprietor of the Pittsfield-Dalton bus line, who fixed $30,000 as a price for his business, including equipment. A proposal of the Public Utilities Commission that the purchase price be submitted to arbitration has been rejected by Mr. Tremblay. Mayor Power is trying to find some way to bring the parties together and thus remove the principal obstacle to trolley-owned buses.

Files Rate Application.—The Washington & Old Dominion Railway, Washington, D. C., has filed an application for authority to establish rates on classes and commodities, carloads from points in central freight association and trunk line territories to Rosslyn, Va., lower than rates concurrently in effect on like traffic to Alexandria Junction, Barcroft, Clencarlyn, Bon Air, Lacey, Douglas and Thrifton, Va., without observing the long-and-short-haul provision of the fourth section of the interstate commerce act.

Freight Eliminated at Steam Railroad Stations.—Competition by the Indiana, Columbus & Eastern Traction Company and various motor truck lines has practically eliminated local freight business at the various steam railroad stations in Bellefontaine, Ohio, foremen of the various freight houses declared. Local jobbers and manufacturing houses are practically shipping all of their material to nearby points via the traction lines or by truck, according to Alonzo Hess, foreman at the "Big Four" station. Although the short-haul freight traffic has been reduced, long-haul traffic has been increased Mr. Hess said, few shipments of long distance being made other than by steam lines.

Must Have Relief from Jitneys.—The Houston Electric Company, a Stone & Webster property, is considering going into Federal Court to seek financial relief, caused by municipal regulation and competition of jitneys, according to unofficial information. At a municipal election two weeks ago the voters of Houston approved the operation of jitneys and declined to bar them from the streets of the city. The railway had appealed to the City Council for relief, and the question of eliminating jitney competition had been submitted to the voters at the referendum election. W. E. Wood, vice-president and general manager of the company, declined to say that his company would seek relief in the Federal Courts.

Accepts Bailey Avenue Franchise.—The International Railway, Buffalo, has accepted the franchise offered by the City Council for the operation of buses in Bailey Avenue between Broadway and the north City Line at a 7-cent fare or four tokens for 25 cents with free transfers. The company is now seeking the consent of the Public Service Commission to operate the bus line. The permit is for one year only and can be revoked at any time. The railway previously had informed the City Council it would not accept the Bailey Avenue franchise without the Delaware Avenue franchise. The Bailey Avenue bus line will act as an extension of the Bailey Avenue car line and as a feeder for other east side car routes. The same fare, rules and regulations that apply to cars will apply to the bus line.

Asks Fare Increase.—The Pennsylvania-Ohio Electric Company, Youngstown, has petitioned the City Council of Niles for permission to increase fares. The company states that owing to the rise in operating costs for the past four years, and to the fact that the revenue in fares from patrons is not sufficient to pay the operating expenses, to say nothing of providing any return on the investment, an adjustment in the fare situation is very much needed. The paving of Robbins Avenue is said to be the reason for the action of the company with respect to increasing the fare. The improvement is an expensive one, and the company's share of the expense can be said to be between $70,000 and $80,000. The company recently announced a new schedule of a thirty-minute service between Niles and points out of the city. At the time the schedule was announced to the Council a communication was also presented for an increase in fare.

Permission Asked to Intervene in Fare Case.—Permission has been asked of the Superior Court by the United Business Men's Association and the Cliveden Improvement Association of Philadelphia to join with the city of Philadelphia in complaining against the 7-cent fare and other phases of the Public Service Commission's recent decision in the valuation matter of the Philadelphia Rapid Transit Company. The petition claims that the 7-cent fare violates the 1907 contract between the city and the company, which fixed the rate of fare at 5 cents. Besides complaining that the commission made various mistakes in measuring the valuation of the Philadelphia Rapid Transit properties, the petition states that it wants the Appellate Court to consider the question of the $10,000,000 rentals paid annually to underlying companies by the Philadelphia Rapid Transit Company. It is expected that the request for intervention will be disposed of when the Superior Court meets in Philadelphia in October.

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Personal Items

Curb the Faker!

New Head of Mid-West Claim Agents Plans Educational Advertising Campaign in Newspapers

Curb ambulance chasers and eradicate fakers! These are the chief planks in the platform of Trevor C. Neilson, claim agent for the East St. Louis & Suburban Railway and related properties, who on July 14 was elected president of the Mid-West Claim Agents' Association. During his administration of the association's principal office he will endeavor to put through a general advertising campaign in the columns of the leading newspapers of the association's territory, giving examples of how the ambulance chasers profit at the expense of those injured in railway accidents and showing up the fakers who travel from city to city trying to collect damage claims for "fake" injuries. As a first step in this work Mr. Neilson expects within the next few weeks to broadcast photographs and a brief history of one of the fakers who have victimized railways in a number of Mid-West cities.

Mr. Neilson was born in Brisbane, Queensland, Australia, on May 21, 1874. He is of Scotch extraction and was early trained for the bar, putting in six years of hard study before receiving his certificate to practice before the Superior Court of Australia. There no attorney is permitted to accept a civil action on a contingent fee basis. Hence his ethical aversion for the ambulance chaser.

In 1907 Mr. Neilson started from Australia to visit the States and Canada with his sister, and save for a visit to Australia last year he has not returned to his native land. His first railway connection was made in 1907, when he accepted a position with the Turk-Fillmore division of the United Railways, San Francisco, in claim investigation work. He soon attracted the attention of J. H. Handlon, claim agent for the company, who took him into his department as an investigator. Later he was made acting chief clerk for the claim department. He served in that capacity for several years. In June, 1914, he accepted an offer to become assistant claim adjuster of the Columbus Railway, Power & Light Company, Columbus, Ohio, which position he held for eighteen months. On Dec. 1, 1916, he was appointed claim agent of the East St. Louis & Suburban Railway and related properties.

During the South African War Mr. Neilson saw two years service in South Africa. He holds a commission of first lieutenant in his Majesty's naval forces.

In co-operation with President Sawyer, General Manager Parsons and other officials of the East St. Louis & Suburban Railway, Mr. Neilson, since taking charge of the company's claim department, has successfully put through a safety first campaign to educate the riding public and the employees of the road in accident prevention. The benefits have been reflected in a steadily decreasing claim ratio.

Mr. Neilson has found it very helpful to bring home to the platform men the reaction of their wages to the amount of claims against the railway. When a motorman or conductor is employed he is sent to Mr. Neilson. He points out to every trainman that the ability of the company to pay good wages is dependent entirely on operation costs, and that heavy personal injury damage claims may easily have an adverse effect on wages.

T. C. Neilson

His next step in his general educational campaign will be to bring home to the riding public the fact that jurors who award unreasonably large damage claims are really penalizing the riding public and not the utility company. Mr. Neilson's policy has been to exert every effort in every meritorious case to make a reasonable settlement out of court.

Robert Long, master mechanic of the Altoona & Logan Valley Electric Railway, Altoona, Pa., has tendered his resignation, effective Aug. 15, to accept a position as engineer of oil tests for the Texas Company, with headquarters at Columbus, Ohio. Mr. Long went to Altoona on Aug. 1, 1913, as master mechanic, succeeding W. M. Rushton. Before that he had been airbrake engineer with the Westinghouse company. He spent several years in Argentina, where he installed the first air brake on electric cars in the republic. While in Altoona Mr. Long rebuilt the present one-man cars and completed the work of installing air brakes in all hand-brake cars.

L. A. Lovell is secretary and auditor of the Fresno Traction Company. In this capacity he succeeds H. A. Culloden.

S. Hoadman, formerly electrical engineer, is acting manager of the Tucson Rapid Transit Company, Tucson, Ariz. He succeeds Frank E. Russell, who was manager and purchasing agent.

Robert Harris, for some years superintendent of the car repair and shop department of the Winnipeg Electric Railway, has been appointed master mechanic of the New Brunswick Power Company. The office of master mechanic at New Brunswick is a new one with the company.

F. A. Jordan assumed his new duties on July 1 as purchasing agent for the Georgia Railway & Power Company, to succeed J. P. Dick, who has been made assistant to W. H. Taylor, vice-president and general manager of the company. Mr. Jordan entered the employ of the Atlanta Gas Light Company in 1908 as a timekeeper in the street main department and since 1916 has been connected with the purchasing department of the Georgia Railway & Power Company.

J. Fred Keate, commercial agent of the Salt Lake & Utah Railroad, has been appointed traveling freight agent of the Chicago, Rock Island & Pacific Railroad Company. Fred McClure has been named city freight agent, to take over practically the same duties as those of Mr. Keate. Mr. McClure will be succeeded by William W. Orem as traveling freight and passenger agent. Mr. Keate started in the railroad business with the Union Pacific in Salt Lake. He was later connected with the Chicago, Milwaukee & St. Paul in Salt Lake City as chief clerk and city freight and passenger agent from 1911 to 1917. Since 1917 he has been with the Salt Lake & Utah Railroad, first as chief clerk, and as commercial agent for the past three years.

Obituary

John J. Woollam, superintendent of the third division of the United Railways, St. Louis, died recently. Mr. Woollam started as a mule car driver in 1883 and held various positions with the company during his long career. Rolla Wells, receiver, and Col. A. T. Perkins, manager of the United Railways, were among the honorary pallbearers at the funeral.

Hermann J. Strobel, supervisor of appraisals of Stone & Webster, Inc., Boston, died Aug. 3 following an operation. He was forty-one years old and had been with the Stone & Webster organization for the past eleven years in electrical engineering work and appraisal work. From 1905 to 1911 he was with the New York Central & Hudson River Railroad in New York as chief draftsman and assistant engineer on the electrical work of the Port Morris and Yonkers power stations and the Grand Central Terminal.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

General Electric Company Gets New $1,000,000 Order for Paulista Railway

Orders totaling about $1,000,000 for new equipment for electrifying an additional 35 miles of the Paulista Railway, Brazil, have just been placed with the International General Electric Company. This extension was contemplated when the first contract with the International General Electric Company was closed in 1920. That contract provided for 28 miles of double-track electrification, and the extension brings the total electrified mileage up to 63 miles, starting at Jundiahy and extending north to Tatu. This is approximately half the total mileage originally planned. Further extensions are expected. Included in the order just announced are five 62-ton 3,000-volt d.c. switching locomotives, a complete substation of 4,500 kw. ultimate capacity with motor generator sets, stepdown transformers, switchboards, switch gear and other auxiliary equipment and overhead line material and transmission for the extension.

The original contract called for twelve electric locomotives, (eight freight and four passenger) a 4,500 kw. substation and transmission for the first 28 miles, running from Jundiahy to Campinas. This equipment went into service about October, 1921.

Scarcity of coal and the necessity of using wasteful wood-burning locomotives, coupled with steep grades, has been the principal factor in the decision to electrify. The heavy traffic was another reason for this step. In 1918 275,000,000 ton-miles were handled Jundiahy to Cordiero.

The operation of the portion already electrified has accomplished substantial savings, while with the completion of the extension more than double the tonnage formerly handled is expected to be hauled with ease. The Paulista is the most important railroad in South America to adopt the direct-current system for electrification. Power is being supplied at 88,000 volts, 60 cycles, by the São Paulo Light & Power Company. This will be converted at the substation for train operation.

Feralun Plant Enlarged

The American Abrasive Metals Company, which manufactures "Feralun" step treads, has recently completed an enlargement to its manufacturing plant at Irvington, N. J. Among the recent car orders mentioned in ELECTRIC RAILWAY JOURNAL where this material will be used for step treads are included 200 cars for the Brooklyn City Railroad, forty cars for Memphis, cars and trailers for the Louisville Railway and a recent purchase by the Georgia Railway. The demand for "Feralun" has been growing so rapidly that an addition to the plant became necessary some months ago. An addition 105 ft. x 36 ft. has been built on the finishing shop. A new wing 208 ft. x 30 ft. has been added to the foundry and a new 20-ton cupola has been installed. A still further increase in the number of orders has taxed the capacity of the plant even with the new addition.

No Anthracite Agreement Yet

The hopes appear not to have been well founded that were aroused by the recent announcement of the United Mine Workers of America that they would abandon their demand for the "check-off" if the anthracite operators would give up the practice of deducting various items from the miners' pay. Although this particular point has been eliminated from the controversy the acceptance of a new agreement by both sides appeared on Aug. 17 to be as remote as ever. The union seemingly is still determined to get full "recognition."

A recent bulletin issued by the general policy committee of the anthracite operators states that the coal operators have been advised by counsel that it would be illegal for them to enter into a combination or agreement whereby no one could dig coal except those who pay tribute to the United Mine Workers. Such a monopolistic arrangement, it is said, would violate the Sherman anti-trust law.

An idea of the methods of the union is given by a statement in this bulletin that an incomplete report of disciplinary action taken by the United Mine Workers during a period of sixteen weeks shows over 600 men expelled from the organization for ninety-nine years each, and over forty men fined $1,000 each. In the same period the penalties showed 1,236 members were fined a total of $171,852, and exiled from their trade for a total of 66,784 years. Such actions are contrary to the spirit of American institutions, according to the bulletin, which quotes the Supreme Court of the United States as saying: "There is no more sacred right of citizenship than the right to pursue unmolested a lawful employment in a lawful manner. It is nothing more nor less than the sacred right of labor."

A. H. Jackson has resigned as traction representative to the English Electric Company, Ltd., on being appointed sales manager of the electric traction department of the General Electric Company, Ltd., Magnet House, Kingsway. Mr. Jackson was formerly traction representative to the British Westinghouse Company.

British Contracts Let

In connection with the electrification of the suburban lines of the South Eastern & Chatham section of the Southern Railway, England, the English Electric Company has secured a contract for motors, and the Metropolitan-Vickers Electrical Company has secured a contract for control gear. These large orders are for the electrification of the first section of suburban lines; that is to say, those within a radius of 15 miles of Charing Cross. The number of motors included in the order is 508. Each is to be of 300 hp. The cost forms part of an expenditure of £5,500,000, which is the subject of a Government guarantee under the trade facilities act.

The London County Council has announced the award of a contract to supply high power motors for 200 cars to the English Electric Company. The contract is to be divided equally between the two companies, and it is expected by this means to cut in half the delivery time. The bids submitted by these two manufacturers were the same, namely, £164,000 for the complete equipment.

It may be noted in connection with this matter that Parliament has just passed the railway bill, which enables the Minister of Transport to make an order authorizing any railway to carry out an extension and development project up to a total cost of £500,000 without the delay and expense of a special bill in Parliament. Hitherto the limit without legislation was £100,000.

Portland Cement Output in July

According to a recently published report of the Department of the Interior the production of Portland cement during the month of July increased from 11,557,000 barrels in 1922 to 12,620,000 barrels in 1923. Stocks on hand at the end of the month, however, were slightly less at the end of July, 1923, than they were the year previous. They were noticeably less than at the end of June, the figures being 8,076,000 as compared with 9,168,000.

Metal, Coal and Material Prices

Metals—New York	Aug. 14, 1923
Copper, electrolytic, cents per lb	14.125
Copper wire base, cents per lb	17.125
Lead, cents per lb	6.50
Zinc, cents per lb	6.30
Tin, Straits, cents per lb	38.375
Bituminous Coal f.o.b Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.625
Somerset mine run, Boston, net tons	2.625
Pittsburgh mine run, Pittsburgh, net tons	2.075
Franklin, Ill., screenings, Chicago, net tons	1.675
Central, Ill., screenings, Chicago, net tons	1.375
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$7.00
Weatherproof wire base, N. Y., cents per lb.	18.75
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal	$1.00
White lead, in oil (100-lb. keg), N. Y., cents per lb	11.375
Turpentine, (bbl. lots), N.Y., per gal	$0.935

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Track and Line

Ohio Valley Electric Railway, Huntington, W. Va., has begun work of relaying the tracks from Thirty-first Street to the end of the line at Buffington Street, Guyandotte, now a part of Huntington. Construction crews have been placed at work on the Guyandotte section first, but as soon as the line is relaid there, the crews will begin at the east end of the Guyan River bridge and relay the line to Thirty-first Street. Three or four weeks will be required to complete the work in Guyandotte, it is stated. The lines will be relaid with new rails and other materials and on a concrete base.

Georgia Railway & Power Company, Atlanta, has under way an extensive improvement program. The plan includes new track, roadbed, extensions, signal equipment, etc. The following program has been outlined and is at present under way.

NEW TRACK

Extensions

Higland Avenue: single track 4,000 ft.

Double Track

West Fair: Connect turnouts. Build 931 ft. track.

Nelson, Haynes to Tatnall, 748 ft.

River line, Johnson switch to Edwin Place, 2,600 ft.

Boulevard, North Avenue to Ponce de Leon Avenue, 915 ft.

Gordon Street, Holderness to Westwood, 2,600 ft.

Turnouts

Hapeville, near Stewart Avenue.

Dill Avenue, Stewart to Ashby Street.

Rebuild

Auburn Avenue, Ivy to Boulevard, 4,163 ft., double track.

Augusta Avenue, Grant to Cherokee, 800 ft.

Edgewood Avenue, Bridge to Elizabeth, 2,740 ft., double track.

Kelly Street, Fair to Glenn, 1,057 ft.

Lee Street, West End Avenue to Park Street, 610 ft.

Pulliam, Bass to Ormond, 807 ft., double track.

College Park Line, Hapeville Underpass to Virginia Avenue, 4,392 ft.

College Park Line, at Newman, 4,900 ft.

New Special Work

Mitchell and Forsyth Streets.

Piedmont, Gilmer to Edgewood.

Forsyth and Marietta, four curves, 7-in. 140-lb. rail and four crossings.

New Special Work

Alabama and Forsyth, two curves, 7-in. 140-lb. rail, one crossing.

Broad and Marietta, replace present grand union 7-in. 140-lb. rail.

Broad and Alabama, five curves, 7-in. 140-lb. rail, one single-track crossing, one double-track crossing.

The company is completing pits under eleven 200 ft. tracks at the Butler Street carhouse, and the carhouse at East Point is under construction.

The company has installed on the South Decatur line three sets of Nachod Type C.D. block signals; on the River line, four sets Nachod Type C.D. block signals, and it has on order for the Atlanta Northern Railway nine sets of Nachod Type C.D. block signals.

Gary Street Railway, through its president, has announced a $1,000,000 extension from Gary, east to Miller and the new Gary Lake-Front Park, with a spur north to the new plant of the Gary tube works. The new line will consist of 13 miles of double track built east along Fifth Avenue and Gleason Road, paralleling Dunes Highway to the Gary bathing beach and a number of other beach resorts. When the new line is completed eight buses which have been used by the railway to handle this traffic will be used elsewhere in the city as feeders to the car lines. Future extensions beyond Gary paralleling the Lake Michigan shore drive now being built to the Porter County line are planned for next year.

Power Houses, Shops and Buildings

Indiana Service Corporation, Fort Wayne, Ind., is planning a central operating carhouse costing about $250,000 and covering one-half of a city block. The ground was recently acquired on the south side of Wallace Street, between Lafayette and Barr Streets. The building will also contain offices and will be used for the housing of cars used on the south side of the city. It is strategically located near the new line which is to be put in on Lafayette Street. Building operations will not be started immediately.

Interstate Public Service Company, Indianapolis, has purchased 105 acres of land on the north bank of the Ohio River at Jeffersonville. The land will be used for a superelectric power plant to supply light and power to southern Indiana. The tentative plans also call for the tying in of this proposed plant with important hydro and steam electric plants which the Kentucky Utilities Company is now getting under way in Kentucky. The Kentucky company, which, with the Interstate Public Service Company, is a subsidiary of the Middle West Utilities Company of Chicago, is arranging to spend, it is understood, $10,000,000 in the erection of the big power plants and transmission lines which will furnish power and light to a large part of the Blue Grass state. Mr. Reid says that several million dollars will be spent in the erection and development of the proposed plant at Jeffersonville.

Trade Notes

Power Specialty Company, New York, N. Y., announces that after Oct. 1, the Philadelphia office will be located in the Atlantic Building at Broad and Spruce Streets. The company manufactures Foster superheaters, economizers and oil heaters.

Pure Carbon Company, Wellsville, N. Y., has announced the establishment of a Chicago representative in John Nangle, 184 West Washington Street. This representative is in a position to give personal engineering service on all brush problems and requirements in this territory.

Electrical Engineering & Manufacturing Company, Pittsburgh, has appointed W. A. Harman manager of its branch office recently opened in the Lafayette Building, Buffalo, N. Y. Mr. Harman was for several years connected with the United States Government War Department as chief inspector of the Panama Canal. He was also associated for some time with the General Electric Company at its Schenectady works.

Irvington Varnish & Insulator Company, Irvington, N. J., has taken over the selling agency of the output of the Harvey Wire Company, Newark, N. J., manufacturer of enameled, silk-covered and cotton-covered wire. The Irvington Varnish & Insulator Company will supply the electrical trade with these products, whose quality standard will be maintained on the same basis as its other lines of insulation.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., through R. S. Feicht, director of engineering, has announced the creation of a new engineering department. The new department will be known as the porcelain insulator and transmission engineering department and C. L. Fortescue, well known in electrical engineering, has been appointed manager. This new department will handle the design of line insulators and other work in connection with transmission problems. "The rapid growth in the porcelain business and the steady increase in the number of problems growing out of the transmission of high voltages for great distances have necessitated the creation of a department to handle these problems," declared Mr. Feicht, who made it plain that, in connection with transmission problems, the new department will make studies and analyses of these problems, but will not be concerned with the design of large transmission systems.

New Advertising Literature

Laclede-Christy Company, St. Louis, Mo., has issued two bulletins on its Stowe stoker. One contains a general description of the stoker, while the other gives the results at Gloucester, Mass., of burning Pocahontas coal on a conveyor feed stoker.

Westinghouse Electric & Manufacturing Company has issued the first five leaflets in Vol. II of its railway operating data series. These data have been prepared by the Westinghouse company for the use and assistance of electric railway operators in the care and maintenance of car equipment. The information is in the form of educational articles offering suggestions along labor saving lines in simple language easily understood by shop workmen. The methods suggested and described are those that have proved economical in well-managed repair shops. The subjects treated in this issue of the series are: "Railway Motor Shafts and Their Maintenance," "Axle Collars," "Gear Cases," "Ventilated Railway Motors," "Life of Axle Bearings of Railway Motors," and "Heat Treated Bolts for Railway Service." Copies of this publication and of Vol. I of the series may be had upon application to the company.

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New York, Saturday, August 25, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 8

Public Service Railway Would Go Into the Bus Business

THE people of New Jersey have much to gain by accepting forthwith the plan of settlement proposed by the Public Service Railway. Not only that; the railway would be greatly strengthened in its financial position and, therefore, in its ability to give the territory good transportation by such acceptance. The concessions which the company finds it possible to make, conditional on acceptance of the plan, such as better wages to men, lower fares and improved service, show the people some of the many advantages which should accrue to them through a unification of all transportation.

The plan offered would put the company in the position it logically should hold with respect to transportation in the territory served, namely, a true monopoly, with bus and railway in a co-ordinated service. Heretofore, the railway has had to submit to all the obligations and regulations of a monopoly, but has been deprived of the reciprocal obligation on the part of the public to protect it against competition that obviously has been unfair. The monopoly now proposed would retain for the public whatever benefit the coming of the bus has meant and yet enable the company to place itself in a position where it might hope to earn the fair return to which it is entitled.

Furthermore, the proposed plan is fair and is appealing. The company has about gone the limit in its endeavor to reach a basis of settlement that would win general approval. It has conceded the employees the 20 per cent wage increase which was the men's final demand before the strike, and they have promptly accepted. It has consented to reduce the cash fare 1 cent, making the fare on bus or railway, with interchangeable transfer privileges, 7 cents and 1 cent for transfer. It has agreed to accept a valuation of $110,000,000, which is the amount found by the special master appointed by the Federal court, and which is $15,000,000 less than the amount found by Ford, Bacon & Davis after a study of nearly a year while retained by the state. It has agreed to purchase all competitive buses in service on July 31 and give employment either on buses or cars to all bus drivers who can qualify under the railway's regular standards. It has agreed to operate buses, co-ordinated with the cars, to the extent necessary to accommodate traffic, and to modernize and standardize the buses. It has agreed to resume service promptly upon assurance of acceptance of the plan, with the new rate of wage and, temporarily, the old rate of fare. All this is conceded provided that the plan is accepted as an entirety, that the licenses of all competitive bus owners shall be rescinded and no further competitive bus licenses granted, and that the commission agrees to the $110,000,000 valuation.

Whether the twenty-one-day shutdown of service was a necessary prelude to this proposal of the company and whether it has served a useful purpose are debatable questions. Meantime the commission has given consideration to the company plan, and while it has indicated that there are some difficulties in the way of acceptance in full, it has said that it would accept the plan as a "basis for discussion and conference." Hence its position does not seem so far apart from the company's that general agreement cannot be hoped for. The commission, however, emphasizes that the company should resume service as the first step, rather than hold off until the full acceptance has been assured.

Should the final result be the acceptance of the company's proposal, in substance, there is reason to look for an altogether new era of transportation service in New Jersey with a good prospect of financial success for the enterprise.

Accounting Changes Suggested by the Supreme Court Valuation Decision

A NUMBER of valuation engineers believe that some new measures in accounting methods are desirable, in view of the decision of the Supreme Court in the valuation case of the Southwestern Bell Telephone Company (State of Missouri vs. Public Service Commission of Missouri), decided May 21, 1923. While the court discussed the question of reasonable rates and the validity of certain operating expenses, the most important part of its decision was where it declared definitely, following the Minnesota rate case, that it is the property, and not its original cost, of which the owner may not be deprived without due process of law. Strictly speaking, this means that the utility rates for any definite period must be based on the value of the property in that period. In fact, the court says, "Estimates [of value] for tomorrow cannot ignore prices [of construction] of today." Thus the court went definitely on record in favor of the inclusion of current values in fixing a basis for rates, in spite of the very able argument for the investment method of valuation for rate purposes, presented by Justice Brandeis, with whom Justice Holmes concurred.

The decision in the Southwestern Bell Telephone case is the latest of a series rendered in federal and state courts, all following the same general trend, by which the value of utility property for rate-making purposes is being defined. To mention a few only, the historic case of Smyth vs. Ames, decided in 1898, listed the general elements to be taken into account in a valuation of this kind but did not give the relative weights to be attached to each. The Kansas City Southern case of the Supreme Court, decided about three years ago, was perhaps the first to emphasize the great importance of current values. The Minnesota rate cases are men-

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tioned above. In the Elizabethtown Gas case, the New Jersey Supreme Court declared essentially that the dollar of the present day has an entirely different purchasing power than formerly and this fact must be taken into account. Other important cases bearing on this point were that of the St. Joseph Railway, Light & Power Company, a U. S. District Court decision, and the case of the Potomac Electric Power Company, decided by the U. S. Court of Appeals for the District of Columbia.

A strict interpretation of this ruling means that, other things being equal, the value of a property, with no changes in its capital account, will vary to some extent at least from year to year if there is a yearly variation in the cost of the materials and labor and other things that go to make up the valuation, though where a value for rate-making purposes is established for a property, this rate base will not change until further action is taken by the commission. Obviously, with this method of determining value, the utility should take great care to maintain an accurate inventory of the plant and all additions to it. This is more important than a record of the additional capital charges. In other words, it is more necessary to keep careful records of materials and labor used in construction than to tabulate merely the cost.

While the majority decision of the Supreme Court did not, like the minority opinion, discuss the effect of its conclusion from the standpoint of public relations, it is obvious that much can be said from that point of view in favor of the majority decision. In the first place it places utility valuation more closely in the same class with valuation of other properties for other purposes than does the investment theory. Another great advantage is that it will encourage and reward good judgment in selecting the best time for the construction of extensions and additions to the plant. With the investment principle, a management has no definite incentive, so far as increased return is concerned, toward economy when expanding its capital account. With the valuation of the property constantly changing, however, according to the current prices of material and labor, there is every incentive to make necessary additions to the plant at times when construction costs are low. Here also the Supreme Court decision puts the utility more in the class of other lines of business.

It is interesting to note that this decision has already been applied by the Pennsylvania Public Service Commission in the hearing to determine whether there should be any reduction in the fares of the Philadelphia Rapid Transit Company.

When a Car Is Not a Car

COMMENT was made on this page several weeks ago concerning the injurious effect upon electric railways of inaccurate newspaper stories. Another harmful practice of the daily press is the indiscriminate use of the word "car." Take, for example, the headline "Boy at play killed by car." The impression often is created that this fatality was the result of a street car accident. Only those who read further find that it was an automobile accident. Similar headlines appear frequently. In justice to the electric railways the use of such misleading headings should be avoided.

We must realize that this is a very natural error. Nearly every automobile owner refers to the vehicle as his "car." So general a usage will not be changed simply because railway men desire it. But newspaper editors are pretty fairminded, on the whole, and a diplomatic appeal might bring to an end this unfortunate use of the word.

Bus vs. Trolley Looks Different When All Factors Are Considered

WHILE few of the writers who have discussed the relative merits of trolley cars and buses have given serious consideration to the public's side of the question, it is a matter of such great importance that it should not be passed over, as it so frequently is in these discussions. At a recent hearing on the subject, it was brought out that a township having some three miles of double-track trolley line was facing an expenditure of $25,000 for paving if the trolley went out of business. The same township is receiving $30,000 a year from the company in taxes and licenses, while at most, under present conditions, the buses that might replace the trolley could not be forced to pay more than $1,800, according to the Mayor of the township.

The question of paving is well covered in the article by Victor Topping in this week's issue. The figures he presents are based on studies made for the Toronto Transportation Commission in order to determine the most economical type of service to be provided on certain extensions to its system. While the first costs given by him are somewhat high for conditions in the United States, as he notes, this fact favors the buses in his results on account of the lower permanent investment required as compared to the railway.

Those who are familiar with the maintenance of modern pavements know only too well the difficulties of keeping up a good surface with heavy motor traffic. Even the best types of construction known are none too permanent. The figures used in Mr. Topping's article of 1 cent per ton-mile for pneumatic tires and 1½ cents per ton-mile for solid tires, which were presented at the 1922 convention of the American Electric Railway Association as the cost of deterioration of highways due to operation of motor buses over them appear to be low, rather than the reverse.

The conclusion of the article based solely on the question of cost, that there is no field for the gasoline bus in mass transportation, would appear to be sound in the light of actual results obtained by various bus operators. Where service is infrequent, as in the suburbs, or for certain light interurban service, the trolley bus and the gasoline bus have their field. Special service where tracks or wires would not be tolerated, or where de luxe transportation is desired, furnish additional uses for the gasoline bus. But on the basis of cost of service for carrying the bulk of the population, the trolley car undoubtedly is the best.

Some individual bus owners may dispute figures on cost of service. However, these men do not make proper allowance for the labor they supply free of charge for inspection, making minor repairs and cleaning of their own buses. Nor do they figure their pay on the basis demanded by employees of a corporation. And of course a corporation would be necessary in any sizable bus undertaking. Many bus owners are their own chauffeurs and stay on the job eleven to twelve hours each day, after which they inspect their machines. They forget that at present they are furnishing base transportation only, and leaving the peak demands largely to the trolleys.

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Operating Results of Automatic Door Safety Cars

By Charles Gordon
Western Editor ELECTRIC RAILWAY JOURNAL*

Regular operation of forty-six cars of the type developed in Chicago has demonstrated the design to be practical and to offer a number of desirable operating features. A method of studying and analyzing passenger movements in the development of car design to fit service requirements, or of fitting cars to service with only few traffic observations, is given.

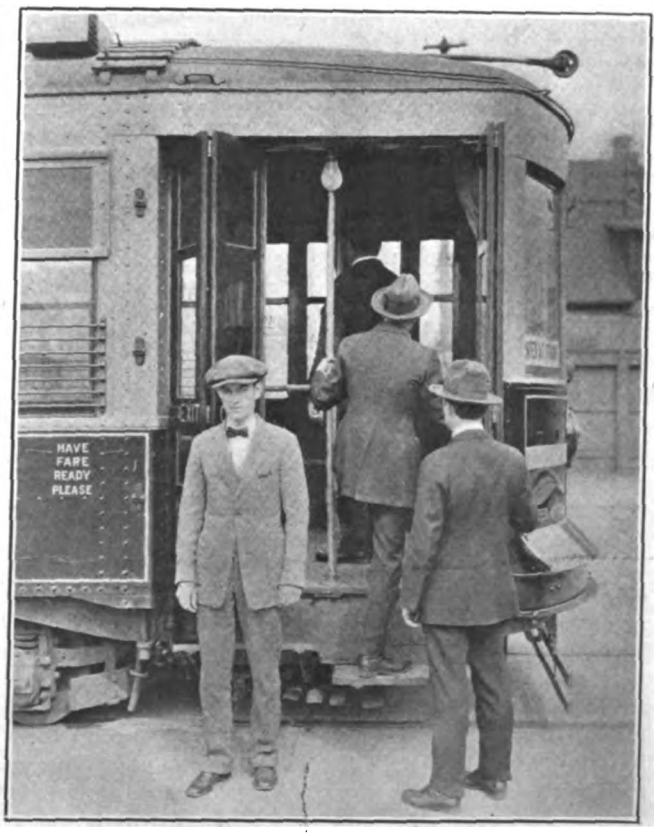
SUFFICIENT experience has been had in the operation of the automatic exit door, double-truck, one-man safety cars designed by the Chicago Surface Lines, so that their practicability has been established. Forty-six of these cars have now been in operation over an extended period in regular service on various lines.

The construction of these cars was described in the ELECTRIC RAILWAY JOURNAL of Jan. 14, 1922; and the automatic exit door was further treated in the issue of Sept. 30, 1922. The first car of this type was put into actual service in March, 1922, and the addition of the remaining forty-five cars started in the fall of that year. They have been distributed over a number of lines in the city where conditions were considered suitable for one-man operation.

Comparing these cars with the single-truck, single-doorway type of one-man car, of which the company had ten in operation for some time, their superiority in appearance, comfort to passengers and suitability to general service conditions in a large city was at once noticeable. The more liberal provision for the movement of passengers within the car, combined with the arrangement for simultaneous loading and unloading through door openings of generous dimensions, and with the further encouragement to rapid movement of passengers offered by low steps, enabled these cars to go into service on the same schedules as had been operated with the smaller cars, despite the fact that they have a seating capacity of fifty passengers and a considerably larger total rush-hour capacity. The automatic exit door has provided a method of obtaining the advantages of free and uninterrupted simultaneous interchange of passengers without slowing down the passenger movement by the use of any form of barrier in the passageways. At the same time, this arrangement, without imposing any additional duties on the car operator, has effectively safeguarded fare collection by preventing passengers from boarding through the exit doorway. The combination of this door control with the usual safety devices and the arrangement for facilitating loading operations at terminals and for balancing all doors at both ends of the car in emergency are features that were soon found to function with entire satisfaction under actual operating conditions.

The car body, though built for minimum weight consistent with rigidity and strength, was also designed to withstand wear and tear of service and certain types of collisions without demolition of the vestibule and consequent excessive repair costs. It has been subjected to some severe tests and has met all of the requirements of substantial, conservative design. The exit-door mechanism was developed with simplicity and ruggedness in mind in order to assure minimum adjustments and maintenance in service. It has also demonstrated, after continuous operation through a winter of extremely adverse weather conditions, that the fundamental requirements for such a device were properly anticipated.

This device accomplishes what may on first description appear to be a number of complicated functions. But as the result of persistent study of the original installation on full-sized models, it was simplified to a very few simple and rugged parts. The treadle in the platform floor is made of safety tread material and is arranged so that it is self-cleaning to prevent



Simultaneous Interchange of Passengers, Showing Automatic Exit Door Closing as Alighting Passenger Clears Step

*At the time this article was written Mr. Gordon was engineer of equipment Chicago Surface Lines.

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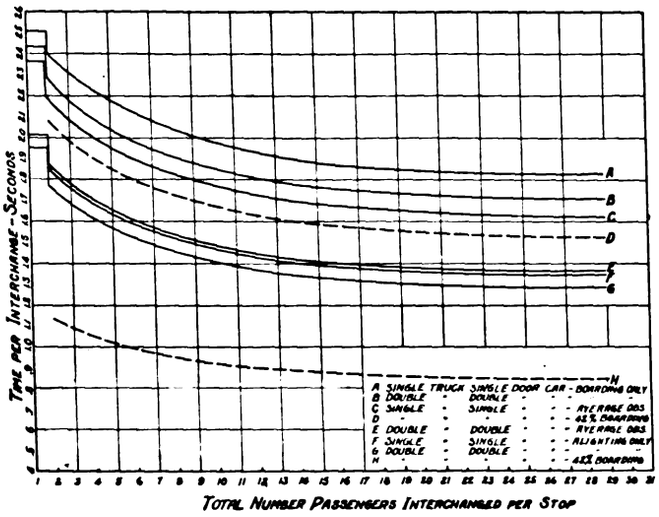

Fig. 1—Time Consumption for Passenger Interchange for Single and Double-Door Cars

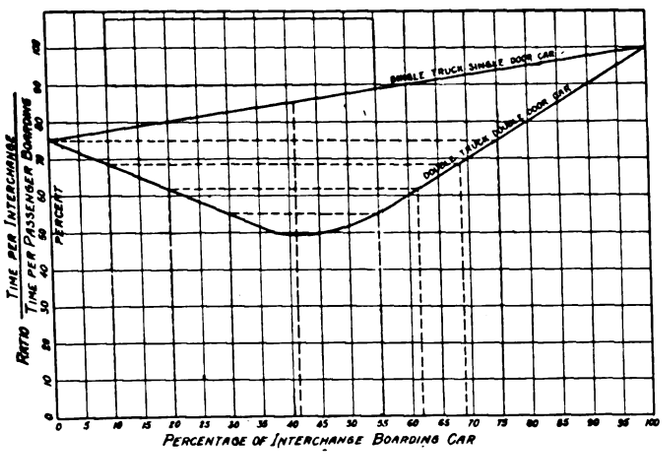

Fig. 2—Comparison of Passenger Interchange Efficiency Under Varying Percentages of Boarding Passengers

clogging with ice, snow or mud. The valve of the door engine mounted overhead is actuated from the treadle by a steel rod extending up through the stanchion which separates the entrance and exit passages. The exit door is prevented from opening until the proper time by a small, simple air cylinder tapped into the opening pipe of the entrance door engine, and the selective control of entrance and exit door is accomplished by providing an additional port in the M-28 brake valve. In addition to the simplicity in design, all of the parts of the device are permanently pinned in place, and as the motion of these parts is extremely small, little evidence of wear in the mechanism can be discovered after more than a year of service.

In order to compare the effect of the door arrangement on the time of passenger movement of these cars with that of the single-truck cars provided with a single doorway, a series of observations was made on the two types of cars running on the same line under similar conditions. For each set of observations, the cars compared were operated on the same run by the same operator. The data were collected over a large number of trips, so as to eliminate as far as possible any slight inaccuracies in individual observations. The observations were made by men stationed on the cars and equipped with stop watches for recording the length of stop required for passenger interchange. In order to keep the data collected on the two types of cars on a comparable basis, this time was carefully separated from time consumed in delays due to traffic interference. The time of leaving and arriving at terminals was noted, and the number of passengers boarding and alighting at each stop was counted and recorded.

The original data were collected on simple forms and worked up into trip averages and finally into daily averages. In an accompanying tabulation the results of observations taken over a period of twenty-one days are recorded for 118 half-trips of the double-truck car and 114 half-trips of the single-truck car.

It will be noted from the general average figures that the schedule speed on this particular line is approximately 14 m.p.h. with approximately four and one-half stops per mile. It is also interesting to note in the tabulation that although the schedule speed maintained with the double-door unit was within 4 per cent of that maintained by the single-door unit, the average passenger interchange handled was 17 per cent higher on the double-truck than on the single-truck car.

Although the data on this particular line represent outlying residential feeder service in which the number of stops per mile is quite low, some of the double-door cars are in service on lines operating through more congested districts where the stops per mile are considerably higher. The line selected was used for these observations in order to allow operation of both the single-door and double-door cars on the same run, so that conditions would be closely comparable.

The data compiled are of general interest, but although the cars were run on the same line, over the same routes and by the same operator, there are still included in these average data several important variables. Therefore, in order to eliminate these variables and obtain an accurate comparison of the effect of door construction and arrangement on the speed of passenger movement, a further analysis of the data was undertaken.

Comparative Time per Passenger Interchange Analyzed

This analysis quickly demonstrated that the time per passenger movement varied materially with two important factors—first, the total number of passengers interchanged at a given stop, and second, the direction of the passenger movement; that is, boarding or alighting. When the passenger movement includes both boarding and alighting, the time of stop is materially affected by variations in the number boarding as compared with the number alighting, even where the total number of passengers interchanged is the same.

In the following discussion, the term "number of passengers interchanged" is used to indicate the sum of the number of passengers boarding and those alighting at a given stop. The "time per passenger interchange" is therefore the total time of the given stop divided by the "number of passengers interchanged," or is the time of stop per passenger movement (either on or off) for any combination of passengers on and off. The effect of the arrangement of car platform, doors and steps on the time per passenger interchange is a measure of the merits of the design from the standpoint of rapidity in loading and unloading passengers.

It is almost apparent that the time per passenger interchange will be materially affected by the number interchanged at any stop, and will decrease as the number of passengers interchanged increases. This is the

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first factor referred to above and may be called the "quantity factor." Careful study of the data accumulated also shows that on each of these cars the time for passengers to alight is approximately 75 per cent of the time to board on the same car. It is therefore again evident that various combinations of passengers boarding and alighting will have a material effect on the "time per interchange." This is the second factor referred to above and may be called the "directional factor." By analyzing the effect on the time per passenger interchange of variations in the quantity factor and the directional factor for each of the two cars under consideration, a complete comparison between the two cars may be made for any combination of passenger movements.

Curves *A* and *B* in Fig. 1 are plotted from the data collected, to show the time per passenger for various numbers of passengers to board the single-truck and the double-truck cars, respectively. Likewise, curves *F* and *G* show the variations in the time per passenger to alight from each car. The time per passenger to alight, in curves *F* and *G*, is approximately 75 per cent of the time per passenger boarding for the corresponding car as shown by curves *A* and *B*.

An average of all of the data collected on each car for various numbers of passengers interchanged per stop is shown in curve *C* for the single-truck car and curve *E* for the double-truck car. These two curves show the variation in time per interchange in seconds for varying total interchanges at individual stops, without regard to the direction of passenger movement. They are presented simply to show the average of actual results obtained under the conditions existing at the time and on the particular line which is represented by the data collected. The curves shown in Fig. 1 illustrate clearly the effect of the quantity factor on the time per passenger interchange on each car, both for passenger movements in each direction separately, and also for the average of all conditions encountered in the observations.

Directional Factor Defined

The curves in Fig. 2 were prepared for the purpose of studying the variations in the directional factor and determining the comparative effect of such variations on the time per passenger interchange for each type of car. To make this comparison, it was necessary to arrive at some means of expressing variations in the directional factor quantitatively. If, in any combination of passengers on and off, the number boarding is expressed as a percentage of the total number interchanged, a ready means of accomplishing this is obtained. To illustrate with a concrete example, we may obtain for a total interchange of ten passengers the following combinations of passengers on and off, and if the directional factor is expressed as the ratio of the total number boarding to the total number interchanged, the result will be as shown in the table below.

A directional factor of 0 represents all passengers alighting, and a directional factor of 100 per cent represents all passengers boarding. Curves *A* and *B* in

Total interchange	10										
Number of passengers boarding	0	1	2	3	4	5	6	7	8	9	10
Number of passengers alighting	10	9	8	7	6	5	4	3	2	1	0
Percentage of total interchange represented by passenger boarding (directional factor)	0	10	20	30	40	50	60	70	80	90	100

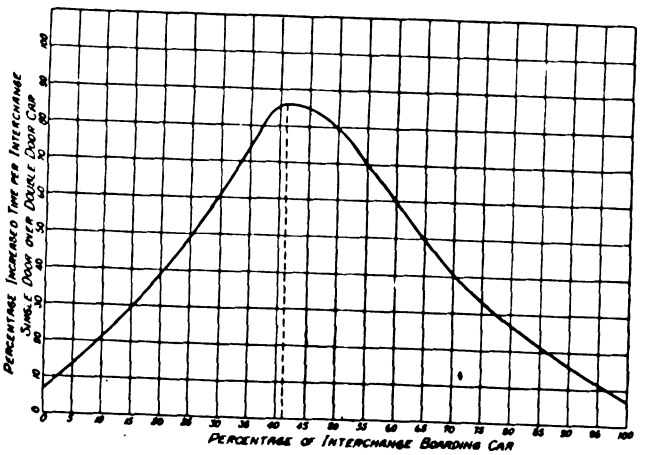

Fig. 3—Excess Time per Interchange of Single-Door Car as Against Double-Door Car for Varying Percentages of Boarding Passengers

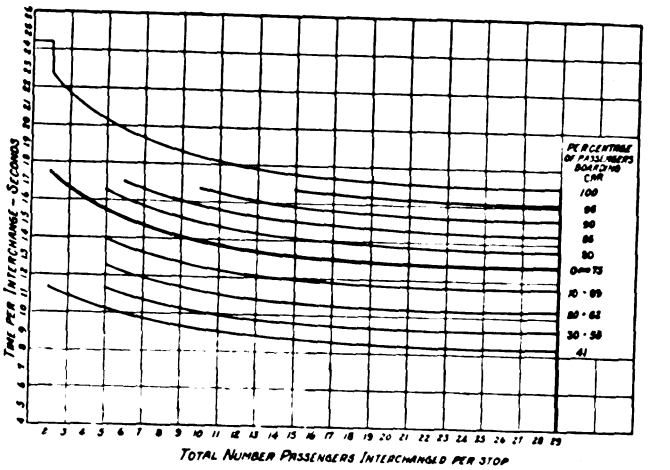

Fig. 4—Combined Effect of Number and Direction of Passengers on the Time per Interchange for Double-Door Car

Fig. 1 therefore represent the variations in time per interchange on the single-door and double-door cars, respectively, when the directional factor is 100 per cent; and curves *F* and *G* represent the conditions when the directional factor is 0. It is then a simple matter to determine the effect on each car of other values of the directional factor between these two limits.

On the double-truck car when passengers are boarding and alighting, the movement requiring the shorter time will be completed before the movement in the opposite direction, and consequently the total time of a stop will be the time for this second movement to be completed. The time per interchange, however, will be this total time of stop divided by the sum of the number of passengers boarding and alighting. As an example, if we assume eight passengers to be boarding and two alighting, the total time of stop will be the time for eight passengers to board. The two alighting passengers will have left the car during this time. The time per passenger interchanged will then be the time for eight passengers to board, divided by ten.

From curves *B* and *G* in Fig. 1, the time for any number of passengers to board and alight, respectively, may be determined by multiplying the time per passenger obtained from the curves by the number of passengers. In any combination, the time of stop on the double-truck car is the greater of the two values obtained, whether this is for the passengers boarding or alighting, since the movement in the opposite direc-

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COMPARISON OF LOADING CHARACTERISTICS OF ONE-MAN CARS; GENERAL OPERATING DATA FROM OBSERVATIONS

		Operating Time					Time of Stops									
		Running		Stops*			Passengers		Traffic							
Date	No. of Half-Trips	Seconds	Per Cent	Seconds	Per Cent	Total Seconds	Seconds	Per Cent	Seconds	Per Cent	Total Seconds	Total Miles	Total Number of Stops	Stops per Mile	Schedule Speed, M.P.H.	Total Pass. Interchange
DOUBLE-TRUCK CAR—DOUBLE DOORS—AUTOMATIC EXIT																
4/ 9/23	6	4,144.8	92.5	340.2	7.5	4,485	290.5	85.5	49.7	14.5	340.2	17.76	63½	3.57	14.26	149
4/ 9/23	8	5,617.6	87.1	832.4	12.9	6,450	640.3	77.0	192.1	23.0	832.4	23.68	112	4.73	13.22	402
4/11/23	13	9,454.0	87.9	1,301.0	12.1	10,755	991.6	76.3	309.4	23.7	1,301.0	38.48	179	4.65	12.88	725
4/12/23	7	5,058.3	88.7	641.7	11.3	5,700	521.7	81.8	120.0	18.2	641.7	20.72	90	4.35	13.10	330
4/13/23	8	5,516.5	90.1	678.6	10.9	6,195	504.6	74.4	174.0	25.6	678.6	23.68	108	4.56	13.78	258
4/16/23	16	11,287.4	88.9	1,402.6	11.1	12,690	1,125.5	80.3	277.1	19.7	1,402.6	47.36	217½	4.59	13.42	677
4/17/23	16	10,441.5	88.0	1,423.5	12.0	11,865	1,078.5	76.8	345.0	23.2	1,423.5	47.36	209½	4.42	14.37	553
4/20/23	6	4,080.6	87.3	599.4	12.7	4,680	501.1	83.6	98.3	16.4	599.4	17.76	84½	4.75	13.68	341
4/21/23	8	5,871.8	94.1	368.2	5.9	6,240	259.6	70.5	108.6	29.5	368.2	23.68	94	3.97	13.64	168
4/21/23	8	5,696.1	89.6	663.9	10.4	6,360	531.1	80.0	132.8	20.0	663.9	23.68	118	4.98	13.41	330
4/24/23	11	7,572.9	91.9	662.1	8.1	8,235	522.5	79.0	139.6	21.0	662.1	32.56	142	4.36	14.23	285
4/25/23	11	7,604.9	88.3	1,011.1	11.7	8,616	831.3	82.3	179.8	17.7	101.1	32.56	165	5.07	13.60	538
SINGLE-TRUCK CAR—SINGLE DOOR																
4/23/23	11	7,246.1	92.2	613.9	7.8	7,860	506.1	82.5	107.8	17.5	613.9	32.56	142	4.36	14.91	262
4/23/23	16	10,791.9	87.9	1,493.1	12.1	12,285	1,222.8	81.9	270.3	18.1	1,493.1	47.36	212	4.47	13.89	581
4/26/23	12	7,847.5	90.6	822.5	9.4	8,670	658.0	80.0	164.5	20.0	822.5	35.52	153½	4.32	14.75	338
4/26/23	15	10,535.9	86.6	1,629.1	13.4	12,165	1,354.0	83.3	275.1	16.7	1,629.1	44.4	232½	5.24	13.12	738
4/27/23	10	6,478.6	91.3	616.4	8.7	7,095	413.9	67.2	202.5	32.8	616.4	29.60	120½	4.07	15.03	193
4/27/23	13	8,843.2	88.4	1,161.8	11.6	10,005	894.7	77.0	267.1	23.0	1,161.8	38.48	190	4.94	13.85	483
4/28/23	21	14,001.1	89.6	1,628.9	10.4	15,630	1,304.7	80.1	324.2	19.9	1,628.9	62.16	269	4.33	14.31	724
4/28/23	7	4,879.8	88.7	625.2	11.3	5,505	516.8	82.7	108.4	17.3	625.2	20.72	96	4.64	13.55	304
4/30/23	9	5,958.4	88.9	746.6	11.1	6,705	627.0	84.0	119.6	16.0	746.6	26.64	125½	4.71	14.30	331

	Double-Truck Car	Single-Truck Car
Average interchange per stop	3.00	2.57

* Exclusive of layovers.

tion, being carried on simultaneously, is completed before this time. In each case the time per interchange may be found by dividing the time of stop by the sum of the number on and off. In this way any number of points may be obtained for various values of the directional factor by expressing this factor in terms of the percentage which the number boarding represents of the total number interchanged. These percentages are used as the horizontal values or abscissa in Fig. 2.

Directional Factor Segregated

The vertical values, or ordinates, in this diagram could be plotted as the time per passenger interchange for each value of the directional factor. The time per interchange, as is shown in Fig. 1, however, also varies with the number interchanged, or the quantity factor. As was shown in the discussion of Fig. 1, the time per passenger off is approximately a fixed percentage (75 per cent) of the time per passenger for the same number to get on, regardless of the number, and consequently if the time per passenger interchange, as obtained in the preceding paragraph, is divided by the time for the same number of passengers to board the car, the result is a fixed percentage for any given value of the directional factor, regardless of the number of passengers involved. In this way the relative variations in the time per interchange may be studied for various relative values of the directional factor only, and therefore the curve for the double-door car in Fig. 2 was prepared in this manner.

A similar curve was also prepared for the single-door car, but with a slight difference in procedure due to the difference in the door arrangement. On the single-door car there is no provision for simultaneous movement of boarding and alighting passengers, and consequently the passengers desiring to board the car must wait until those desiring to leave have all alighted. As a result, the total time of stop will be the sum of the time required for passengers to board and alight. With this change in procedure, the curve in Fig. 2 for the single-door car was prepared from curves *A* and *F* in Fig. 1 in a manner similar to that explained above for the preparation of the curve for the double-door car shown in Fig. 2.

These curves represent not only the result of the theoretical combination of the conditions described, but also the results obtained by plotting, for corresponding combinations of conditions, the actual data obtained in the observations on the cars in service. From the curve for the double-truck car it is apparent that when the number of passengers boarding at any given interchange is equal to approximately 41 per cent of the total number interchanged, the time per interchange is a minimum. At this point, the time per interchange is approximately 49½ per cent of the time per passenger for the same number of passengers to board the car. For the single-truck car with single doorway, the corresponding value of time per passenger is 85½ per cent of the time for the same number of passengers to board that car. At this point, the saving in time for the double-door car is a maximum as compared with the single-door car, and decreases as the proportion of passengers boarding varies either up or down from the 41 per cent value.

Double-Door Car Has Wider Application

A curve showing the relative values of this difference between the time per interchange for the single-door and the double-door cars, expressed as a percentage of the time per interchange for the double-door car, is shown in Fig. 3 for various combinations of passengers boarding and alighting. This curve expresses completely the relative difference in time per passenger interchange on the two cars for various values of the directional factor, and is therefore a true comparison of the merits of the two-door arrangement, from the standpoint of facilitating passenger movement. The comparatively large difference in time for passenger movement in favor of the double-door car makes this car applicable to a considerably wider range of city service conditions, where the single-door unit cannot be efficiently used, and where the requirements are still below that of the heavy trunk lines for which larger two-man units must be provided.

The curves in Fig. 4 were prepared as a matter of interest, in that they show completely, for the double-door car, the combined effect of the quantity factor and the directional factor on the time per passenger interchange. A diagram similar to the one shown in this figure may be used in scheduling cars for the purpose of predicting the total time allowance on a given line for the interchange of passengers. To do this requires

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only a simple set of observations on the line under consideration, in order to determine the passenger characteristics for that line, which will give a record of the number and direction of passenger movements at each stop, without regard to the time for these movements. A diagram similar to Fig. 4 may be prepared for any car under consideration and the effect of using this car on the particular line may be predicted by applying to the car diagram the passenger data collected, and determining therefrom the total time allowance for the movement of passengers. This was done with the data collected from these observations without regard to the time of stops, and the computed total time of stop thus obtained checked within a few per cent of the actual time recorded. The primary advantage of the method is that once the characteristics for a type of car are determined, the labor and time of collecting a large number of stop watch readings to eliminate personal errors may be saved.

Auxiliary Manual Control of Exit Door

In the construction of the automatic door as applied to the double-truck safety cars in Chicago, an auxiliary manual control for the exit-door engine has been provided for the car operator, enabling him to open the exit door independently of the treadle device. This auxiliary control is interlocked, however, so that the door cannot be opened until after the brakes are applied, and is also arranged so that the door is closed by the release of the brakes without the necessity for any further attention to the auxiliary handle. This auxiliary device was provided primarily to facilitate terminal loading, where it is sometimes desirable to load passengers through both doorways. But it has been found in practice that the car operators make use of this control to speed up the loading of passengers at heavy loading points along the line, particularly where a large proportion of transfer traffic is encountered. This feature further speeds up passenger movement in comparison with the single-door car, but is not taken into consideration in the results herein presented, as the data compiled includes only normal interchanges using the entrance and exit doorways independently, with the automatic exit door in full operation at all stops.

Passenger Compartment at the Front in Combination Cars

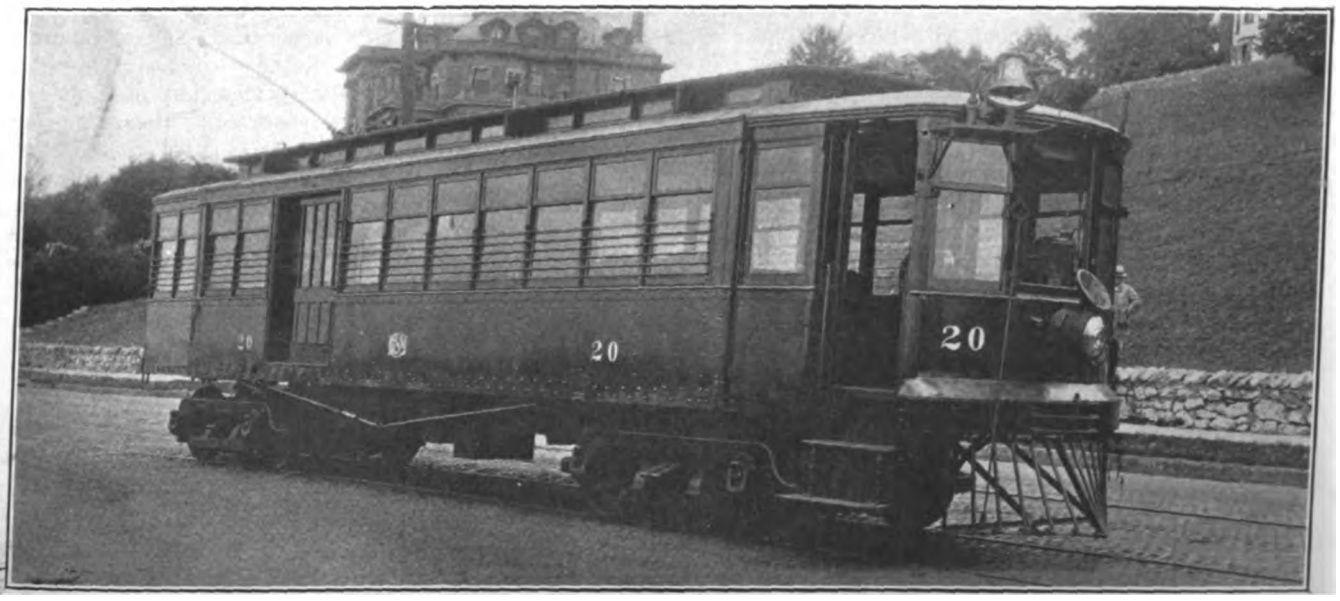
The Tri-City Railway Is Rebuilding Standard City Cars for Interurban Service—Special Attention Is Being Given to the Comfort of Passengers

IT IS the intention of the Clinton, Davenport & Muscatine Railway soon to replace the present two-man cars by cars rebuilt for one-man operation. These will be the present standard city service cars of the Tri-City Railway Company, rebuilt for one-man interurban operation but using the same motors and trucks as are now under the cars.

The company feels that sufficient attention has not been paid in the past to making the ride as pleasant as possible for the passengers. In redesigning these cars, therefore, particular emphasis has been given to this feature. The passenger compartment of the combination car will be placed at the front, with the baggage compartment in the center, and a smoking compartment at the rear. At the back of the passenger compartment will be a toilet and a small closet for an oil heater. This heater will be used for emergency only, in case of power failure. Formerly this type car was equipped with a hot water heating system, but this is now being taken out and electric heaters are to be installed for normal operation.

The headlining of the car is painted white, and every effort has been made to secure an attractive interior finish. The exterior of the car is painted light maroon in color, partly in order to insure visibility and partly for looks. Great care has been taken to provide sufficient artificial illumination so that it will be easy for a passenger to read in any part of the car even if the voltage drops somewhat below normal. In the passenger compartment the seats are covered with green plush, and in the smoking compartment they are covered with Pantasote. Linoleum is used for floor covering. The smoking compartment has been arranged as a sort of observation compartment, and an attempt has been made to give it a somewhat "clubby" effect.

The old 1,200-volt drum controller has been replaced by Westinghouse HL control, this being considered



Standard City Car Rebuilt for One-Man Operation

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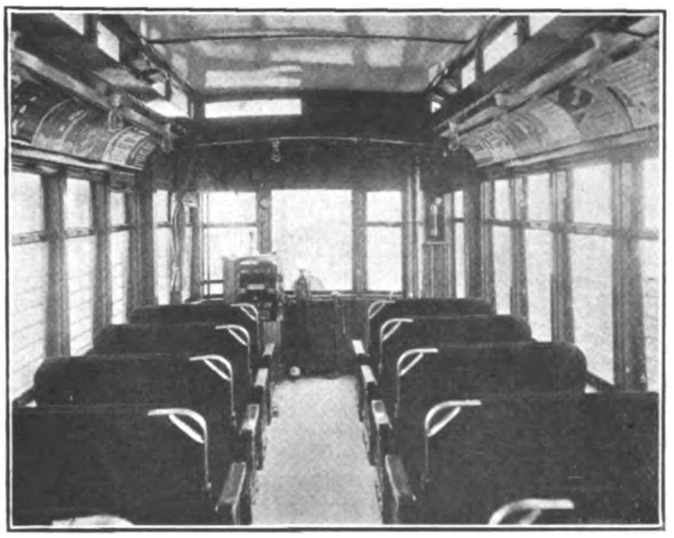
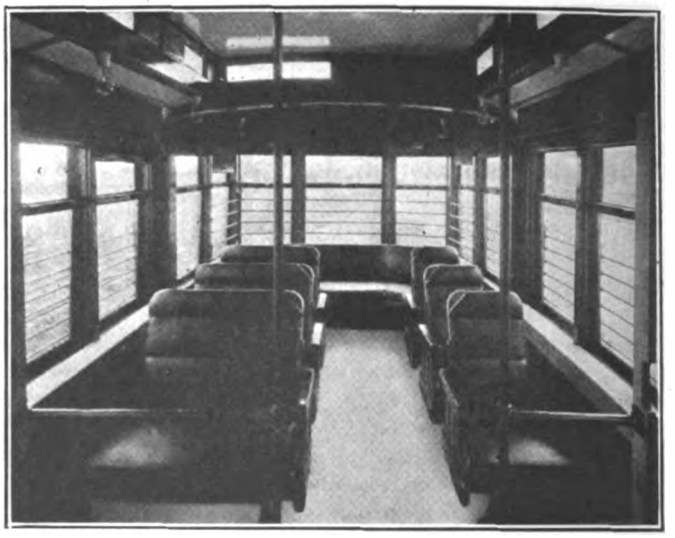


Passenger Compartment Seats Are Covered with Green Plush



Smoking and Observation Compartment

somewhat safer. Another reason for this change was the fact that the HL controller will obscure the forward vision of the passengers less than would the old drum controller. The rebuilt cars are to be equipped with standard one-man safety devices which operate better with the HL control than they do with the drum control, although they can be, and in fact on the city line they have been, adapted to the latter.

The platforms of the standard city cars before being rebuilt in this way for one-man interurban operation were several inches lower than the car floor. In order to permit the trucks of the rebuilt car being placed at wider centers, the platforms have been reconstructed flush with the car floor. Another reason for doing this was to secure standard M.C.B. height for the bumpers and thus to prevent telescoping in case of collision.

Prior to putting these cars in service a test was made by the railway to determine whether or not the riding qualities were satisfactory. For the purpose of making this test before the HL equipment had been delivered, one of the large 1,200-volt drum controllers was temporarily connected up. This controller was still in place when the photograph at the top of this page was taken. The trucks are equipped with graduated springs, and this feature, together with the increased wheelbase, was found to produce a very easy riding car. Moreover, the speed has been increased about 15 per cent. These rebuilt city cars weigh approximately 37,000 lb., as compared with 65,000 lb. for the present cars.

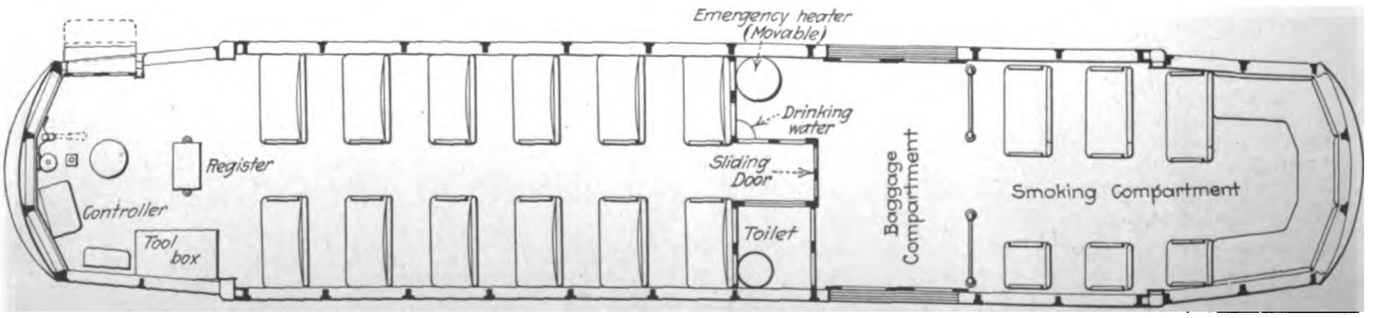
The company has already replaced the 80,000-lb. cars on the Mason City Clear Lake Railroad by similar light-weight rebuilt cars. There is the difference, however, that the 600-volt motors and trucks are allowed to remain, because the Mason City line operates at that voltage. The control arrangement will be the same as is now used. On account of the shortness of this line, the toilet and emergency heating arrangement have been omitted from the cars rebuilt for that service. These cars are being geared for a speed of 50 m.p.h., and it is expected that the scheduled speed on that line will be nearly doubled. Thirty-minute service will then be given in place of the present hourly service. There will be no change, however, in the present 1½-hour schedule on the Muscatine division of the C. D. & M.

Six of the standard city cars of the Tri-City Railway are being rebuilt for the purposes outlined. The Mason City cars are already in service, and the cars for the Muscatine division were completed about Aug. 1. Double-truck cars weighing about 25,000 lb. each have been bought to replace them. They have already been described in the ELECTRIC RAILWAY JOURNAL. For rebuilding cars on which the controller will remain unchanged, the cost is $2,800 per car. An additional outlay of $1,400 per car will be necessary to install HL control on the Muscatine division.

A 2½-Cent Fare in Lynn

THIS summer the Eastern Massachusetts Street Railway has put on a run for which a fare of only 2½ cents is charged, that is, a fare of 5 cents is charged for the round trip. The route is between Central Square, Lynn, and Lynn Beach, a distance of about ¾ mile. Usually one car can give the service, but on Sundays or other busy days two are required. The passenger pays 5 cents for his ride, but is entitled to a return ticket without charge. The money is collected in a Johnson box and the return tickets in a Cleveland box.

The car runs only on pleasant days, and the business is primarily in summer only.



Floor Plan of Rebuilt Car

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Economic Fields of Trolley Car and Bus

Cost of Urban Transportation by Means of Double-Truck and Safety Cars, Trolley Buses and Auto Buses Compared—Paving Maintenance an Item That Must Be Considered —Including This, Rail Cars Appear Best for Medium and Heavy Traffic

By Victor Topping
Engineer of Traffic Analysis, Toronto Transportation Commission

URBAN transportation is a natural monopoly, and experience has shown that only chaos results from the destructive competition of transportation agencies. Granting this, the controlling factor in the choice of a means of transportation for a particular case is density of traffic. If traffic be light the unit cost of service may be kept within a reasonable limit only by low investment charges, even at the cost of fairly high operation charges. As the density increases the investment expenses may be greater, with the object of reducing operation expenses and in this way lowering the total unit cost of transportation.

Operating Charges Favor Trolleys

Considering for the present the tools of surface transportation alone, electric railway, trolley bus and auto bus, it will be recognized that investment charges are in the order mentioned, commencing with the highest. Operation charges are in the reverse order, the cost per bus-mile for the auto bus being very considerably greater than the cost per car-mile for the electric car.

J. C. Thirlwall of the General Electric Company has presented valuable analyses of the relative cost of these three forms of city transportation, several of which have appeared in ELECTRIC RAILWAY JOURNAL and *Bus Transportation.* In a paper in the *General Electric Review* for December, 1921, his conclusions are that:

TABLE I—COMPARISON OF VEHICLES

	Electric Cars: Double-Truck	Electric Cars: Safety	Trolley Bus	Auto Bus
Seats	55	32	30	30
Weight, pounds	45,000	18,000	13,000	10,000
Operation charges, cents per vehicle-mile:				
Maintenance and renewals of way and structures	3.9	2.5	10.0	7.5
Maintenance and renewals of equipment	4.8	2.5	6.0	11.0
Power	4.3	2.5	2.5	6.0
Platform expense	14.0	7.5	7.5	7.5
General and miscellaneous	6.0	6.0	6.0	6.0
Total operating charges	33.0	21.0	32.0	38.0
Fixed charges, per cent of total investment:				
Interest	8.0	8.0	8.0	8.0
Obsolescence and inadequacy	1.5	1.5	3.0	4.0
Taxes	2.0	2.0	2.5	2.5
Total	11.5	11.5	13.5	14.5

1. Where minimum headways required are three minutes or less, the rail car is most economical.
2. From three- to six-minute headways the rail car and trolley bus are equally economical.
3. For headways of six to sixty minutes the trolley bus is most economical.
4. For greater headways than sixty minutes the gasoline bus is most economical.

An examination of the data on which these conclusions were based constrains the writer to suggest considerable modification, and to show that the above is not altogether a fair comparison, the forms of trackless transportation being too highly favored.

Mr. Thirlwall's figures do not take into account the wear of the roads by buses. Even when no commensurate charge is made to the transportation agency for the use of the city roadways, the cost is borne by the public in the form of taxes, so that the ultimate economic comparison must take maintenance of roads into account.

Cost of Damage to Highways by Buses

As to the amount of damage which buses cause to public highways, a report presented in 1922 at the Chicago convention of the American Electric Railway Association, by the committee appointed to consider motor-bus and truck transportation, states the cost of deterioration of highways by pneumatic-tired vehicles to be 1 cent per ton-mile and 1½ cents per ton-mile by solid-tired vehicles. These figures were obtained by an extensive investigation of information supplied by state highway commissions in various parts of the United States. The committee recommended these rates, with the admonition that they are not the result of accurate data. The belief is expressed that more accurate studies will necessitate a revision, if any, in the upward direction.

The costs given in Table I were obtained from a study of the operating and financial statistics of a large number of electric railway and several trolley-bus and auto-bus systems, being fairly representative of average conditions in America. The writer has followed the principle mentioned in the first chapter of the committee report with regard to depreciation, i.e., each system is assumed to be maintained at a set standard of excellence, all expense of maintenance and renewals contingent thereto being charged directly to operation accounts. In addition, an item for "obsolescence and inadequacy" is added to the fixed charges.

This analysis of unit costs is based on the ultimate economy as regards the individual passenger, who pays the piper in the long run; hence the item for maintenance and renewals of way and structures in the case of the trackless vehicles includes 1.5 cents per ton-mile or 7.5 cents per passenger car-mile for a vehicle weighing 10,000 lb.

By this procedure, and by transferring a considerable portion of depreciation expense from fixed to operation charges, as stated above, considerable divergence

TABLE II—AVERAGE COSTS OF CONSTRUCTION AND EQUIPMENT—CANADA

Single track in paved streets, per route-mile	$75,000 to $100,000
Double track in paved streets, per route-mile	150,000 to 225,000
Distribution line, per route-mile	6,000 to 8,000
Transmission line, per route-mile	2,500
Generating station, per maximum kilowatt output	150
Substation, per maximum kilowatt output	50 to 60
Shops, per car used	2,000 to 3,000
Fifty five-passenger double-truck cars	18,000
Thirty two-passenger safety cars	10,000
Thirty-passenger trolley buses	11,000
Thirty-passenger auto buses	10,000

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TABLE III—COMPARATIVE COSTS OF SERVICE PER ROUTE-MILE FOR A COMPLETE SYSTEM OF LENGTH 5 MILES

Type of Vehicle	Headways, Minutes Base	Headways, Minutes Rush	Cost of Service, Dollars per Route-Mile — Neglecting Wear on Road Surfaces: Double-Truck Car	Safety Car	Trolley Bus	Auto Bus	Including 1.5 Cents per Ton-Mile for Roadway Maintenance: Double-Truck Car	Safety Car	Trolley Bus	Auto Bus
All	60	60	.....	$12,480	$5,070	$4,700	.....	$12,480	$6,250	*$5,690
All	30	30	.....	15,660	7,590	9,060	.....	15,660	*10,960	11,030
All	15	15	.....	22,590	15,620	17,790	.....	22,590	*20,350	21,730
Safety car	15	10	.....	24,300	20,600	23,000	.....	*24,300	26,300	27,700
Bus	15	6.7								
Safety car	8	4	.....	50,160	45,690	52,190	.....	*50,160	58,630	62,990
Bus	8	2.7								
Double-truck car	6	3	$93,200	93,600	110,300	126,500	*$93,200	93,600	141,400	152,400
Safety car	3.5	1.6								
Bus	3.33	1.1								
Double-truck car	3	1	209,300	223,200	300,800	341,500	*209,300	223,200	380,000	407,500
Safety car	1.7	0.54								
Bus	1.6	0.37								

* Indicates most economical form of transportation, including roadway maintenance.

results from the economic relationships of the three agencies of transportation as shown by Mr. Thirlwall

The costs of construction and equipment given in Table II are based on prices in Canada. Costs in the United States should be about 20 per cent to 30 per cent lower. The cost per route-mile of track includes cost of special trackwork at intersections and turnouts. At intersections one-half of the cost of special trackwork is included, the remainder being borne by the intersecting line. While the cost of construction varies greatly in different localities, the figures suggested are fairly representative of average conditions.

Using these costs of equipment and of providing service, a series of economic comparisons for the different types of surface systems has been computed in a fashion somewhat similar to that used by Mr. Thirlwall. Costs are estimated on a completely-equipped line 5 miles long, for very widely varying headways, ranging from those which would obtain in the most sparsely-settled districts to the headways necessary in densely-populated cities. All costs are reduced to a route-mile basis.

A summary of the total costs per route-mile of service for electric car, trolley bus and auto bus for the different headways will be found in Table III. The costs for the trackless vehicles take into account the wear of road surfaces, to give a more fundamental economic comparison. In addition, as a matter of interest, the summary also shows the costs if this wear of road surfaces be neglected.

The detailed analyses for the different densities of traffic will be found in Table IV. These tables are all based on a route 5 miles long, single track being used for light traffic and double track for medium and heavy traffic. The schedule speed for all except the very heavy city traffic has been assumed 10 m.p.h., making the time allowance for the round trip sixty minutes. In the case of the very heavy traffic the schedule speed for the double-truck car has been taken as 9 m.p.h., making the round trip time 66.7 minutes, while for the safety cars and buses the schedule speed is 8.5 m.p.h. and the time allowance seventy minutes.

Surface Transportation—Conclusions

An examination of Table IV indicates the following facts with respect to the economic fields of electric car, trolley bus and auto bus in urban passenger transportation, assuming the ultimate economy to the individual passenger; that is, taking into account the wear of roads by trackless vehicles.

1. Normal headway, three minutes or less (double-truck cars):

The most modern double-truck two-man electric car, such as the Peter Witt type, is most economical. Conditions here obtain in the larger cities, where rush-hour loading will often necessitate carrying passengers at six times or more the normal rate.

Apart from the impracticable rush-hour headways necessary to provide the same accommodation by means of trolley bus or auto bus, viz., twenty-two seconds, the cost of providing service by these trackless vehicles is about 100 per cent greater than for double-truck cars, making them entirely unsuitable for mass transportation of this kind. The safety car is slightly more costly than the double-truck; the peak headway necessary (thirty-two seconds) makes its use undesirable.

TABLE IV—COMPARATIVE STATISTICS OF URBAN PASSENGER SERVICE WITH TROLLEY CARS.

	Headway, Minutes Base, 13-Hr.	Headway, Minutes Rush, 5-Hr.	Hourly Passenger Capacity: Base	Rush	Vehicles Required, with Spares: Total	Per Route-Mile	Annual Vehicle-Miles: Total	Per Route-Mile	Track	Overhead System
Very light traffic all day										
Safety cars, thirty-two seats	30	30	64	130	3	0.6	131,400	26,300	$70,000	$8,500
Trolley buses, thirty seats	30	30	60	90	3	0.6	131,400	26,300	.....	9,000
Auto buses, thirty seats	30	30	60	90	3	0.6	131,400	26,300	.....	.....
Light traffic all day										
Safety cars, thirty-two seats	15	15	128	260	5	1.0	262,800	52,600	75,000	8,500
Trolley buses, thirty seats	15	15	120	180	5	1.0	262,800	52,600	.....	9,000
Auto buses, thirty seats	15	15	120	180	5	1.0	262,800	52,600	.....	.....
Light traffic, with peak load										
Safety cars, thirty-two seats	15	10	128	390	7	1.4	284,400	56,900	75,000	8,500
Trolley buses, thirty seats	15	6.7	120	405	10	2.0	318,000	63,600	.....	9,000
Auto buses, thirty seats	15	6.7	120	405	10	2.0	318,000	63,000	.....	.....
Medium traffic										
Safety cars, thirty-two seats	8	4	240	975	17	3.4	598,000	119,600	150,000	9,500
Trolley buses, thirty seats	8	2.7	225	990	24	4.8	719,000	143,800	.....	10,000
Auto buses, thirty seats	8	2.7	225	990	24	4.8	719,000	143,800	.....	.....
Moderately heavy city traffic										
Double-truck cars, fifty-five seats	6	3	550	2,400	22	4.4	795,000	159,000	200,000	10,000
Safety cars, thirty-two seats	3.5	1.6	544	2,405	40	8.0	1,410,000	282,000	175,000	10,000
Trolley buses, thirty seats	3.33	1.1	540	2,385	60	12.0	1,730,000	346,000	.....	11,000
Auto buses, thirty seats	3.33	1.1	540	2,385	60	12.0	1,730,000	346,000	.....	.....
Very heavy city traffic										
Double-truck cars, fifty-five seats	3	1.0	1,100	7,200	72	14.4	1,940,000	388,000	225,000	10,000
Safety cars, thirty-two seats	1.7	0.54	1,100	7,215	138	27.6	3,490,000	698,000	175,000	10,000
Trolley buses, thirty seats	1.6	0.37	1,110	7,200	205	41.0	4,400,000	880,000	.....	11,000
Auto buses, thirty seats	1.6	0.37	1,110	7,200	210	42.0	4,400,000	880,000	.....	.....

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2. Normal headway, six minutes (double-truck cars):

With this density of traffic there is little to choose between the two-man car and the safety car from the economic standpoint, the balance favoring the former slightly. As against this might be set the advantage of greater frequency furnished by the safety car.

3. Normal headway, eight to fifteen minutes (safety cars):

At these headways, where rush-hour conditions are found, as in small towns and the outskirts of cities, the safety car is most economical, the trolley bus ranking second.

4. All-day headway, fifteen to thirty minutes:

Under these conditions the trolley bus has undoubted sway, if economics alone be considered. At thirty minutes there is practically no difference in cost between trolley bus and auto bus.

5. All-day headway, thirty minutes or more:

Beyond headways of thirty minutes the auto bus is apparently the most economical form of urban transportation.

These results would seem to show that there is no field for the auto bus in city service, for headways greater than thirty minutes are hardly admissible in urban transportation. The auto bus may find a legitimate field in providing service where, from esthetic considerations, tracks and overhead wires would not be tolerated; and also in supplementing existing street car systems, by providing a special service for those who are willing to pay extra for it. An example of such service is that of the Fifth Avenue Coach Company in New York. In outlying districts, where headways of about thirty minutes are adequate, or even at closer headways when the final location of a route is indefinite, the use of the auto bus would seem to be proper.

The trolley bus furnishes a valuable solution of the problems of extending and developing the service of the existing electric railway into the suburbs, pending the ultimate construction of the track in the same location when traffic density is sufficiently great to warrant it.

For the problems of mass transportation presented by the main portions of our cities the modern double-truck electric car still provides the most efficient and economical answer, and where traffic conditions are less rigorous the one-man safety car fills a large field.

TROLLEY BUSES, AND AUTO BUSES

Power and Sub-stations	Shops or Garages	Cars or Buses	Total Investment	Fixed Charges	Operating Charges	Total Cost
	Comparative Costs per Route-Mile					
$2,500	$1,200	$6,000	$88,200	$10,140	$5,520	$15,660
2,000	1,200	6,600	18,800	2,540	8,420	10,960
	1,200	6,000	7,200	1,040	9,990	11,030
4,800	2,000	10,000	100,300	11,540	11,050	22,590
4,000	2,000	11,000	26,000	3,510	16,840	20,350
	2,000	10,000	12,000	1,740	19,990	21,730
7,200	2,800	14,000	107,500	12,400	11,900	24,300
9,000	4,000	22,000	44,000	5,900	20,400	26,300
	4,000	20,000	24,000	3,500	24,200	27,700
17,500	6,800	34,000	217,800	25,050	25,110	50,160
21,000	9,600	52,800	93,400	12,610	46,020	58,630
	9,600	48,000	57,600	8,350	54,640	62,990
52,000	13,000	79,000	354,000	40,700	52,500	93,200
44,000	16,000	80,000	325,000	37,400	59,200	93,600
53,000	24,000	132,000	220,000	29,700	111,700	141,400
	24,000	120,000	144,000	20,900	131,500	152,400
170,000	43,000	259,000	707,000	81,300	128,000	209,300
150,000	55,000	276,000	666,000	76,600	146,600	223,200
185,000	82,000	451,000	729,000	98,400	281,600	380,000
	84,000	420,000	504,000	73,100	334,400	407,500

Cutting Down the Operating Ratio in Terre Haute

Results Obtained Since Inauguration of Safety Car Operation in 1918—Jitney Competition Eliminated, Gross Revenue Increased, Operating and Maintenance Costs Reduced

NEARLY five years have elapsed since one-man safety car operation was inaugurated in Terre Haute, Ind. By this time operating expenses and revenues should have settled down to a stable basis because the cars now require normal maintenance and the element of novelty has long since ceased to play a part in attracting business.

To be somewhat more specific, on June 10, 1918, thirty Birney cars were ordered by the Terre Haute Traction & Light Company, and the first cars were put into service on Dec. 1 of that year. As promptly as possible 40 per cent of the city mileage was equipped with the safety cars, the daily car mileage being increased 25 per cent as the change was made.

The new cars soon demonstrated their fitness for the service, and in spite of money stringency the purchase of twenty-six additional cars was financed during the following year. Therefore, early in 1920 fifty-six cars were available for service, about fifty being required for regular schedules. By this time practically all of the forty old-type cars which had preceded the safety cars had been retired from service.

At the time the new cars arrived jitney competition was unusually severe. The effect of the improved street car service was practically to eliminate the jitney and to force what was left to go onto a 10-cent fare basis after 7 p.m. The street railway fare was and still continues at 5 cents. The new service brought a commensurate increase in traffic, due partly to its inherent qualities and partly to the elimination of jitney competition, and the traffic was soon on a profitable basis.

Salient Facts Disclosed by the Records of Operation

A recent analysis of the operating data of the Terre Haute city lines has been made, covering the period from Jan. 1, 1920, or the entire period of practically 100 per cent safety car operation. The data have been put into graphical form, as reproduced herewith, for convenience in study. Certain facts stand out prominently in the charts, noticeably the following:

The gross revenue has held remarkably steady, fluctuating slightly with industrial conditions. The gross revenue shows a characteristic tendency toward heavier traffic in midwinter, due largely to the laying up of automobiles. A slump occurred last summer on account of the strike in the coal field; otherwise the gross revenues might almost be said to be constant from year to year.

The weekly pass was put into effect on the Terre Haute lines on May 1, 1922, and has proved increasingly popular. At the last report the sale was about 1,500 passes per week, at $1 each. This is about one per forty-five inhabitants, estimating the population of Terre Haute at approximately 68,000. In a letter published in the issue of this paper for June 30, 1923, page 1086, E. M. Walker, general manager of the company, stated that the pass revenue is the most stable part of the total revenue. Reference to the gross revenue graph

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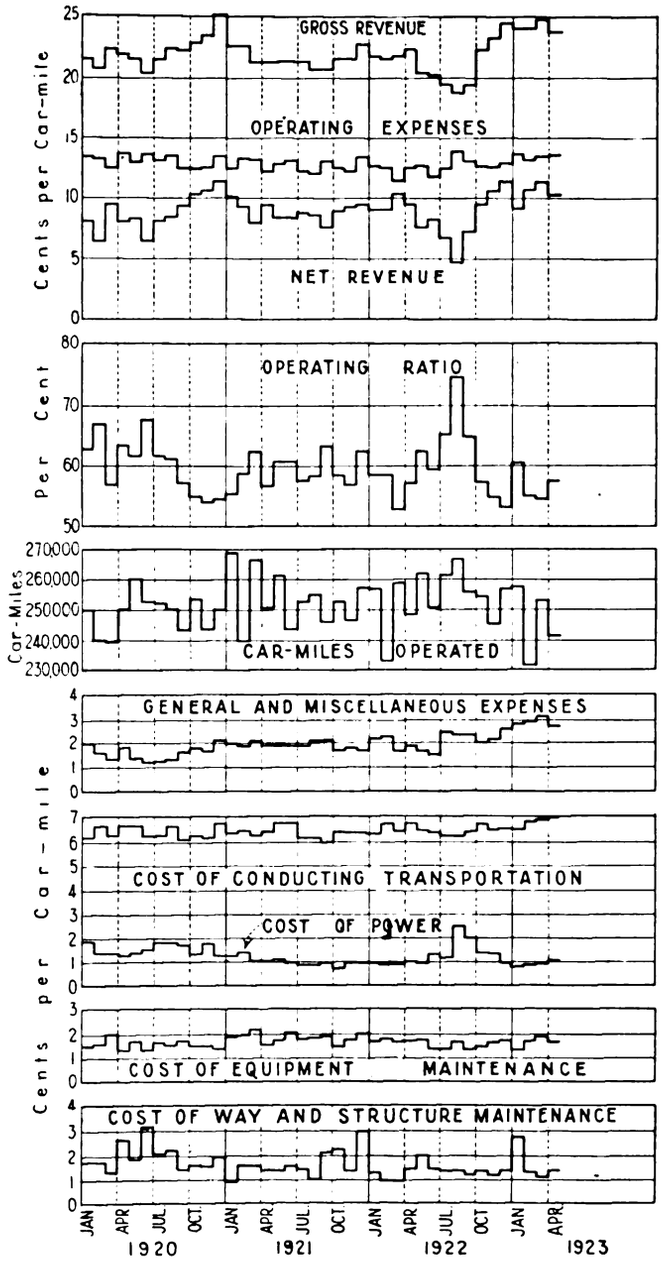

Data Covering Operation of Safety Cars in Terre Haute During Period of 100 per Cent Safety Car Operation

shows that the unfortunate slump last summer makes difficult an estimate of the effect of the pass. However, the present traffic is distinctly better than for the corresponding period last year, credit for part of which must be given to the pass.

The operating expenses are even more nearly constant showing a slight tendency downward from 1920 to 1922, with a slight tendency upward at present due to a corresponding reduction in car-miles operated.

The difference between the gross revenue and operating expenses, or net revenue, is slightly on the increase, having during the past few months twice exceeded 11 cents per car-mile. Last summer's slump in gross revenue is more than reflected in the net revenue because the same causes which operated to decrease the gross revenue increased the operating expenses.

A striking point in regard to the whole record is the gradual recession of the operating ratio, which twice last year was 53 per cent or below and for the past six months or so has averaged not far from 56 per cent. In the first half of 1920 it was twice above 67 per cent and averaged more than 60 per cent for the year.

The number of car-miles operated is remarkably uniform, the fluctuations indicated in the graph being largely due to the differing number of days in the several months.

The sixth item graphed is general and miscellaneous expense, which has shown a tendency to increase, absorbing the decreases made elsewhere, but the grand total is practically constant, as mentioned earlier. However, a contributing cause for this increase has been the high cost of accidents due to the very high wages paid in the coal fields.

There has been no substantial change in the cost of conducting transportation, which for three years has averaged about 6¼ cents per car-mile. During this time there has been no change in wages, the average wages paid to the platform men being about 42 cents per hour.

Power cost, after 100 per cent safety car operation was inaugurated, gradually fell to its present magnitude of 1 cent per car-mile, or even less. The company charges itself for electrical energy at the rate of the actual cost of production and delivery to converting machinery.

Light-Weight Car Maintenance Cost Is Not Excessive or Fluctuating

Equipment maintenance is now running consistently at about 1½ cents per car-mile, as in 1920. The excessive prices of 1921 are reflected in the increase in this item to about 1¾ cents. The moderate cost is due to the careful organization of the maintenance work, one feature being a section of the shop set aside for testing the various parts of the safety equipment. Once a year the motors are overhauled, the armatures and ball bearings being removed, and all of the air parts taken out and overhauled. Painting is also part of the yearly schedule. The steel wheels are not lathe-turned but they are brought back to contour by what may be termed "gas turning," as described in the issue of this paper for July 21, page 104.

The effect of the light-weight cars on the way and structure maintenance is clearly brought out in the graph. Each of the past three years has brought about a reduction, the average for 1920 being 2 cents, that for 1921, 1.6 cents, and that for 1922, 1.24 cents per car-mile.

Segregation of City Car Operating Expense Items

The Terre Haute division of the Terre Haute, Indianapolis & Eastern Traction Company, of which division the Terre Haute city lines form a part, operates in Terre Haute heavy interurban cars. This requires in some items of operating expenses an estimate of the proper division between interurban and city cars. The maintenance of way is charged 25 per cent to the city cars and 75 per cent to the interurban; the equipment expense is determined by the separate items; the power cost is calculated at 1.5 kw.-hr. per car-mile in winter and 1.35 kw.-hr. in summer; conducting transportation is separated by items; and general and miscellaneous is separated sometimes on a 50-50 basis, or when accident damages are high on the interurban lines, a division is made 40 per cent to the city cars and 60 per cent to the interurban cars. As these data are given on a car-mile basis, the items will fluctuate somewhat with the number of car-miles of service furnished.

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Planning a Carhouse and Storage Yard

The Layout Proposed Was Made with a View to Easy and Rapid Handling—Facilities Are Provided to Eliminate Interference and Waste Movement

*By Henry S. Day**

Railway Department, Westinghouse Electric & Manufacturing Company

THE chief object that should be sought in the layout of a carhouse is ready accessibility of cars. Freedom from interference in dispatching of cars by the transportation department and delays in switching cars needed by the inspection force are essential, and necessary facilities must be provided to save time and produce good inspection and practical operation in bad weather, without subjecting the carhouse force to temperature conditions that reduce their efficiency.

The accompanying plan of a carhouse and storage yard is intended to take care of 200 cars. It is assumed that these cars will average 3,000 miles per month and that they are inspected at 1,000 miles and washed once each week. Omitting anything but emergency work on Sunday, this would require twenty-four cars per day for inspection and thirty-four cars per day for washing.

A study of the layout will show that cars due for inspection are delivered to storage tracks 3 to 8 at the west side of the carhouse, and from this point over the inspection pits to storage tracks at the east side. Tracks 3 to 8, each with two pits, have sufficient capacity to house at one time half of the twenty-four cars required for inspection. Tracks 1 and 2 are equipped with air jacks for wheel and motor changes, trucks being run out from under the cars on their own power to the transfer table, by which they are moved to the north end of the car house, where the truck work is carried on under electric cranes. Tracks 11, 12 and 13 are in the car wash room and are equipped with the spray system, similar to that installed by the Detroit Municipal Railway. Tracks 9 and 10 are transfer tracks intended for use only in bad weather.

In detail, car movements are as follows:

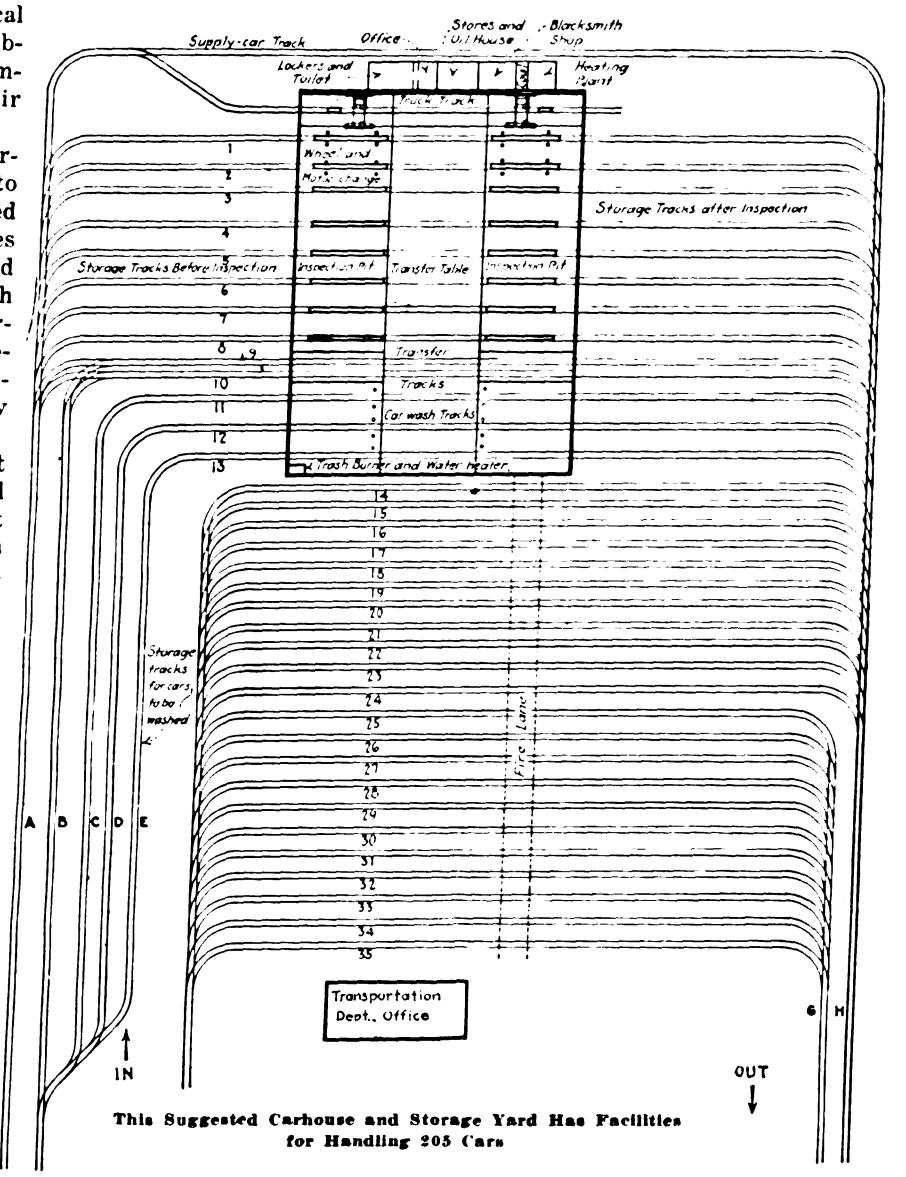
Cars due for inspection arrive on track *A* to the storage space west of the carhouse.

Cars due for washing arrive on track *B* to storage space on tracks *C*, *D* and *E*, and thence go direct to wash room.

Cars due for both inspection and washing arrive in the wash room over the transfer table from the inspection pit.

The supply car comes in on track *A* to the storeroom, thence on over the siding to the truck track for delivery of wheels and armatures to the electric crane. In bad weather cars due for inspection come in on track *B* to the transfer table over tracks 9 and 10.

It will be seen from the foregoing that the movement of cars for inspection, washing or repairs is a wholly progressive one. There are no dead-end tracks, and no track is required to store more than seven cars.



This Suggested Carhouse and Storage Yard Has Facilities for Handling 205 Cars

Basing the storage space on a 50-ft. car, it will be found that the main yard easily will accommodate 154 cars, wash tracks *C*, *D* and *E*, twenty-one cars, tracks 3 to 8 will hold twelve cars at the west side of the carhouse, and eighteen cars at the east side, making a total of

*Formerly superintendent of equipment Kansas City Railways.

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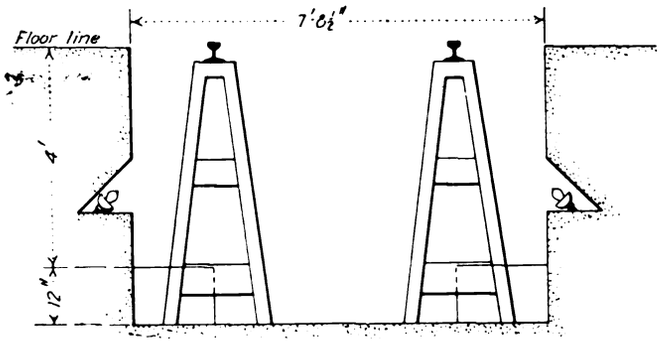
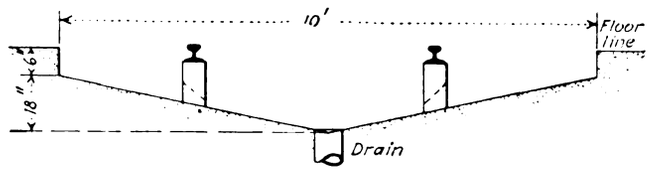
205 cars that can be stored without blocking movements through the carhouse. This leaves the way open to handle trouble and emergency repairs at night without extra switching movements or interference with transportation department dispatching.

It is believed by the writer that the arrangement of the "in" tracks makes it simple and easy to dispatch



The Inspection Pits Are Open and Arranged for Floodlighting the Under Sides of the Cars



The Wash Tracks Provide Good Drainage for Spraying the Cars

cars direct to their destinations by trainmen, without additional handling by hostlers.

Tracks 9 and 10, called "transfer tracks" on the drawing, were included with the distinct purpose of furnishing a means of moving cars in and out of the carhouse in cold weather without opening the doors at the ends of the inspection pits. This prevents reducing the temperature of the carhouse to a point that interferes with the comfort of the carhouse force, resulting in poor inspection.

It is not desirable, but sometimes is necessary, to make wheel and motor changes at a division carhouse. Where this practice is not followed tracks 1 and 2 could be used as straight inspection pits or eliminated.

The carhouse should be constructed with a sawtooth roof with ventilator sash, and all available wall space should be utilized for windows running down close to floor. All doors should be of the electrically-operated rolling steel type.

An accompanying illustration shows the type of pit, which would have floodlighting designed brightly to illuminate the under sides of the cars. Pits would also be equipped with compressed air for cleaning and testing. Another illustration shows a suggested type of wash track.

It is believed that while the first cost of the plan suggested may be higher than for some designs, it would show results in the reduced number of men required by both the mechanical and transportation departments.

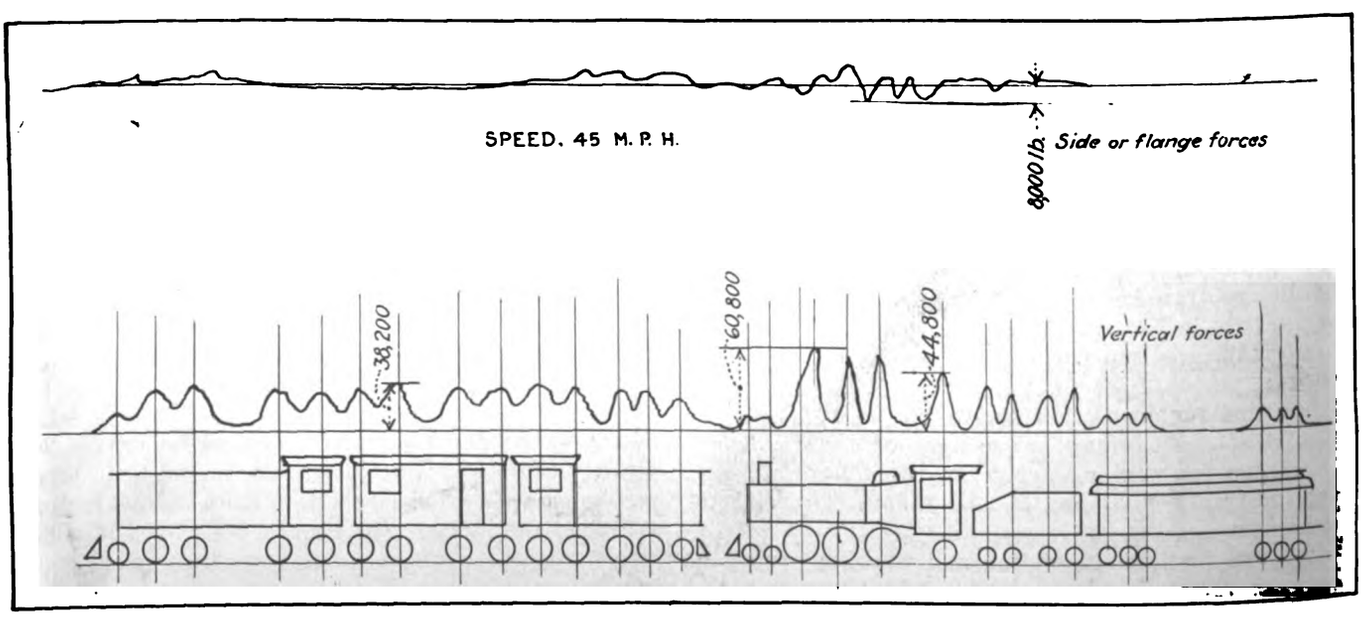
Device for Determining Stresses in Track

The Otheograph Has Been Developed to Record Actual Pressures Due to Locomotives—Graphic Record Is Made Directly by the Impact of the Wheels

IN CONNECTION with the work of testing electric locomotives the General Electric Company has developed a new device for the determination of the pressures exerted against the rails by the passage of the wheels of a railway train or locomotive. This device, which has been named the otheograph, is placed in the track in the place of a standard tie.

The general appearance of the device is shown in an accompanying illustration. A bed of cast steel is provided, on which the rail is mounted in a manner somewhat similar to a standard tie. Instead of being supported directly, the rail rests on a knife edge at the center of a very stiff steel spring. The side of the rail likewise is supported against a spring. Any movement against these springs is transmitted through reducing motions to two pencils, one at either end of a drum, as shown. The deflection of the rail is multiplied in the ratio of 8 to 1.

Provision is made for two different springs for recording the vertical load, one having a deflection of about ⅛ in. for 25,000 lb. axle loading, the other spring, for heavier weight, having the same deflection for 50,000



The Record Shows the Individual Wheel Pressures, Both Vertical and Horizontal

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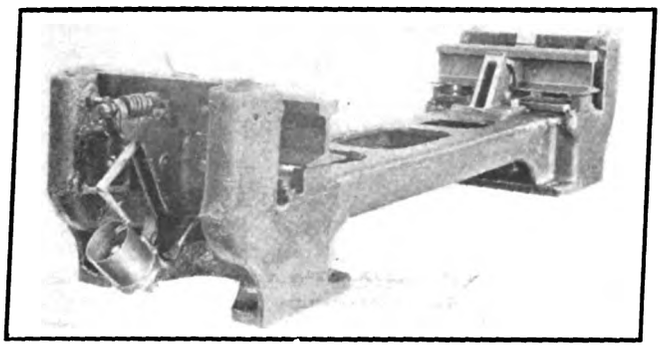


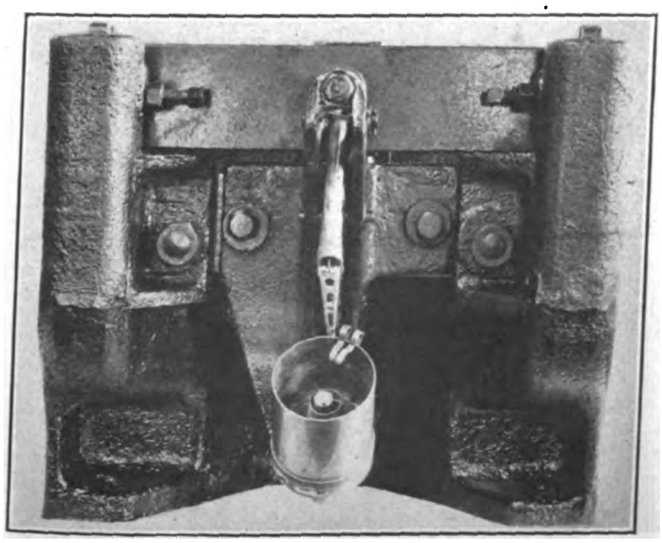
The Otheograph Is Placed in the Track Instead of a Tie

lb. axle loading. The springs are designed for a maximum deflection of ⅜ in. Springs recording the transverse thrust have deflection of about ⅛ in. for 20,000 lb.

In use a sheet of prepared paper is placed on the drum, and the pencils are adjusted to zero lines. At the instant the locomotive passes the drums are rotated by hand by means of a cord. In this way a record is made of the pressures, both in a vertical and in a horizontal direction, produced in the rails. The operating mechanism provides for moving a number of recording cylinders simultaneously so that as many records may be taken of each wheel on each side of the locomotive as the number of ties that are grouped together.

In a steam locomotive the impact of the different wheels varies widely, depending on the location with regard to the stroke. A representative record obtained with this device is shown in the diagram, with the corresponding positions of the wheels of two locomotives. This is the result of a test between one of the original Chicago, Milwaukee & St. Paul electric locomotives and a New York Central Pacific type steam passenger engine. The maximum vertical force recorded for the electric locomotive at a speed of 45 m.p.h. was 38,200 lb., being nearly uniform for all the driving wheels, while with the steam locomotive the maximum vertical force was 60,800 lb., and on the trailing wheels 44,800 lb. The maximum side or flange pressure was 8,000 lb.

It is planned to install twenty-five of these devices in a curved section of the track of the East Erie Commercial Railroad, which is used for testing locomotives built at the Erie works. With this number in use at once it will be possible to study in detail the action of the various types of locomotive construction on the track. It is expected that this will supply definite information as to the relative merits of different arrangements of running gear for operation at various speeds.



A Close-Up View of the Recording Mechanism

Bright Colors Attract Business

Circus Man Suggests to Buffalo & Lake Erie Traction Company that Cars Be Painted Emerald Green—Accident Prevention a Factor in Selecting Color

ACCORDING to reports of the United States Weather Bureau, Erie, Pa., is the second cloudiest city in the country. This is probably due to the fact that the prevailing winds are westerly and sweep in, moisture laden, from the lake. For years it had been the practice of the railway company to paint its cars a dull olive green, and on a cloudy day the drab-looking street cars presented an uninviting appearance. There was no incentive to ride in them unless one were going a distance too far to walk.

The management of the Buffalo & Lake Erie Traction Company has always tried to maintain pleasant public relations, and in a half-column advertisement which appears every day in the local newspapers suggestions for the betterment of the service have been sought from the public. Not long ago a letter was received from a man who said that he had been for some time connected with the Barnum & Bailey "Greatest Show on Earth," and that one of the established policies of the circus was to attract business by the use of bright and startling colors. If the theory worked in the case of the circus, why wouldn't it work with street cars?

The idea seemed to be worth trying, and recently the first repainted car made its appearance. The lower side panels are painted a bright emerald green while the posts, letterboard and trimmings are cream colored. The roof is a light gray, and a lighter color for interior decorations is used. The change from the old dingy olive green occasioned a good deal of comment, both on the street and in the newspapers. Not a few people poked fun at the idea of emerald green street cars, but it all served to focus public attention on the railway and on the fact that something new was being tried. It will, of course, be impossible ever to attribute definitely any increase of traffic to repainting the cars, but it is very evident from remarks that are heard that people consider the change to be an improvement. Moreover, it is thought that greater visibility and fewer accidents may follow the use of brighter colors.

The cars are being painted at the East Twelfth Street shops of the company. One or two coats of Ripolin enamel are used, depending on the condition of the old paint. Cars are washed every spring and fall with a 1/100 solution of Magic cleaner, 4 oz. of the alkali being dissolved in 16 qts. of water. The average period of painting is between twenty-four and thirty months, or, on a mileage basis, about 150,000 miles. Cars are sometimes painted at shorter intervals and two coats of enamel may not be needed. Old Dutch railway enamel also is used, but no work is now done with flat colors and varnish.

A Dayton air brush is used to spray the light green paint on the lower panels. The air brush is also used on the arched roofs. Monitor roofs are painted by hand, and the cream colored work on posts, letterboard, etc., also is air-brushed on. The enameling process and the use of the spray gun have resulted in a great saving of labor cost in repainting cars.

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Association News & Discussions

Badger Railway Men Meet at Oshkosh

Co-ordination Urged Between Operators, Manufacturers and Educators —Transportation, Safety and Track Problems Receive Consideration—North Shore First-Aid Team Gives Demonstration

WELCOMED by the Mayor, entertained by the chairman, and addressed by prominent personages of the electric railway industry, the second annual summer meeting of the Wisconsin Utilities Association, Electric Railway Section, was held at Oshkosh, Wis., Aug. 16 and 17, with a registered attendance of 136. Business sessions were held during the mornings of the two days, while the afternoons were devoted to inspection trips and entertainment. A well-balanced program of papers was presented which offered ample opportunity for discussion and comment.

B. W. Arnold, Oshkosh manager of the Eastern Wisconsin Electric Company and chairman of the section, acted as host, and the enthusiasm and dispatch with which the convention was held indicated the spirit of hospitality. An inspection trip to his new carhouses revealed many improvements in recognized shop practice. Following the inspection a trip was made in the new de luxe buses to the municipal park on Lake Winnebago, where the Chicago, North Shore & Milwaukee first aid team gave a demonstration of the various methods of artificial resuscitation, together with methods of bandaging and life saving.

Charles E. Scott, president of the Bureau of Safety, was the principal speaker at the banquet in the evening, delivering his speech on his very serious subject in such a manner that he held the interest of all. A quartet obtained by Mr. Arnold furnished music, while a dance followed the banquet and further strengthened everyone's belief in his ability to entertain.

At the Thursday morning session Mayor A. C. McHenry of Oshkosh welcomed the members, urging each to make himself at home. Believing, as a student of economics and government administration, that municipal ownership was the best thing for a community, Mr. McHenry admitted that now after six years in municipal affairs, he had changed his mind and realized that if the city, state or nation would carry on the work it is supposed to do, it would find the job large enough. Better results would be obtained in municipal affairs if co-operation and business methods were used, rather than to have the executive pose as a world reformer.

President Harold L. Geisse of the Wisconsin Utilities Association replied that words of welcome from a Mayor to public utility men are like balm to a troubled spirit. Continuing, Mr. Geisse explained that without its public utilities a city cannot exist. The plea of the utility enterprises is to be unmolested in their efforts to serve.

Chairman Arnold Addresses Meeting

Following these words of welcome and response, Chairman Arnold discussed problems of the industry relating to Wisconsin conditions. "These problems," he said, "are no greater than the problems which are pressing for solution in every state in the Union, and I feel that the men charged with the responsibility of operating these utilities in Wisconsin are making just as creditable a showing as is being made everywhere.

"In general, the average individual has no conception whatever of the scope and magnitude of this branch of the utility business. He does not realize that more than $5,000,000,000 is invested in electric railway properties. This represents practically one-third of the total investment in all forms of public utilities.

"The capital investment of street railways and interurbans in Wisconsin reaches the total of nearly $100,000,000 and we operate a total of 998 miles. In 1922 we carried about 270,000,000 passengers and paid taxes in the aggregate amount of $1,073,368, or at the rate of $2,968 per day.

"Our present growth in Wisconsin lies largely in one direction. During the past year a number of our member companies installed auxiliary coach and bus service, operating as feeders and to open up new territory, while some others are maintained as a protection to the capital of the respective companies operating them. The operation of these conveyances will be carefully watched by all transportation men, and the cost of such operation will be closely analyzed. By application of a suitable system of accounting and by making proper allowances for depreciation, this system of transportation will be placed on a legitimate basis."

C. M. Larsen, chief engineer of the Wisconsin Railroad Commission, stated that the thing the commission expects of the operating men is service in a large sense. While the law has defined the term "service" specifically, its other phases should not be overlooked if the operating company is to be successful, inasmuch as employees must have satisfactory working conditions, and the private capital must have service in the form of a return on the investment.

Problems of the Mechanical Department

An opportunity was afforded the supply men to present their views of the master mechanic's problems when a paper prepared by H. S. Day of the Westinghouse Electric & Manufacturing Company was presented. Mr. Day said that commercial men as a group regard the master mechanic as a man who has not yet come into his own. In other words, he heads a department that should be regarded as one of more importance than it now is, particularly by the railroad's own management. Too many operators, forced by conditions to economize, have taken the mistaken position that expenditures by the master mechanic must be curtailed and have forced him to defer proper overhauling, accomplishing just the opposite result from what is needed. If there is one time more than another that a road needs a maximum number of cars in good operating condition available for revenue service, it is when the road is fighting to make receipts greater than expenses. The commercial man, according to Mr. Day, wants to see the electric railway industry on a sound footing, and thoroughly believes that master mechanics will contribute largely to placing it there, not only in better operation but in reduced cost.

Mr. Day's paper was discussed by Henry Cordell, A. P. Jenks, N. A. Stumpf, F. Fox and Earl Harra, all of whom felt that every help should be afforded to mechanical men, both by the managements and by the manufacturers' representatives.

Co-operation Between Railways and Colleges Urged

James T. Rood, professor of electrical engineering at the University of Wisconsin, spoke of the assistance the colleges, such as the University of Wisconsin, can be to the electric railway. That they have not been so up to the present is because both sides are at fault. The colleges have not gone out to the roads with any sort of intimate touch, while the latter have not turned as they might have to the colleges for real help on practical matters. "For a number of years the University of Wisconsin has been giving courses in electric railway work," said Professor

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Rood. "Small groups of able men have been enrolled, but many have gone into manufacturing, telephone and power work. Over a course of years a considerable number of men have been sent out who from this instruction are alive to the work and the difficulties of the electric railway field and who have a sympathetic appreciation of the needs of our transportation systems. Men thus trained should become influential in helping the railroads with the public. But at Wisconsin or other engineering colleges, the courses have not been vital enough, in general, and not in close enough touch with real railway problems. There are many technical problems where the colleges could be of help, especially such as analyses of distribution and return circuits, energy consumption and schedules."

As to how work of this nature is to be done, Professor Rood said that it is not at all difficult to send out one or a group of men to a given point to secure the required data. Sometimes this can be done during term time, taking the place of regular classroom instruction. Sometimes it is best done during the shorter vacation periods, the men then bringing the results back with them for conference, analysis and report. A requirement at Wisconsin of electrical and mechanical engineering students is that experience of at least a part of one summer must be obtained in some plant, factory or system. The electric railways could be a great help in this. They can take on the students for one summer, giving opportunities to get data and letting them take it back to college where it could be used as the basis of advanced individual study or theses. Often the college is able to supply a large number of skilled observers for a big test, more men of requisite knowledge than could probably be supplied by the company itself. Again, colleges frequently have more extended regular and special equipment for such tests than could be supplied by the company, making possible better, wider and more dependable investigations.

Regarding employment of college graduates, Professor Rood points out, "so long as the railway companies permit the manufacturing and telephone companies to be the ones who select senior students for employment, just so long three things will happen. First, these corporations will get the pick of the students, so that should the railways desire to take on some of our men the chances are that they will get only the less desirable ones. Second, the course in transportation and power plant work is made less effective because less desirable in the eyes of the student, since he judges largely from the number and desirability of the position offered him. Third, the possible extent and the effectiveness of the help which the university could give the railways is greatly reduced."

Mr. Arnold suggested that a railway fellowship at the university, similar to the existing gas and electric fellowship, be established by the railway section at the next business meeting. Such a fellowship, Mr. Arnold pointed out, would aid the railway industry of the state to obtain desirable men for the various properties.

The Human Side of Business

Charles B. Scott, president of the Bureau of Safety, presented an address on the human side of business under the somewhat intangible title, "Safety." Along these lines Mr. Scott said: "While the subject upon which I am to speak is quite unlike the mechanical or operating problems, it is a subject of absorbing interest devoted to the human side of things. My object is to bring before you your responsibility to your company and to the public from the viewpoint of accident prevention. I am talking as an individual about the duty you owe your company, and as a man who constitutes part of a nation. I am afraid that the industry fails to appreciate the importance of the human side of the business.

"Safety is not a question of physical property. It is the result of giving attention to the man-power in the organization. Figures from representative organizations show that 75 per cent of all accidents were due to causes other than the physical properties. If, therefore, you are giving no attention to the human side of the organization, you are doing at the most 25 per cent of your share in accident prevention, However, I feel that the time is coming when the industry as a whole will give more attention to the human side of things.

"There are three requisites for safety in any organization. First is the heartfelt and sincere interest and support by the chief executive. Second is the proper selection and instruction of the men. Third is the continuity of effort. It is continued accident prevention which tends to humanize the entire industry. We should not be too critical of some of the means employed to bring about safety. Often it is necessary to go far out of the beaten track of procedure to bring home a lesson of safety to the man. Soon after I started in this safety work, I had the task of 'selling the idea' to an organization employing 6,000 men, in which thirty-three were killed within five years. The management felt that if an average of seven per year were killed they were operating with a fair degree of safety. If more than seven were killed, that was considered a bad year, while if five or six were killed it was considered an exceptionally good year. After the installation of a safety campaign, within the next five years only eleven were killed. During the past year, I understand, only one man lost his life in the service."

The A.E.R.A. and Its Relation to Wisconsin Railways

At the Friday morning session, James W. Welsh, executive secretary of the American Electric Railway Association, gave a very interesting talk and exhibited many pamphlets and statistical records which were the results of the work of the association. In Mr. Welsh's talk, which is abstracted elsewhere in this issue, he pointed out that the association is primarily a clearing house for statistical data and material and is at the service of any property to help solve whatever problem confronts it.

Motor Vehicle Discussed

Motor vehicle problems were the subject of two papers and much discussion, the operators' side of the question being presented in a paper by Henry Cordell, master mechanic Chicago, North Shore & Milwaukee Railroad, who said in part: "Our company, aside from the excellent service provided by interurban and city cars, also operates buses between Lake Geneva and Kenosha, Kenosha and Waukegan, Highland Park and Wilmette, as well as in the city of Waukegan to give transportation to a section not covered by street car service. Buses are also chartered for special parties and tours to lake resorts and other points of interest. The average daily bus mileage operated is 2,900. The regular service is given by twenty-two buses, consisting of nineteen White Model 50, city-type bodies, and three Fageol city-type bodies. For the chartered and tour service five Fageol intercity type safety coaches are used.

"We also maintain a fleet consisting of seven White 5-ton tractors, two United 2½-ton tractors, eighteen Highway 10-ton semi-trailers and one Buick speedwagon. The total mileage operated with this equipment is about 28,500 miles per month.

"The acquisition of bus lines by the electric railway made a new maintenance problem. An organization which had been educated along the line of maintaining electric car equipment can hardly be expected to produce automobile experts. However, there is a decided advantage to use old and true men on this work, even if you have to educate them all over. One thing they do know is what is required after close and careful inspection—lubrication and cleanliness.

"After all, the difference between an interurban or a street car and a bus is not so great as might appear at first. The fundamental parts are the same. The body, with the exception of its shape, is the same, wheels are still in evidence, and other mechanical parts function the same although they may be differently constructed. The electrical equipment is much along the same line as the electrical apparatus and wiring of street cars, and is readily understood by the men. The motor, control, and means of power transmission differ the most, and it is here that we must spend most of the time instructing not only our men but ourselves.

"The automobile or bus is still in the stage of development and only recently have the manufacturers been met with

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the concerted and constructive criticism which the electric roads and operators alone can give. This will lead to the building of equipment which will compare favorably with electric cars and give reliable service. We are looking forward to the same spirit of co-operation from the automobile manufacturers that was brought about by the electric railways and customers of the car builders getting together with the manufacturers, who were willing to co-operate. Still, looking into the future I can see where bus and automobile riders, fed up on rubber and gas and unavoidable delays due to climatic conditions, particularly in this part of the country, will return to the good old electric cars, particularly when service such as is rendered by the North Shore line is to be had."

Mr. Cordell then told in detail of methods used for inspecting and repairing the automotive equipment used on the North Shore line.

The manufacturers' side was presented by Howard Smith, manager General Tire Company, Akron, Ohio. In his paper Mr. Smith stated that the tire industry looked upon the bus and coach business very enthusiastically. He then gave some statistics relative to the history of the tire industry.

In the discussion of these papers H. L. Debbink, in charge of the motor coach division of the Milwaukee Electric Railway & Light Company, gave some very interesting facts relative to the operation of the company's coaches. Earl Harre of the Eastern Wisconsin Electric Company presented some figures on oil costs. W. E. Thorn urged the railway men operating coaches to make their own inspections and do their own maintenance work, inasmuch as railway inspectors and maintainers were more thorough in their work than private garage mechanics.

Getting the Public to Ride

C. H. Allen of the Wisconsin Public Service Corporation, Green Bay, presented a paper on some factors in service, which is printed elsewhere in this issue. In the discussion, W. H. Burke, division superintendent Chicago, North Shore & Milwaukee Railroad, stated that he agreed with the conclusion of Mr. Allen regarding the value of advertising street car service. "The main problem in the transportation business," said Mr. Burke, "is to fill the cars, since, as Mr. Allen states, it costs but very little, if any more, to operate a car with a maximum load than to haul it empty. A merchant's show windows should be one of his chief trade assets. I sometimes wonder how many railroad men think of this point.

"One important way for a street railway to sell its transportation is in the seating arrangements. The average rider does not like a longitudinal seated car. Even if the cross-bench seat does detract from the standing capacity, it is the seat that the rider wants in nine cases out of ten. Therefore, why not aim to give it to him? Putting the thing the other way around, why fret his soul with awkward or uncomfortable seats, with turnstiles and other similar devices, and then expect his undying affection and support? After all, your patron is but human. He likes his motor car because it seats him the way he likes to be seated. How many motor cars do you think Henry Ford would be making each twenty-four hours if he had them rigged with longitudinal seats, or if a man had to climb through a turnstile to get into one of them?

"A first-class salesman does not depend entirely upon correspondence to sell his product, but knows that it is very desirable for him to come into personal contact with his customer. The rolling stock is one of the essential points of contact between the railway and the traveling public. I believe that a well-painted car, kept in good condition to eliminate noise, is so good an investment that it increases the riding sufficiently to pay for the additional expense necessary to keep it in good condition.

"From a bankrupt and almost helpless interurban trolley system the company I am associated with," said Mr. Burke, "has been brought back, not only to life, but to something approaching success, one of the best roads in this country. And how was that done? It is too long a story to be told in detail. However, it was not done by the installation of cars that were dirty, uncomfortably seated, or equipped with cumbersome passenger regulatory devices. The equipment of the trains, terminal stations, cars, and all the rest of it was planned with a view to satisfy the necessities, comforts and even the whimsical desires of the passengers.

"Serious reductions in the income of interurban railways have resulted from increased use by the riding public of passenger motor vehicles. It is generally conceded that there is no permanent way to overcome this condition. If interurban railways expect to continue to live, some means must be found to augment their depleted income to such an extent that will enable them again to build up their properties to a high standard of maintenance.

Freight Haulage Recommended

"The most logical and surest means of accomplishing this is through the development of freight business. Much tonnage can be hauled during the idle periods and off-peak hours, thus making unnecessary any further investment for power facilities, and at the same time utilizing this idle equipment in revenue producing service. The cost of providing adequate terminals, motive power and rolling stock, and also a competent traffic organization, which are other essential requirements for conducting a successful freight business, is comparatively small. More or less freight is being handled by a number of electric lines, but in the past we have given little attention or encouragement to this phase of the operation. Such service as is being given is the result of insistent demand on the part of the shippers, and as a general rule no consistent efforts have been made to conduct the business along progressive lines, notwithstanding this branch of service is a proved source of net income.

"Transportation authorities have presented figures showing that short hauls, and especially less-than-carload traffic, for distances up to 75 or 100 miles cannot be handled by steam lines except at a loss. This is on account of the necessarily large overhead expense involved in providing extensive terminals, trackage, etc., suitable for long-haul traffic. The electric line can handle such tonnage more economically and at a profit, by reason of its more flexible and lighter equipment, smaller terminals and much lower overhead."

Discussion of track construction was opened with a paper by Clyde L. Hedges, which will appear later in this paper. F. E. Hibbard, construction engineer Milwaukee Electric Railway & Light Company, gave some very interesting facts relative to the track construction in the city of Milwaukee, bringing out the fact that thermit welds, tie rods, concrete-reinforced pavement and labor-saving devices were the outstanding features of their construction. Mr. Hibbard and Mr. Kraemer of the Chicago, North Shore & Milwaukee Railroad discussed to a considerable extent the application of Hedley mulsified asphaltic oil in the construction of grade crossings and railroad intersections. It was the opinion of both that the oil had proved very satisfactory in every capacity that they had used it and they also felt that the number of uses for the oil was unlimited.

Some Factors in Service*

By C. H. Allen
Wisconsin Public Service Corporation, Green Bay, Wis.

IT COSTS little, if any more, to haul a car loaded to capacity than to haul it empty. Our objective therefore must be to increase the returns; and to attain our objective, we must keep before our operators and the public constantly the keynote of railway transportation: Service.

We must serve all the public, in order to increase the number of car riders. Service means, first of all, clean and neat cars, 100 per cent on time, and courtesy from operators. It is worse to have cars one minute ahead of schedule time than one minute late. In towns the size of Green Bay, where cars run on a twelve or fifteen-minute headway, if a patron misses a car the chances are he will walk, or start walking and be picked up by a friend in an auto, and another fare is lost.

When people realize that at a certain minute a car passes a certain corner, they will ride. On our best line cars

*Abstract of a paper presented before the Electric Railway Section of the Wisconsin Utilities Association, Oshkosh, Wis., Aug. 17, 1923.

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are invariably on time. We have several business men living adjacent to that line who own automobiles, but who ride the cars to work. If our cars were not on time these men would use their autos, and carry others with them who would otherwise ride the cars.

Invite complaints and show the complainant the utmost courtesy. Let him know that you are trying to give him the best service possible, and that you welcome the opportunity to correct defects. Make the complainant a booster instead of a knocker. When the service is off for some unavoidable reason, see that the press carries a story explaining why.

Courteous operators are of vital importance. There is no place in car service for a grouch. Passengers frequently comment on the pleasant manner in which an operator directs some old lady to the hospital to which she was going, or the attention shown ladies with children. On the other hand, the operator who is discourteous not only hurts the service in the eyes of the particular passenger to whom he shows the lack of courtesy, but makes an enemy of every regular rider on his car.

The next time he has an accident with some of those riders as witnesses, they will have very little good to say of his operation. Our claim department reports that when an accident happens, it can tell quite accurately what kind of statements they are going to get from witnesses, by the reputation of the operator for courtesy or lack of it. If he is a man they like, everything he did at the time of the accident looks good to them, and they place all the blame on the other fellow; but if they dislike the motorman, they can see very little good, even if he did all in his power to avoid the accident. A courteous motorman will have on his list of witnesses passengers who will not only support him in every statement he makes, but will so testify in court. The effect of his courtesy even may extend to the jury that tries the case.

Advertising is a good salesman for special forms of transportation. In our experience neat car cards in conspicuous places bring results, especially if ticket books are used on which the public rides for a reduced rate. Strangers call at our ticket window every day, saying that they have read the car cards and want to buy the books to obtain the reduction.

We believe that our bonus system for operators brings about better service. When Mr. Warwick explained our bonus to this meeting last year, our bonus system had been in effect a time too short to be taken as a true test. This year, however, we are able to give you some statistics on it which tell a more reliable story.

In 1922, the last nine months of which we operated under our bonus system, we had 160 accidents. We paid out for the year 1922 in settlement of all claims $1,040. Of this sum we paid out only $287 during the nine months in which the bonus system was effective, or about 0.1 per cent of our gross income. During these same nine months we collected as damages to street cars caused by collision with motor trucks $228. During these nine months therefore we paid only $69 more than we collected.

During the first seven months of 1923 we have had 144 accidents. We have paid out for claims during this period $66, or approximately 0.03 per cent of our gross income. During the same seven months we have collected $170 as damages to street cars from truck owners. During the sixteen months of our bonus system we have fought four lawsuits and the jury has given us a verdict in each case. We have no accident or damage suits pending at the present time.

The Place of the Motor Bus*

All Local Transportation Should Be Subject to Same Restrictions—Increased Facilities Should Give Greater Riding Habit—Evidences of Improvements in Electric Railway Industry Many

By J. W. Welsh
Executive Secretary American Electric Railway Association

THE motor bus is proving itself today to be a very useful ally to the electric railway industry. It has been taken up by many companies to develop extensions into districts not previously served and in some cases to replace non-profitable routes when expensive track and paving replacements became necessary. Owing to its low capital investment it has saved electric railway companies from making the large expenditures ultimately required for a permanent rail system. The latter is deferred until traffic has developed to the point where the lower operating costs of the rail installation are sufficient to justify its larger capital requirement.

The question of fitting the bus to transportation service is, however, a detail to be worked out in accordance with local requirements. It is vastly more important that communities should recognize the necessity of co-ordinating their transportation service as a whole, from the standpoint of public convenience, safety, comfort and economy. It is disastrous to the public as well as to the private interests concerned to encourage or permit the competition of unregulated buses with the closely circumscribed service and fares of the electric railway. To be fair, both must come under the same authority and be subject to the same restrictions. The alternative is to remove all restraints from both and let the electric railway run the service it pleases at any fare it sees fit to ask.

Buses Are Regulated in Forty-two States

All the states in the Union except six have taken official action with respect to the motor bus. Public utility commissions have some sort of jurisdiction in thirty-two states, and in seventeen of these the commissions have issued general orders governing their operation. Thirty-six states have imposed a gasoline tax. The "Certificate of Convenience and Necessity," under which competition with electric railways or other buses is either completely eliminated or restricted, is effective in twenty states. Unfortunately, however, in some of these states this requirement is of recent origin and does not apply to buses previously in service. Issuance of indemnity bonds is required in twenty-three states and reporting of accidents in fifteen. The commission has authority over rates of fare in nineteen states, and regulations regarding routes are prescribed by the commission in fourteen and schedules in sixteen. It is the larger and more important states that have taken the lead in these matters, and consequently it may be said that the country as a whole has progressed well in according the bus a legitimate place in transportation.

When it comes to the question of fare to be charged, it is even more important that the community as a whole should be considered. Every electric railway man knows that the cost per passenger carried varies through the widest possible limits on the various routes of any system of any size. He would gladly agree to carry passengers for a 5-cent fare if he could choose certain routes only on which this would apply. Other routes of the same system, less favored by density of traffic, length of haul and other factors, would require fares ranging from 10 cents up.

If the greatest good to the greatest number is to be the principle, then the fare should be averaged within the limits of the areas where a common interest is recognized. Thus it is that the bus when allowed to compete unrestrictedly with the established rail service has been able to choose a favorable route and seemingly operate successfully at a low fare. In the city of New York today the operators of buses on the Grand Concourse are finding they are losing money on the 5-cent fare prescribed by the city administration. Unregulated competition may be counted as only a passing phase in the application of the motor vehicle.

Effect of Motor Vehicle on Riding Habit

A more vital question, I believe, is the ultimate effect of the motor vehicle, including all its forms, on the riding habit. If the riding habit is increasing,

*Abstract of address before the Wisconsin Public Utilities Association, Electric Railway Section, Oshkosh, Wis., Aug. 17, 1923.

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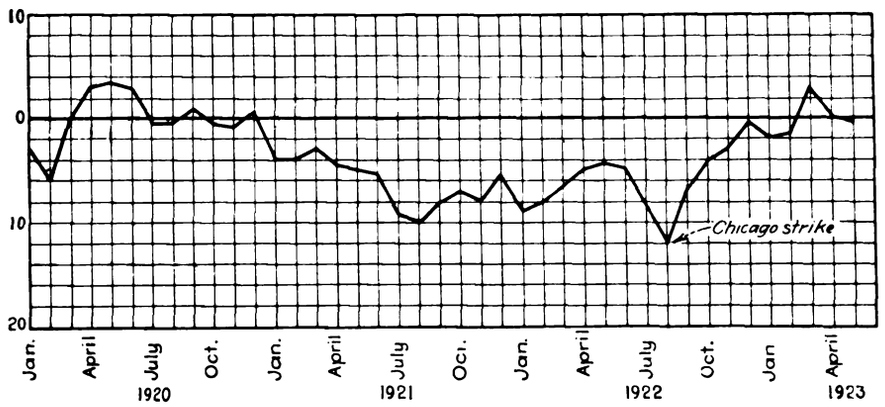
then the transportation industry is stable and may look to the future with confidence. What has been the effect of the 11,000,000 pleasure automobiles on the number of riders on public conveyances such as the electric railway and the legitimately operated motor bus? To determine this we have prepared an index number represented by the daily car riders average for the month and going back for several years. There are, of course, numerous factors which affect this figure, such as general business conditions, employment, etc., which are reflected in this study. The index is based on the average of 1920, as this represented the best year since the war. It is noted that the trend is downward to the winter of 1921-22, since when it has been climbing upward, and now has gone above the 1920 average. As this includes no bus passengers, and represents eighty typical railways picked at random over the country, it is a most significant and encouraging sign of the inherent stability of the electric railway. This represents a total of more than 15,000,000,000 passengers for the country and an annual gross revenue of $1,100,000,000, of which $50,000,000 is from the carrying of freight. This gives the electric railway seventh place among the industries in the value of its output. There are 45,000 miles of railway track today in active service and the total capital investment is $5,600,000,000. These are large figures and are significant of the magnitude of the industry.

As a tax collector, the electric railway has been quite successful. It contributes today $92,000,000 annually in the form of direct taxes, plus the other imposts levied upon it, such as paving, street cleaning, snow removal, etc. These charges amount to 10 per cent of the fares collected on the average, while in individual cases they amount to as much as 15 per cent. In other words, from ½ cent to 1 cent out of every street car fare is collected as taxes. This is the culmination of a burden which has been increasing at an alarming rate in recent years. For the year 1922 the direct taxes alone amounted to $70,000,000, and with the other imposts to $92,000,000, while the net income was but $84,000,000. Thus the electric railways paid more money into the public treasury last year than they paid to their stockholders and to the various reserve funds combined. Since 1890 operating revenues increased 1,000 per cent, while taxes increased over 2,000 per cent, and net income increased a little over 500 per cent. A committee of the association will report on this subject at the convention and it is hoped more effective means than those already tried may be suggested to secure much-needed relief.

Wages Up; Fares Down

Comparing the first half of 1923 with 1922, the association's returns from companies throughout the country show a most favorable trend. There has been a 6.6 per cent increase in passengers carried, a 3.5 per cent increase in gross revenues, a 6 per cent increase in net revenue and a 3.7 per cent increase in service measured by car-miles operated. This has been accomplished in spite of a 2.5 per cent increase in wages paid and a 3.6 per cent reduction in average fare per passenger.



Riding Habit Index. Based on Eighty Typical Electric Railways
Zero taken as daily average for 1920

In other words, the industry as a whole has increased wages and decreased fares. It has increased the service rendered and carried more passengers. At the same time it has increased its net revenues, or the company's own share of the receipts. If this doesn't indicate a promising condition and a wide-awake and efficiently conducted business, I will leave it to the professional investigators.

Evidences of good management and an active and searching study for improvement in the industry are many. Labor-saving machinery in track construction has permitted track to be relaid under traffic conditions at a minimum cost. The welded rail joint is saving millions while it offers a smooth-riding surface, which is the despair of the jitney. The association has raised a fund of $23,000 to study this further. The automatic substation is a saver in power costs. Light-weight one-man cars have been important in aiding service in certain places, while still larger cars with trailer operation are providing a rapid and comfortable ride in others. Better shop practice and maintenance methods have lowered up-keep costs. These are a few of the improvements. Many others are under way. The use of higher quality materials and the release of inventive and mechanical genius will undoubtedly add greatly to the further advancement of the industry.

Summary

The motor vehicle is a new tool in the hands of the railways, offering a cheap method of expansion as a forerunner to the installation of the permanent rail system. It has taught the riding habit to those who used to walk and increased the opportunities for transportation service.

Nothing has developed, or is likely to, which will destroy the necessity for public transportation.

Regulations by public authorities are overcoming the inequities of the past and unjust competition is being eliminated.

Taxation and the additional burden due to franchise obligations are receiving close study and the future should see a material alleviation in this direction.

Wonderful opportunities for inventive genius exist in improving the mechanical forms and economies of transportation facilities, and with these should come a corresponding return to the industry.

Inquiry Suggested Into Public Ownership Abroad

W. P. STRANDBORG, president of the Public Utility Advertising Association, is outlining to members of the association a plan for conducting a broadside investigation of public ownership in Europe. It has been the thought of Mr. Strandborg ever since it was decided to hold the World's Advertising Convention in London next year that it would be a splendid opportunity for the advertising association to form a strong, representative and well-equipped delegation to attend the London convention and then sit as a commission, preferably in London, and conduct formal hearings into every phase of government ownership in Europe. It is his idea to invite prominent public utility men from all the leading countries in Europe to attend these hearings and be prepared to present information that might have material bearing on the railroads, tramways, light and power, gas, telephone, water—in fact, every phase of the utility industry.

As to the personnel of the commission, it has been suggested that it be limited to about twenty-five men, every one equipped to handle a definite phase of the subject—men who have had experience in public relations work with large management corporations or the large industrial concerns whose business dovetails into the public utilities industry; also, representatives of the leading state committees on public utility information and the National Utilities Association.

In order to assist in the efficient dis-

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patch of the work by this commission, Mr. Strandborg would ask the national utilities to designate one or two legal representatives, one or two engineers and one or two operating men to act as advisers for the commission. It would also be essential to establish as early as possible a contact committee, preferably in London, to get in touch with all phases of public ownership of utilities in Europe, to invite the proper utilities men to attend the commission hearings and to see that all the documentary, engineering and operating data necessary are available for the use of the commission.

Overhead Construction Specifications Approved by A.E.S.C.

THE specifications prepared by the American Electric Railway Association for 600-volt direct-current overhead trolley construction (Ds 2c) have been approved by the American Engineering Standards Committee as tentative American standard, and the American Electric Railway Association has been designated sponsor for the revision and future development of these specifications.

In the preparation of the specifications co-operation was had from a number of the larger manufacturers of overhead line material, as well as from engineers and contractors. They embody much of the best practice in electric light, power and communication, as well as electric railway service, and it is understood that they have been followed to a large extent by the majority of electric railways as standard construction practice.

In recommending the approval of these specifications, the special committee of the A.E.S.C., headed by E. A. Frink, called attention to the revision of the National Electrical Safety Code now under way. The revision of this code and of the specifications for trolley construction will be carried out in such a way as to assure their complete harmony at all points where they contain related provisions.

National Safety Council Convention

THE twelfth annual convention of the National Safety Council will be held in Buffalo Oct. 1-5. All meetings will be in the new Statler Hotel. Marcus A. Dow, New York, president of the council, will preside.

American Association News

B. I. Budd Is Nominated for President

THE nominating committee of the American Electric Railway Association has made its report in favor of the following men for election at the coming annual meeting, Oct. 8 to 12, in Atlantic City:

For president, Britton I. Budd, president the Metropolitan West Side Elevated Railway and Chicago, North Shore & Milwaukee Railroad, Chicago, Ill.

For first vice-president, J. N. Shannahan, president Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.

For second vice-president, F. R. Coates, president Toledo, Ottawa Beach & Northern Railway, Toledo, Ohio.

For third vice-president, W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill.

For fourth vice-president, R. P. Stevens, president the Pennsylvania-Ohio Electric Company, Youngstown, Ohio.

For treasurer, Barron G. Collier, president Barron G. Collier, Inc., New York.

Four members of the executive committee are to be elected this year, two representing railway members and two representing manufacturer members, their terms expiring in 1926. The railway members nominated are J. H. Hanna, vice-president the Capital Traction Company, Washington, D. C., and H. B. Flowers, president New Orleans Public Service, Inc. The manufacturer members are E. F. Wickwire, secretary the Ohio Brass Company, Mansfield, Ohio, and Cornell Hawley, president Consolidated Car Heating Company, Albany, N. Y.

Entertainment at the Convention

THE entertainment committee met in New York on Aug. 22 to make final arrangements for the Atlantic City convention, Oct. 8 to 12. The members in attendance were: J. C. McQuiston, chairman; C. C. Beck, Harold A. Hegeman, Jerry Stanton for E. F. Wickwire, L. W. Shugg, E. P. Waller, George R. Lyman, J. V. Sullivan, J. P. Barnes, L. H. Palmer, Edwin C. Faber and Harry L. Brown. The program of entertainment that will be provided will be about as follows:

One of the Paul Whiteman orchestras will supply music each morning from 11:30 to 12:30; each afternoon except Thursday from 4 to 5, and for the evening affairs.

The Submarine Grill at the Traymore Hotel has been designated as the official midnight rendezvous each night, and there will be dancing and music until 2 a.m.

A golf tournament has been planned for Sunday, Oct. 7, at the Northwestern golf course. Prizes will be offered.

Monday evening the opening dance in honor of the president and officers of the association will be held on the Pier.

Tuesday evening will be given over to a carnival or feature night on the Pier, with dancing.

Wednesday evening there will be a Grand Ball at the Ambassador Hotel with specialty numbers interspersed between dances.

Thursday evening arrangements have been made for a theater party and also for a water show at the Ambassador Hotel.

For the ladies, a very inviting card party has been arranged at Haddon Hall for Tuesday afternoon. Another card party is to be given on Wednesday afternoon at the Traymore Hotel. And on Thursday afternoon the ladies will be entertained at the Ritz-Carlton Hotel by a much talked of mind reader.

Committee on Coffin Prize Meets in New York

THE committee which will award the Charles A. Coffin prize in the electric railway field met at the association headquarters in New York on Aug. 23 to give consideration to the applications from eighteen electric railway companies.

After going over the reports briefly, it was decided to engage two railway consultants to make the detail analysis of the data submitted and to select the three or four best petitions from which the committee will then choose. John A. Beeler and Albert S. Richey were employed to do this work and to report by Sept. 20. The committee will then meet again on Sept. 21. The committee members sitting were: C. D. Emmons, chairman; Britton I. Budd and James H. McGraw. W. W. Trench, secretary of the Coffin Foundation; J. G. Barry, vice-president General Electric Company, and Executive Secretary Welsh were also present.

Meetings and Subjects

THE committee on meetings and subjects met in New York on Aug. 22 and made final arrangement for the program for the October convention. This program will be published along with the programs of the affiliated associations in next week's JOURNAL. The plan previously announced to hold one evening session devoted to public relations with some nationally prominent speaker was abandoned. The subject of "customer ownership" was also dropped from the program on account of pressure of time.

The committee also discussed briefly the subjects which it would recommend for consideration of the association committees next year, and decided to send a letter to all the committee members asking that they make suggestions along this line for consideration at the next meeting of the committee to be held in Atlantic City on Sunday, Oct. 7, just prior to the convention.

Those present at the meeting were: Messrs. J. N. Shannahan, chairman; H. V. Bozell, L. H. Palmer, L. C. Datz and Executive Secretary J. W. Welsh.

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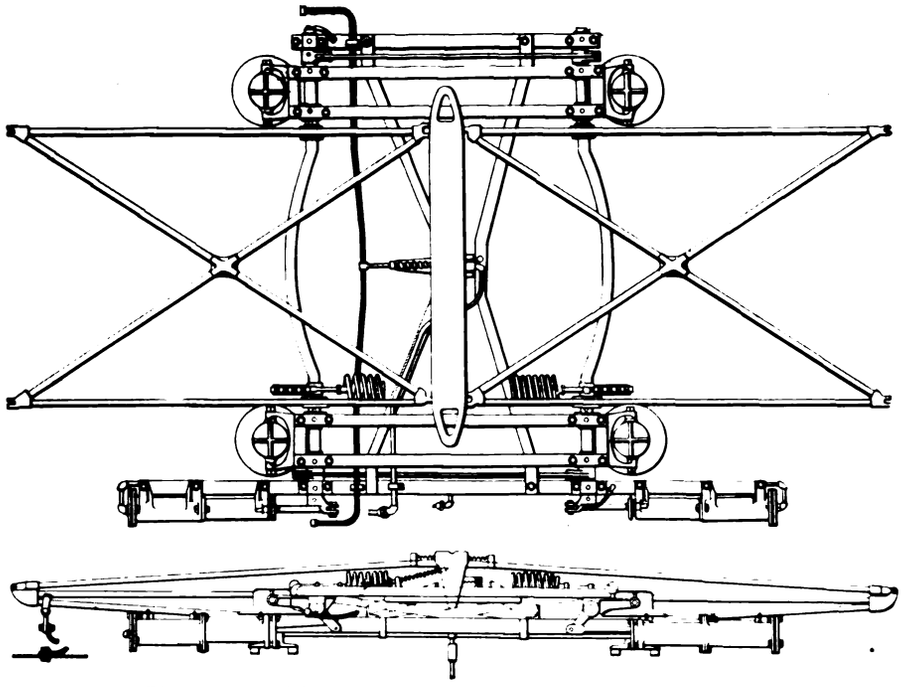
Maintenance of Equipment

New Pantograph Unlocking Device Saves Time

BY MEANS of a slight change in the pantograph unlocking apparatus, the New York, Westchester & Boston Railway has greatly facilitated the work of the motor-switchmen who prepare the cars for service.



The Heavy Line Shows a Piece of Shaped Conduit Fastened to the Pantograph Latch. It Saves Time in Preparing Cars for Service

Normally the pantograph is locked and unlocked pneumatically. Previous to the installation of the modification described below, when it was desired to raise the pantograph on a car standing without power or compressed air, it was necessary in order to create the air pressure for unlocking the latch to use a small hand pump located under the car body.

This method was unsatisfactory for several reasons. When the car was alongside a high platform station, the hand pump was difficult to get at. The pressure created by this pump was not always high enough properly to unlock the pantograph. Some men forgot to restore the valves to their normal position after using the hand pump, thereby preventing the proper locking and unlocking of the pantograph by means of the magnet valve in the motorman's cab.

The new unlocking device consists of a piece of 1-in. iron conduit bowed in the middle as shown in the accompanying drawing. This pipe is mounted on two brackets, one at each side of the pantograph support frame. To the center of the shaped conduit is attached a rod, the opposite end of which is fastened to the unlocking latch of the pantograph cylinder. A spring is fastened to this rod to insure the return of the latch to the closed position.

Instead of having to get down underneath the car and use the hand pump, all that it is now necessary for a motor-switchman to do in preparing a car for service is to reach up with an insulated hook and pull down on the bent portion of the conduit pipe. This movement is communicated to the rod at the center, and the latter releases the pantograph latch. When the latch is released the spring raises the pantograph to the wire.

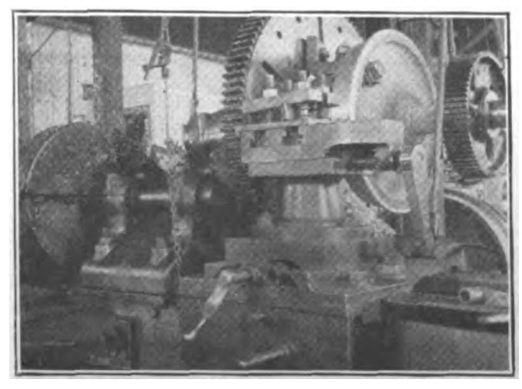
This device has already been installed on all of the No. 1 pantographs of the cars of the New York, Westchester & Boston Railway. It is being installed also as rapidly as possible on the No. 2 pantographs of these cars. When the installation is complete it is the intention of the company to remove the hand pump. A similar device is being used extensively on the New York, New Haven & Hartford electric cars.

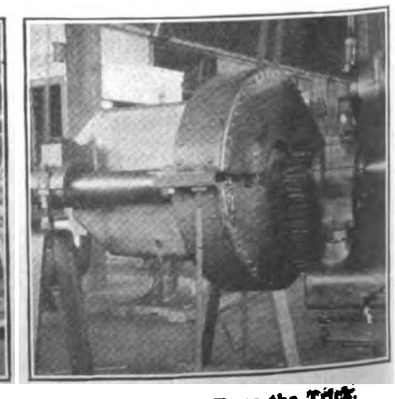
Automatic Feed for Lathe Toolpost Carriage

THE Kentucky Traction & Terminal Company does not have a regular wheel lathe in its shop at Lexington, but has rigged up an old two-spindle lathe for wheel turning, as shown in the accompanying illustrations.

The crank on the feed screw of the toolpost carriage of the lathe was removed and a ratchet arm was put in its place. In order to give the ratchet arm a reciprocating motion, it was connected through connecting rods and bellcranks on an overhead shaft to a faceplate crank on the end of the upper lathe spindle just outside the headstock.

This permits a cut to be taken on the wheel tread at an angle to give any desired coning. A steel wheel





At Left, a Ratchet Lever on the Toolpost-Carriage Feed Screw Does the Trick. At Right, an Old Railway Motor Drives the Wheel Lathe Through Gearing

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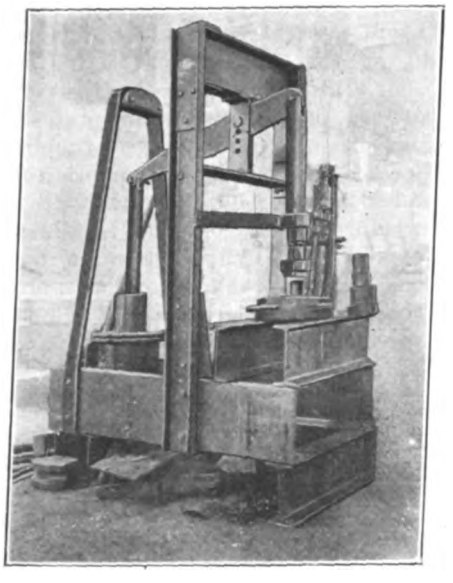
of one of the company's light-weight interurban cars is shown in place in the lathe.

As the pictures show the rather unique motor drive used for this lathe, a word regarding it may be in order. Power is supplied by an old railway motor which is mounted on steel floor stands and drives the lathe through its back gear.

A Powerful Bearing and Broaching Press

AMONG the many uses for compressed air in and around the electric railway shop, the performing of pushing and pulling operations is one of the most obviously advantageous. A press which is used for pushing motor bearings into and out of housings, which the men in the Virginia Railway & Power Company's shop at Norfolk have built, illustrates this.

This press comprises a 10-in. airbrake cylinder with a lever for multiplying by two or more the push supplied by the cylinder. The foundation of the press is made up of I-beams and channels built up as shown in the picture. Three 2-ft. pieces of 8-in. steel I-section rest on the floor. These support, on their ends, two 3-ft. pieces of 10-in. channel-section, set with the flat surface outward. Bolted to the channels are two 3-in. upright channels, placed a few inches off the center of the channels and rising to a height of about 4 ft. 6 in. from the bottom of the channels. A piece of 8-in. I-section joins the uprights at the top, being supported on brackets inside, with reinforcing plates outside. Bolted to the under side of this I-beam is a pair of flat plates forming the bearing for the fulcrum pin, projecting downward about 10 in. and perforated with a row of holes to permit the lever to be raised and lowered. These plates are 3 in. wide and they are stiffened at the bottom by being bolted to a similar cross-plate spanning the distance from upright to upright. Supported from this bearing is the lever, shown in the illustration, with a ratio of 2 to 1.



An Air-Operated Bearing Press that Provides Freedom of Movement for the Operator

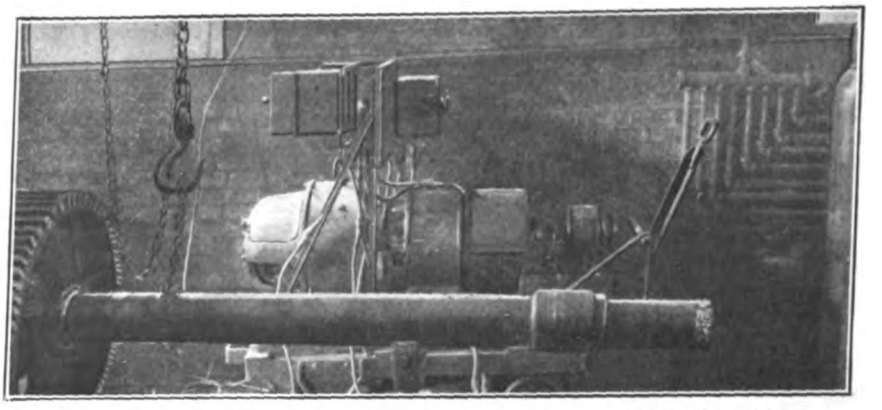
At the back of the press is a 10-in. airbrake cylinder, with its elongated plunger rod attached to the long end of the lever. A wood block mounted at a suitable height, on a 2-in. flat-iron support, limits the travel of the piston. A 2½-in. round rod hangs from the other end of the lever, being maintained vertical by a guide, made of 1½x⅜-in. flat steel, bolted to the uprights at a suitable height.

To provide a table for the motor housing to rest upon while the bearing is being pushed in or out, two 8-in. I-section pieces 2 ft. long are placed from one foundation channel to the other, being spaced sufficiently to allow a bearing to drop down between them.

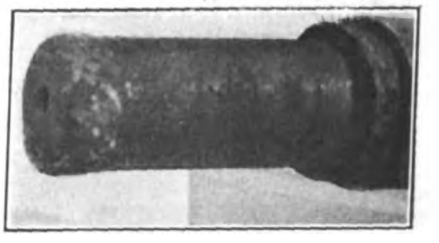
With 75 lb. per square inch pressure in the air line, the press will produce a force of about 5 tons, which is ample for the present purpose, as well as for broaching bearings, to which it is well adapted.

Pinions Boiled in Hartford

AT THE Hartford shops of the Connecticut Company a gas fed pot is used for boiling pinions before they are put on the armature shafts. The pot is close to the assembling track, and the heat of the pinions, when they are removed from the boiling pot, enables them to slip easily over the armature shaft.



New Portable Welding Set



This Is the Only Part of a Car-Axle Journal that Can Be Welded with Impunity

Restoring the Check-Plate Groove on Axle Journals

WHILE it is generally considered unwise to do any welding for the purpose of building up worn axle journals or the abutting shoulders, some railways find it profitable and perfectly safe to fill in a worn check-plate groove on old-type axles, to permit recutting, with the aid of the electric welder.

An axle end built up in this way in the welding department of the Indianapolis Street Railway is illustrated. The Westinghouse welding set used is shown in the upper half-tone.

Welding Lugs on Gear Cases

THE accompanying illustration shows some special gear-case lugs which have been designed and constructed in the Easton shops of the Lehigh Valley Transit Company. The lugs are of cast steel and are arranged for welding to the sheet-iron gear cases. When repairs are made the gear cases are welded throughout and the lugs are welded

Gear Case with Welded Lug

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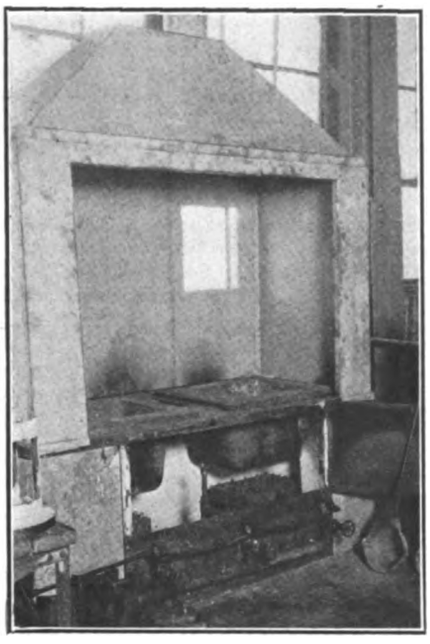
in place. A V-shaped recess is provided around the edge next to the gear case so that metal can be deposited by the electric arc.

Twin Babbitt Pots in Westchester Shop

THE installation of a pair of twin babbitt pots has recently been completed by the New York, Westchester & Boston Railway at its Union Port Road shop. The pots are 14x18x12 in. deep and are placed about 6½ in. apart. Special gas burners, designed by J. T. Hamilton,



These Recently Installed Babbitt Pots Are Heated by Special Gas Burners

master mechanic, are used to heat them. The lower part is housed in a fireproof compartment with a metal door for access to the burners. The upper part is entirely surrounded by a galvanized iron hood with a large opening located in the front to give access to the babbitt pots. In the back, two holes, one of which appears in the illustration, have been made, through which the light of a near-by window enters and illuminates the working area. At the top, the hood tapers to connect with a flue discharging the gases outside.

The pot on the left-hand side is used for preheating the material to be babbitted. Whatever old metal, dirt or grease is on the bearing is melted off during the preheating process. The piece is removed, cleaned, thoroughly tinned, and then babbitted in the right-hand pot, where only pure babbitt metal is present. By this means, the quality of the babbitt metal applied to the bearings is much improved. None of the impurities on the worn piece are incorporated into the finished product. Another advantage of the new installation lies in the fact that the babbitt pots are larger than the one previously used in this shop and will, therefore, accommodate pieces which formerly could not be immersed in the pot, but had to be treated in other ways.

New Equipment Available

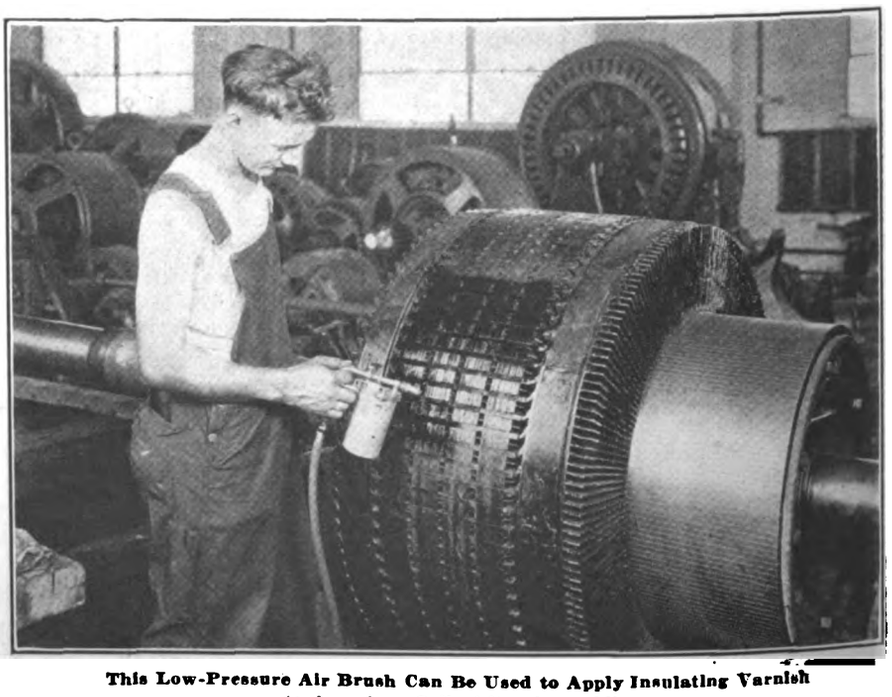
Low-Pressure Air Brush Saves Paint

A Better Finish to the Job, Diminution of Fumes and a Smaller Power Consumption Are Other Advantages Claimed for This Apparatus

PROPER laying out and flowing of either varnish or paint requires the natural evaporation of the solvent after the coating has been applied. High-pressure spray-painting apparatus is said to cause the evaporation of much of the solvent in the paint before the material reaches the surface. The fundamental principle in air brush painting therefore is the use of the lowest possible pressure consistent with speed and perfect atomization of the material, according to the Eclipse Air Brush Company, Newark, N. J., manufacturers of a new low-pressure air brush. This apparatus operates at a pressure varying from 25 to 35 lb. per square inch in contrast to the ordinary outfit which requires from 60 to 100 lb.

In an attempt to avoid undue evaporation when using a high-pressure air brush, the paint is often piled on in a more or less dry condition, producing a stippled finish. An excessive amount of material may thus be used. On the other hand, at the low pressure it is claimed that the normal amount of solvent is left in the material, so that the varnish, shellac or paint flows out naturally.

Besides the saving in material, which, it is said, quickly pays for the initial cost of the low-pressure air brush, there are several other advantages claimed for it. Better working conditions obtain because of the diminution of fumes. A better finish results because the physical properties of the material are not changed during the application. Saving in labor is also effected because the even surface obtained by a low-pressure application requires less rubbing down. The power consumption is about 50 per cent less than with a high-pressure air brush, it is claimed, because the Eclipse requires only half as much volume and pressure. No special preparation of the paint for spraying is necessary, as it can be used through the machine at the same consistency as when applied with a hand brush.



This Low-Pressure Air Brush Can Be Used to Apply Insulating Varnish to Armature Coils After Assembling

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The News of the Industry

Interurban Wages Adjusted

Indiana, Columbus & Eastern Traction Settles Wage Scale in Conference with Its Men

Trainmen on the interurban and city lines of the Indiana, Columbus & Eastern Traction Company receive wage increases of from 5 to 6 cents an hour under the terms of a new wage agreement signed by officials of the company and representatives of the employees in Springfield, Ohio, on Aug. 18. The new scale is effective for a period of one year. It is retroactive to Aug. 16. The new scale in cents per hour is as follows:

INTERURBAN CONDUCTORS AND MOTORMEN	
First three months	41 cents
Next nine months	49 cents
After first year	52 cents
INTERURBAN BRAKEMEN	
Straight	40 cents
CITY LINES (Bellefontaine, Ohio)	
First three months	39 cents
Next nine months	44 cents
After first year	49 cents

The contract also contains a clause providing for 3 cents an hour additional to the regular scale for the operation of one-man cars should the company decide to operate this type of car at any time. A similar clause has been contained in the contracts for the past three years.

FIVE CENTS AN HOUR MORE

The new scale provides increases of 5 cents an hour for both interurban and city conductors and motormen, and 6 cents for brakemen. The agreement is subject to the approval of Federal Judge John M. Killits as the company is in receivership, but the approval of the court is expected to be forthcoming.

The trainmen submitted a proposal to the company on Aug. 1, asking an increase of 10 cents an hour. A conference was held in Springfield on Aug. 9, at which time the company's financial status was explained to the employees. Representatives of the men then agreed to ask the employees to reconsider their demand. This was done, and as a result the employees modified their demand to 5 cents an hour.

In discussing the modification by the men, John S. Bleecker, general manager, said:

> It is an encouraging sign that the men were willing to recognize our problems. They knew after we laid the cards on the table just about how much we could pay them in increased wages and still provide for our budget of repairs and extensions without which we cannot give the improved service to attract more patronage and keep the lines in operation. It is an encouraging sign that the whole I., C. & E. family is imbued with the spirit to give better service to the public and to exert every effort to increase and improve our facilities.
>
> The company is now in receivership and needs a great deal of money to build up the property. We are doing the best we can to get back patronage by providing better facilities.
>
> Our budget of improvements, repairs and extensions for 1923 totals $111,000. We estimated we will have this amount for this purpose, and judging from actual earnings so far this year we will come close to that figure.
>
> Of that amount, about $45,000, or nearly one-half, is estimated to be necessary for franchise requirements, such as rebuilding tracks and paving streets in the cities and towns through which the lines pass. Another $42,000 is necessary for extensions, improvements and modifications of the system. These include a new power line at Bellefontaine, improvements to the telephone system to facilitate car dispatching, purchase of gasoline power cars for the section workmen and the cash payment for six new lightweight cars for use on the Dayton-Union City division.
>
> This leaves about $25,000 of the estimated $111,000 which can be diverted to make up the increase for the trainmen. The increase totals about this amount in a year.

OTHER NEGOTIATIONS UNDER WAY

The wage agreement between the Columbus, Newark & Zanesville Traction Company also expired on Aug. 16, but negotiations for a new scale have not been completed. The C., N. & Z. trainmen also asked for a 10-cent increase, but a counter proposal was submitted by the company, the terms of which have not been made public. Mr. Bleecker expects an early settlement on the latter line. The C., N. & Z. line is not in receivership. Negotiations between it and the employees are conducted separately from those of the I., C. & E.

Strike Reprisal Threatened at Fairmont

Possibility of a strike exists affecting all the employees of the Monongahela-West Penn Public Service Company operating at Fairmont and Parkersburg, W. Va., and Marietta, Ohio. This is indicated in an announcement made by C. R. Boyles, chairman of the strike committee of the International Brotherhood of Electrical Workers, that a sympathetic strike against the company is impending.

As matters stood a few days ago more than 150 members of the union have been on a strike since June 30, the company not having negotiated a new wage scale with certain classes of workers in the union. The strike, however, has not applied to trainmen, being confined to groundmen, linemen and other electrical workers. The utility company has shown a willingness to increase the scale of pay to the electrical workers to some extent, but not to as great an extent as demanded by the strikers.

The trainmen employed by the company and the company itself are on amicable terms and employer and employee are working together for the improvement of public service.

Raise for Municipal Men

Board Considering Wages for Detroit Employees Awards Men a 10 per Cent Advance

Department of Street Railway employees in Detroit have been granted an increase in pay averaging 10 per cent by the board of arbitration. The award was announced on Aug. 18. The men were allowed approximately half the increase they had demanded. The increases named range from 5¾ cents to 7½ cents an hour, effective for six months from June 1 to Nov. 1. The decision of the board was signed by all three arbitrators.

The total of the increase in wages under the award will, it is estimated, amount to $300,000 for the six months. W. D. Mahon, international president of the Amalgamated, recommended that the men accept the terms.

Under the new agreement the men will receive 62 cents an hour for the first six months; 66 cents an hour for the next six months; and after one year's service, 70 cents an hour. One-man car operators will receive 5 cents an hour more than regular platform men. Overtime will be paid for at 75 cents per hour as before. For Sunday and holiday work the men will be paid 95 cents an hour for time in excess of eight hours, and for owl car work 80 cents an hour. One-man owl car operators will get 85 cents an hour.

SCALE FIXED FOR SIX MONTHS

The city can take action to have the wage scale changed at the end of six months or the schedule can be allowed to stand for a longer period if it is thought desirable to do so. In fixing the period at six months the arbitrators had in mind statements made before the board to the effect that officials of the railway department had had under discussion the submission to the voters of an amendment to the city charter which would relieve the department of taxes and paving between the tracks. The amendment can be submitted to the voters at the fall election, according to Judge Dingeman, chairman of the board of arbitration in the wage dispute.

In commenting on the men's request that the question of schedule runs be more definitely defined, the arbitrators stated that the commission is substantially complying with recent promises to arrange schedules so that as many runs as possible can be completed in the eleven hours. This policy is expected to be continued.

Employees of the railway have contested the opinion that they are not city workers. They claim that as city

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employees they are not liable for the payment of the income tax. It is the opinion of the internal revenue office that under the terms of the deal by which the city took over the Detroit United Railway, the men could not in reality be classed as city employees.

William B. Mayo, general manager of the railway, stated before the arbitrators that if the men had waited a little longer before presenting their demands and following up the demands to the point of arbitration, the department could have handled the matter much better and the men would have been entirely satisfied.

An increase in fares was announced on Aug. 21 intended to produce sufficient revenue to enable the city to meet the wage award. This development is referred to elsewhere in this issue.

Initiative Election at Birmingham on Aug. 28

Preparations are being rushed for the initiative election on the jitney men's ordinance offered as a substitute for the city jitney regulations, which practically put jitneys off the streets of Birmingham, Ala. The election is called for Aug. 28, the final check of the election petition showing the signatures of slightly more than the required 1,500 qualified voters necessary to call the election.

Jitney men are making a personal canvass, largely confined to passengers in their cars. The City Commission has appealed to civic organizations to make a campaign in favor of the settlement effected with the Birmingham Railway, Light & Power Company and against the jitney men's ordinance. Plans have been made for a short speaking campaign in favor of the city's ordinance, if it is found necessary.

Commissioner Urges Miami to Take Over Railway

The city of Miami, Fla., may take over the operation of its railway lines in the near future. This has been revealed in a statement by C. D. Leffler, City Commissioner. According to Mr. Leffler, the city commission has received no official communication from the Fisher interests, operating the Miami Beach Electric Company, but some of the commissioners have spoken informally with representatives of the Fisher interests. Mr. Leffler said:

> Personally, I hope that some arrangements can be made for the Fisher interests to continue the operation of the lines until more mileage is secured. It would be ridiculous for two 5-mile car lines with connecting tracks to operate under two different organizations, two sets of mechanics and other duplications which would be necessary should the city take over the local lines.
>
> The city has only 5¼ miles of tracks and I should like to see the Fisher interests continue to operate the lines until we have at least 12 miles of tracks. When the City Commissioners receive some formal communication from the Fisher interests, the commission will take action on the matter.
>
> The Fisher interests do not say they have lost money in the operation of the lines, but say that when the damage suits are taken into consideration they have lost money.

Making Money for Merchants

Jealous of the Real Estate Values Built Up by Railway, Davenport Merchants Kill Rerouting Scheme

An offer on the part of the Tri-City Railway, Davenport, Iowa, to reroute its lines at a cost of $400,000 and to increase the service 34 per cent during the peak hours has been turned down by the City Council following several months' consideration. The rerouting plan would have necessitated the removal of some forty-four blocks of track and the laying of several new passing tracks and of some six blocks of new connecting lines.

It would have resulted in operation economies which would have justified the expense of starting the system, according to R. J. Smith, manager of the lines. At present there are many parallel lines, the service on some lines is delayed at grade crossings and one loop in northwest Davenport makes the entire system unwieldy.

The company offered to provide bus service in the outskirts to replace the ends of some of the existing lines intended to be cut off if the rerouting plans were put into effect. These bus lines would have served the residents of a rapidly developing section which now largely without street car transportation.

Opposition to the proposal developed from the business interests on Brady Street, the main north and south street of the city, the greater part of it double tracked. The rerouting plan would have sent the Vander Veer Park cars, which serve the outlying Brady Street section, over Harrison Street, two blocks to the west.

The Brady Street merchants, including the city's largest department store and two banks, one of which has just announced a $1,000,000 loop office building, contended that the change would upset real estate values created in that section by a railway line which had remained unchanged since it was built. These merchants also contended that their business would be carried elsewhere by the new routing system.

The extensive program of new paving which the city had planned was brought into the discussion as it was the desire to complete this paving as soon as possible and all parties were desirous of settling the rerouting in order that the contractors might proceed with their paving work.

The railway offered to pay without protest the paving tax apportionment on streets where it would take up and abandon trackage under the proposed plan. It was realized by all that this new paving would seal the fate of any future street car line changes for many years to come as the expense of tearing up brick or concrete or asphalt once it had been laid would be prohibitive.

In the plan better service on practically every line in the city was specified, the proposal calling for a car every five minutes during the rush hours on some main lines and more cars at more frequent intervals on other lines.

The plan was considered at citizens' meetings, at civic club gatherings, at open meetings of the City Council and at conferences between business men and the company officials and between Aldermen and the company officials. While the Council seemed to be practically won over to the proposal the business interests could not be convinced and it is regarded as largely due to this attitude that when the plan came up for final decision before the City Council it was lost by a vote of four to two.

Bust of Colonel Strickland to Be Erected in Dallas

In honor of the late Col. J. F. Strickland of Dallas, Tex., who was president of four of the public utility companies having headquarters in the Interurban Building, Dallas, a bronze bust will be erected to his memory in the waiting room of the Interurban Building. Subscriptions are being taken among the more than 3,000 employees in the building, and it is intended that the entire cost shall be borne by the employees, with whom Mr. Strickland was especially popular. At the time of his death Colonel Strickland was president of the Texas Electric Railway, Texas Power & Light Company, Dallas Power & Light Company and the Dallas Railway. It is due largely to his foresight and energy that Texas now ranks high among the states in the development of the electrical industry.

Lima Strike Broken — Company and Men Use Buses

For the first few days of the strike of the forty-three trainmen of the Lima City Street Railway, Lima, Ohio, the company ran buses on the streets to handle traffic. It charged the regular rate of fare of 7 cents cash or four tickets for a quarter. Now, however, the company is actually operating twelve cars a day with men employed to replace the strikers. The company operates only eighteen cars during the normal hours of the day so the strike is apparently broken and the company feels it unnecessary to continue to operate buses.

The strikers also resorted to the use of the bus. Their idea of course was to take business away from the company. Not having any permission from the City Council to run buses the former railway men could not charge any fares, but were forced to depend upon donations from the public to meet their costs.

The men at Lima went out on strike at midnight on Aug. 11 to obtain recognition of the union and an increase in pay of 10 cents an hour.

The company refused to sign any agreement with the union. Consequently the men quit and there has been no wage discussion.

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New Jersey Railway Suggests Settlement Plan

Adjustment of Wage, Valuation, Fare, Jitney and Other Questions All Included in Offer of Service Resumption—Commission Regards Proposal as Offering Basis of Negotiations—Hearing Called for Aug. 28

A PLAN of settlement of the transportation crisis in New Jersey was offered by the Public Service Railway on Aug. 21. This was in accordance with the promise made to the Board of Public Utility Commissioners by E. W. Wakelee, vice-president of the company, at the public hearing before the board on Aug. 14. In presenting the plan the company says that "it is possible to settle this whole problem and it should be done once for all." In conclusion it says that it is prepared to resume service temporarily at the rate of fare in effect when the strike was called, at the new wage scale, upon certain assurances from the commission and the representatives of the more prominent municipalities. The proposal was signed by President Thomas N. McCarter. The plan provides among other things for:

A basic pay of 60 cents an hour, or a 20 per cent increase. The men were demanding 65 cents an hour, or a 30 per cent increase.

A 7-cent straight fare and a 1-cent transfer fee, to replace an 8-cent cash fare and a 1-cent transfer fee.

The purchase by the company of all the bus lines in competition with the surface cars on streets where tracks are laid, on July 31, the day before the strike was called.

The rerouting of bus lines whose owners will not sell.

A valuation of $110,000,000 for the property.

It is set out that the plan will involve the expenditure of several million dollars, financing of which has been provided for, conditioned upon the approval of the whole plan by the commissioners.

The preamble and the plan follow in full:

Public Service Railway Company

Plan of Settlement of Transportation Crisis Offered by Public Service Railway Company

"Newark, N. J., Aug. 21, 1923.

"Public Service Railway Company, mindful of the burdens that have been heaped upon it during the past five years, reaffirms its determination that it cannot contract to pay out large sums of money for wages in excess of its revenues available for that purpose, but conscious of its obligations to the people of New Jersey, and desirous of meeting the local transportation needs of that portion of the state served by it, offers the following comprehensive plan, as an entirety, for the settlement of the very serious problem that now confronts the state. If it were otherwise practicable, nothing would be gained by a resumption of operation upon a basis of destructive and uneconomic competition such as has latterly existed. It would only result in a repetition of the present unfortunate situation at a later date. In no large community in the United States does any such condition exist as has been the case in New Jersey. It has been ascertained by hard experience the country over that cars and buses cannot economically exist in direct competition with each other upon the same streets, and wherever the issue has arisen the necessity for railway transportation has manifested itself. It is possible to settle this whole problem and it should be done now once for all.

PLAN

"1. Although the railway company has never had a desire to embark largely in bus transportation, nevertheless a situation has developed that must be met in a broad way, if local transportation is to survive, therefore the railway company, acting through an allied corporation, will purchase at their present fair physical value all buses operating competitively on July 31, 1923 (the day before the commencement of the strike) on the streets where railway company's tracks are laid whose owners are willing to sell. This present value to be agreed upon, if possible, between the company and the respective owners of the buses. If unable to agree, value shall be fixed by an independent appraisal. This will involve a capital investment of several million dollars, the financing of which, after much negotiation, has been provided for, conditioned upon the adoption of the plan as a whole.

"2. Thereafter the companies will operate cars and buses in co-ordination to the extent found necessary to accommodate the traffic and under the supervision of the municipal authorities and of the Board of Public Utility Commissioners. This will end the wasteful and uneconomic competition that has hitherto existed. As opportunity offers, buses operated will be modernized and standardized. Transfers will be instituted between buses and cars in the manner heretofore existing on the lines of the railway system. While ample service will thus be provided, at the same time much unnecessary traffic congestion will be removed from the highways. This, it may be said, will create a monopoly. This would only be so, as to streets where railway tracks are laid. Such service is a natural monopoly, like the telephone, water, gas and electricity. That such is the fact is the reason for state supervision and control. The ignoring of this economic principle is the chief cause of the present crisis.

"3. The licenses of all bus owners who sell to the company, and of those having temporary permits, shall be rescinded and canceled, and the licenses of bus owners who do not desire to sell shall either be rescinded or the buses shall be rerouted on streets where there are no street railway track. The power of the Board of Public Utility Commissioners as contained in the public utility act as amended by the so-called Elliot act of 1921 is ample to accomplish the result within a very reasonable time, if the board will exercise it. The municipalities and the board, acting together, can accomplish the result whenever they see fit. That it is the duty of the board to thus act is made clear by the opinion of Judge Katzenbach in the recent case in the New Jersey Supreme Court of Arthur A. Hunter vs. Board of Public Utility Commissioners, where the Justice in his opinion speaks as follows:

"While temporarily the public might have greater facilities of transportation in Woodbury and from Woodbury to Camden by permitting the prosecutor to compete with the railway company, in the end such competition is not for the public convenience and interest as it either results in less efficient service by the railway company or abandonment of its service because the operation of the line will not pay operating expenses and a fair return on the capital invested. The state assumes to regulate the rates for transportation and the character of the service rendered. Morally and legally it should protect the business of the established utility from impairment and encroachment. To do otherwise would soon create a situation where the public would be without transportation service. No capital could be obtained for an enterprise where no security was afforded the investor. Without capital there would be no transportation facilities which in this age are indispensable to the transaction of business and the enjoyment of life."

"Two cases in the state of Illinois have recently enunciated the same doctrine. They are Joseph K. Choate, receiver, and others versus the Illinois Commerce Commission and the West Suburban Transportation Company vs. the Chicago & West Towns Railway.

"4. No competitive bus licenses shall be issued hereafter for operation on streets where railway company's tracks exist.

"5. The companies will promulgate a new wage scale with a basic maximum of 60 cents per hour, this being the last figure which the men agreed to accept, and is 10 cents per hour, or 20 per cent in excess of the present schedule. This involves, of course, 5 cents per hour extra for one-man operated car or bus. So far as the labor situation will permit, no one will be required to work more than six days in any week. Other working conditions can be left to the management and the employees to adjust satisfactorily.

"6. Both sides shall agree that the report of former Judge Thomas G. Haight, the Master in the pending rate case, fixing the value of the property of the railway company devoted to the public use, as of the date specified in his report, at $110,000,000 as therein

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set forth, be confirmed by decree. This valuation was arrived at by the Master appointed by the Federal court after considering the whole subject, with the aid of counsel for both parties, for one year and one-half. It is some million dollars less than the valuation fixed by a firm of independent engineers employed by the state of New Jersey, at a cost of approximately one hundred thousand dollars, after nearly one year's study of the problem. It is in excess of the amount fixed as the value in the summer of 1921 by the then Board of Public Utility Commissioners, which, under the law, was obliged to find a value after a few week's consideration. Necessarily such consideration did not admit of so complete an investigation as was made either by the state engineers or by the Master of the Federal court. It is essential to adjust this matter at this time because while the Federal suit remains undetermined, the injunction stands and the change in fare referred to in the next paragraph cannot be made.

"7. Simultaneously with the effectuation of the plan, the companies shall put into effect both on cars and buses a fare of 7 cents, with 1 cent for transfer. This fare is lower by 1 cent for transfer charge than that fixed by the Board of Public Utility Commissioners as a just and reasonable fare in 1921 upon the low valuation found by the board and with a lower wage in effect than that contemplated in this plan. This fare will stand comparison with any company operating under at all similar conditions and is less than the average of present street railway fares in the country. It may be decreased as and when the cost of service, including a fair return upon the value of the property devoted to the public use will admit. Such a reduction could be accelerated by support of the plan by the public, by the employees, by the removal of unjust paving obligations now enforced upon the railway company and by the reduction of present burdensome taxes.

"8. The companies will give employment, either on cars or buses, to all bus drivers who are qualified and can pass the railway company's usual tests of employment.

"9. After the plan has become effective, the company will take up with the Board of Public Utility Commissioners the revamping of its financial structure so as to provide for future financing and to place the company upon a sound financial basis.

"10. Service can be resumed, temporarily at the rate of fare in effect when the strike was called, at the new wage scale, upon the railway company receiving definite assurances from the Board of Public Utility Commissioners and from the representatives of the more prominent municipalities that the plan is acceptable and that they will co-operate with the railway company in carrying it into prompt execution. It is impossible for the railway company to resume service at the rate of wages demanded by the men and under the conditions in other respects that prevailed prior to the first of August.

"Public Service Railway Company submits this plan to the deliberate and intelligent consideration of the Board of Public Utility Commissioners of the state of New Jersey, the authorities of the interested municipalities and of all fair-minded people.

"PUBLIC SERVICE RAILWAY COMPANY
BY THOMAS N. MCCARTER, PRES."

A veritable flood of comment followed the making public of the company's statement. It was given out to the press early in the morning for use in the evening papers, nearly all of which appear on the streets before noon. It was also published by the company in full as a page paid ad in the New Jersey papers and appeared as an advertisement in the New York evening newspapers of Aug. 21 and morning papers there of Aug. 22.

The Public Service Commission delayed its reply to the company's offer until the evening of Aug. 22. It then gave out a statement for use in the papers of Aug. 23. While some of the features of the plan do not appeal to the board as practical, the board regards the proposal as offering a basis for discussion and conference. It accepts it as an effort on the part of the company to end the present situation. While it takes exception to some details of the plan, the board believes that it should be given fair consideration by all whose co-operation would be required to make it effective in whole or in part. It has therefore called a hearing for Aug. 28 to afford the company, municipalities and others affected an opportunity to discuss the plan or any other plan which may be submitted for consideration.

The board said:

"The suggestions submitted are in the main the following: the elimination of bus competition and the method by which this result is to be attained; wages; valuation; fare, and, lastly, resumption of service.

"The last suggestion should be adverted to first. The assumption by the company of the right to suspend service until this board and 'representatives of the more prominent municipalities' give definite assurances to co-operate with the company in establishing its new rate of fare, in eliminating competition of buses by purchase or otherwise, in removing paving obligations and burdensome taxes is unwarranted and a menace to public welfare. It amounts to a strike on the part of the company. A strike against all the public.

"If the company's right to do this is conceded it will apply not only to trolleys but to all other utilities, including water, gas and electric companies. They would have the right to make demands and suspend service until their demands are complied with. The result would be disastrous and jeopardize the health and safety of the public. The company claims that it is financially unable to operate. If this be true, the law provides a method of procedure under which the company's system may be operated and its rights preserved.

"Even if the plan is favorably received, it will take some time before the variant interests can be brought into accord, during which time the public should not suffer the loss and inconvenience which the suspension of service entails.

"The details of the plan other than that relating to the resumption of service will be dealt with in the order in which they are submitted.

"1 and 2 relate to the purchase and control of competitive buses by the trolley company. This can only be accomplished by an agreement, in the first instance by the company with the municipalities and the bus owners, and the board will call a hearing to ascertain their views.

"3. The company proposes that all licenses of bus owners who do not desire to sell their buses to the company shall be rescinded or the buses rerouted. It states that the power of the Board Public Utility Commissioners is ample to accomplish this result. This is a misstatement of the law. The decision quoted by the company does not apply. Under the Elliott Act of 1921 referred to by the company the board has no jurisdiction or control over buses now operated by anyone who obtained a license prior to March 15, 1921. The board has jurisdiction over about 275 buses only, out of some 1,700 now in operation.

"4. The company proposes that no competitive bus licenses shall be issued hereafter for operation on streets where the railway company's tracks exist. Licenses are not issued by the Public Utility Commission. They are issued by municipalities. Licenses issued subsequent to March 15, 1921, except renewals, to be valid, must be approved by the board if the bus is to be operated on the same street as the railway. The board has not approved any licenses for buses except upon proof of public convenience and necessity. The board has imposed restrictions, when licenses have been approved by it, to protect the street railways from unfair competition. This policy will be continued.

"5. The board has no jurisdiction concerning the promulgation by the company of a new wage scale.

"6. The company proposes that the board shall agree that the value of its property shall be that fixed by the master in the rate case now before the United States District Court. The board after exhaustive hearings and in accordance with an act of the Legislature, so directing fixed what it believed to be the fair value of the company's property. It would not be lawful for the board to fix another and different valuation by agreement with the company.

"7. The company proposes that a fare of 7 cents with 1 cent for a transfer shall be put into effect both on cars and buses. Upon many of the buses now in operation the fare is 5 cents. The fare of the Public Service

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Railway now being charged is 8 cents plus 1 cent for a transfer. While the company's proposition would decrease the fares to those using the street cars, it would increase materially the fares to those using the buses. It is the board's duty to fix just and reasonable rates of fare with due regard to all conditions. The board cannot relieve itself of this duty and if the company is to have the benefit of the increased fare and additional patronage of the bus operation and is to be relieved of paving obligations and allowed a reduction of taxes a further investigation would be necessary to determine whether the fare proposed is a reasonable one.

"8. The company proposes that all bus drivers who are qualified shall be given employment either on cars or buses. This is a detail of management not within the authority of the board to control.

"9. The company states that after the plan has become effective it will take up with the Board of Public Utility Commissioners the revamping of its financial structure so as to provide for future financing and to place the company upon a sound financial basis. The board, within the limits of its authority and with due regard to the public interest, would co-operate in such plan of financing as would enable the company efficiently to perform its public duties.

"10. The company states that service can be resumed temporarily upon the receipt by it of definite assurances from the Board of Public Utility Commissioners and from the representatives of the more prominent municipalities that its plan is acceptable and that they will co-operate with the company in carrying it into prompt execution. As above indicated, such a suggestion is untenable. The board can neither waive the law, delegate its authority nor foreclose itself from acting in accordance with the authority vested in it by the Legislature."

Meanwhile announcement was made of a conference on the morning of Aug. 22 between representatives of the company and the joint conference board of the strikers. At the conclusion of this conference Mr. McCarter is reported to have said:

"We have discussed in a general way the details together and I am happy to say the men approve it."

Mr. Busby's Farm Turns Out to Be a Mine

Thirty years after the ore from the famed Iron Mountain of Missouri was believed to have been exhausted, ore from the mountain is again being reduced to pig iron in St. Louis. To Leonard A. Busby, president of the Chicago Surface Lines, is due credit for the return of this famed iron mine as a factor in the pig iron industry of the Middle West.

In 1890 mining experts contended that the ore deposits of Iron Mountain had been exhausted. Finally Mr. Busby bought the land for use as a stock farm.

Quite recently Major William T. May, a mining engineer, asked permission of Mr. Busby to examine his property. He concluded that the experts were wrong who had ventured the opinion that Iron Mountain ore deposits had been exhausted. He showed the results of his work to Mr. Busby in Chicago, and convinced him that the property could be used again for mining. Revised estimates of the value of Mr. Busby's property place it at $10,000,000.

Wages in Covington Correspond to Those in Cincinnati

The Cincinnati, Newport & Covington Railway has signed a new wage agreement with its employees on the same basis of the award of the arbitrators in the wage dispute of the Cincinnati Traction Company. The new agreement expires on June 30, 1924, and is retroactive to Aug. 5. Platform men are to receive an increase of 5 cents an hour, from 48 to 53 cents. Curve cleaners are to get 40 cents an hour, an increase of 8 cents. Crane men are to receive 65 cents, an increase of 15 cents an hour over present pay.

Substitutes are to receive a minimum wage of $90 a month. The former minimum was $75. This is equivalent to five and one-half hours pay a day. Regular men are to be required to run only ten "extras" a month instead of fifteen "extras" as before, except in case of emergency. The regular runs are fixed at nine and one-half hours a day.

Hearing on Spartanburg Abandonment Will Go Over

Attorneys for the South Carolina Gas & Electric Company, Spartanburg, have secured from the Supreme Court an extension of ten days in which to answer the application for a writ of mandamus asked for by attorneys for the city to compel the company to restore electric railway service. Attorneys for the city will have ten days in which to file an answer to the answer of the attorneys for the company, so the argument before the Supreme Court cannot be had on Aug. 28, the date originally fixed. The date for the argument will be fixed by the court, but it is understood that it will not be delayed any longer than is found to be absolutely necessary.

As indicated in a review of the situation in the ELECTRIC RAILWAY JOURNAL for Aug. 11, page 229, the petition of the city to the court for the writ of mandamus claimed that the Railroad Commission did not have the power to issue the order of June 22, which authorized the abandonment of service in Spartanburg on July 21.

Sign Informs Public of Improvement Expenses

The New York State Railways is explaining to the public in Rochester, N. Y., the cost of relaying tracks in North Street. To convey its message the company has erected a sign, which is an innovation in the educational campaign of the railway.

It is expected by the railway company that this plan of informing the public will be duplicated in other future improvements. James F. Hamilton, president of the New York State Railways, maintains that the general public is not cognizant of the tremendous expense entailed in the financing of the system and the sign is part of a campaign to counteract agitation for reduced fares, for which Mr. Hamilton holds there is no justification in view of present operating and maintenance costs.

The sign contains the salient facts concerning the cost of the North Street work. It was erected with the consent of Charles R. Barnes, Commissioner of Railways for Rochester.

The railway at Rochester is operated under a service-at-cost arrangement.

Telling the Story of Costs to the Public of Rochester

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Wages Raised by D. U. R.

The wages of employees on all interurban lines of the Detroit United Railway and on the Pontiac and Flint city lines have been increased 6 cents an hour to 61, 64 and 66 cents, the hourly rate depending upon the length of time the employee has been in the service of the company. An increase of 6 cents an hour has also been granted platform men on the city lines in Ann Arbor and Mt. Clemens, but these men still receive 2 cents an hour less than the prevailing rate on the other lines. One-man car operators receive 5 cents an hour more than the rates just mentioned.

Candidates at Schenectady Will Talk Strike

The strike of the employees of the Schenectady Railway is expected to play an important part in the municipal elections this fall. The present Mayor, Clarence A. Whitmyre, inherited the office when George R. Lunn assumed the office of Lieutenant-Governor. He is the Republican candidate for election to the office. Opposed to him in the primaries will be W. W. Campbell, who has served as a member of Assembly for the past three years. Mayor Whitmyre is opposed by many members of the Republican organization due to the retention in office of Democratic incumbents. He will appeal to the voters for support on his record of having handled the strike situation in accordance with the wishes of the trolley workers and the general public. Assemblyman Campbell, however, is quite popular with the labor organizations, and has been an active supporter of their feature legislation.

News Notes

Another "Trolley Topics" Appears.—To furnish a better understanding of the company and to give a little amusement to its patrons the Spokane (Wash.) United Railways some time ago started the publication of a semi-monthly pamphlet called "Trolley Topics."

Safety Council Formed.—With the aim to regulate traffic the organization of the Nashville Safety Council was recently perfected at a meeting of the Board of Control. The following officers were elected: J. P. W. Brown, general superintendent Nashville Railway & Light Company, president; Watkins Crockett, treasurer, and James S. Patrick, secretary-manager. The executive committee met with Carl L. Smith of Chicago, secretary of the National Safety Council, to discuss further plans.

Many Attend Picnic.—The annual picinic of the East St. Louis & Suburban Railway employees was held at Jones Park, East St. Louis, on July 24. Approximately 10,000 persons attended. All work except that absolutely necessary was suspended for the day. Every person present wore a large yellow button and persons finding another wearing their number received a beautiful gold pencil. Guests from Alton, Belleville, Collinsville, Edwardsville, Lebanon and other points along the company's lines made the trip to and from Jones Park in special cars.

Urges Again Constructive Criticism.—In seeking constructive criticism from its patrons and employees the Monongahela-West Penn Public Service Company has recently printed an advertisement in the papers of Fairmont urging its patrons to continue to send suggestions for better service as so many have proved of great value to the company. The "ad" states that a new and special department comprised of officials and employees has been originated to handle the ideas of the public. The company announces that it values its patrons' friendship as it does their patronage.

Must Seek New Quarters.—The Alton, Granite & St. Louis Traction System, a subsidiary of the East St. Louis & Suburban Railway, and the city lines of Alton, Ill., also controlled by the same interests, will be forced to obtain new quarters. The city of Alton in August will hold a special election to vote $74,000 in bonds for the remodeling of its city hall, and after the work is completed the structure will be devoted entirely to the city offices. At present the Alton offices of the street car company are located in the city hall, which is conveniently situated and highly desirable from the street car company's point of view.

Want Town Painted Orange.—The Galveston Electric Company has painted several of its cars an orange color as an experiment, and R. G. Carroll, vice-president and general manager, reports that he has received more than fifty letters commending the new color and asking that all the cars be given a coat of the same color. The brightly-colored street cars tended to brighten up the old town, the letters state, and some say that if the company would take the lead and paint all its cars, this might act as an incentive and induce others to paint up and clean up, and thus improve the civic appearance of the city. Mr. Carroll said all the cars of the company would be painted the new color as soon as possible.

Men Rewarded for Safety Records.—Fifteen motormen and conductors of the West Penn-Monongahela Company in the Clarksburg, W. Va., region, who have escaped being in a single accident in the month of April, May and June, were given a dinner by the officials of the company at the Waldo Hotel. Fifteen trainmen in the Fairmont region were banqueted because of their three months' safety record and the men of the Parkersburg region were likewise remembered. The Fairmont, Clarksburg and Parkersburg men are grouped into three teams of fifteen men each. These teams will compete in the next three months for highest honors and the team which wins will be treated to a trip. The safety campaign has become more effective each month since last Jan. 1 and men of the system are taking keen interest in it.

Wants Lines Restored.—Residents of the West Walnut Manor and Jennings districts, northwest of St. Louis, Mo., at a mass meeting held at Owls Hall recently appointed a committee to devise ways and means for having the former Jennings trolley line put back into service. The line, which operated between the end of the Bellefontaine division of the United Railways of of St. Louis at Robbins and Florissant Avenue, St. Louis, and Jennings road and Florissant Avenue, Jennings, with a branch line along Helen Avenue, was forced to quit business because of the competition of jitneys. Twenty-nine merchants and manufacturers and professional men have interested themselves in the movement to bring back the street car line.

Guess Right and Be Rewarded.—Paul Hodson, safety engineer for the East St. Louis & Suburban Railway, has planned a unique intelligence test for the patrons who travel on the Belleville division of the company. A key to a safety slogan is to be borne by each hat slip handed out by the conductors. There are thirty-one such slogans. The person sending in the largest number of correct solutions is to be awarded a month's transportation to and from work. The second award will be 400 1-cent coupon fares and for the third highest number of correct slogans 200 1-cent coupons. Mr. Hodson believes that this guessing contest will stimulate interest in the company's "safety first" campaign and impress upon all contestants and other patrons of the lines the full significance of the safety work.

Rules Obligation Have Terminated.—Any obligation of the city of Seattle to return about $11,000 in deposits on railway franchises granted the Puget Sound Traction, Light & Power Company, if it ever existed, has terminated under the statute of limitation, according to an opinion given to Chairman E. L. Blaine of the finance committee of the City Council by Corporation Counsel T. J. L. Kennedy. The opinion was asked in connection with a Council bill which provided return of the deposits. The company's request has been pending before the City Council for more than three years. An earlier opinion by the corporation counsel's office held that the city need not repay the money, the company having surrendered all rights under each franchise on selling the railways to the city. The company later reopened the question with a second petition, and Chairman Blaine asked whether the company's new claims altered the situation. Mr. Kennedy's last opinion held that the first ruling should not be altered.

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Foreign News

City & South London Railway Extension

In regard to the recent rejection by a committee of the House of Lords of the part of the City & South London Railway bill, which sought authorization of a 6-mile extension of the railway from Clapham to a junction with the authorized Wimbledon & Sutton Railway, near Morden, to the southwest of London, an agreement has been reached. Under this, the railway would be extended through Balham and Tooting to North Morden, about a mile short of the original proposal, and all reference to the Wimbledon & Sutton Railway would be excluded.

Lord Ashfield, chairman of the City & South London Company, stated that under the agreement provision was made for car sheds on the extension. The cost of construction of the line (mostly tube tunnels) was estimated at £3,600,000, or about £1,000,000 less than the original scheme. Five stations on the extension would all be in a densely populated area, and he estimated that they would produce at least 23,000,000 passengers annually, while the other two stations would produce at least 5,000,000. At an average fare of 4d., the passenger receipts would be about £20,000, giving a total of £486,000. Expenses were put at £218,000 (5,500,000 car-miles at 9½d.), leaving a net revenue of £268,000. which would cover the interest charges on £4,000,000 of debentures at 4½ per cent, leaving a margin of £88,000. The new capital charges were further secured by the common fund of the underground railway companies, which in 1922 had a margin of £1,706,000 over and above the revenue liabilities of the five companies concerned, or sufficient to cover the interest on the new debentures ten times over.

Street Traffic Congestion in London

From time to time during the last generation or two an agitation has been renewed for the formation of a traffic authority for the whole of London to deal with growing congestion in the streets, but owing to local jealousies among multitudinous road authorities and also to political differences nothing has ever been done. Many years ago a Royal Commission composed of experts made an elaborate report recommending the formation of a Traffic Board for London with wide powers both of initiative and of coordination. Since then various Parliamentary committees have made similar proposals. Now that motor vehicle traffic is developing so rapidly the agitation has started afresh. The Ministry of Transport professes to have a scheme in hand, but when it will result in legislation to give effect to it is quite uncertain. Meantime the traffic congestion grows worse and worse.

Tramways and Bus Competition

The Municipal Tramways Association of Great Britain has appointed a committee to investigate the subject of motor omnibus competition with tramways and to take such steps as it may think proper in the interests of the association. In agreeing to borrow money for the reconstruction of a tramway section the Halifax tramways committee has instructed the town clerk to notify the local authorities concerned and to express the Town Council's hope that they will assist in making the route a success by refusing to grant any application for licenses to run buses in competition with the tramway.

Telephone Dispatching in London

A telephone control system has been put in operation on the northern section of the London County Council Tramways. All cars are supplied with keys to the roadside telephone boxes. From a central control station at Hackney nine lines radiate to all parts of the northern section, connecting 164 instruments with the traffic controller. The new arrangement permits of much more rapid summoning of the breakdown gang and rerouting of traffic in an emergency.

A British Experimental Electric Locomotive

One of the straws which show how the wind is blowing may be found in the report that the London, Midland & Scottish Railway is building an electric locomotive for experimental use on the line from Preston to Carlisle. Significance attaches to this because the route mentioned includes some of the severest railway gradients in Great Britain. It is part of the main line from London to Scotland of what, before the recent amalgamations, was the London & North Western Railway. The sharp summit, among the Westmoreland mountains, is at a great elevation.

Exposed Track in Leeds, England

A suburban extension of Leeds City Tramways which has been under construction for a long time has now been completed, and it is noteworthy from the fact that for a considerable part of the distance exposed track construction, as on a steam railway, is used. Only a very few electric lines of the sort, running along the side of the highway, are yet in use in Britain. The capital cost is lower than that of track construction with concrete foundations in paved streets; maintenance cost is also lower; higher speeds can be used. The plan can only be adopted, however, in suburban or rural areas where there is vacant land alongside the highway.

"The Borderlands of Glasgow"

This is the title of a guide book just published by the tramway department of Glasgow Town Council. Extending to 150 pages and well illustrated, there is much interesting descriptive matter, and particulars and instructions are given as to each route. It is pointed out in the preface that the object is to induce the citizens to take full advantage of the splendid opportunities afforded by the tramways of exploring the highways and byways described therein. The tramways reach various places of public resort and interest around the city.

Fourth Electric Railroad in Norway Opens

After being electrified, the Ofoben Railroad in Norway was ceremoniously opened to traffic on July 10. The road, which is 42 km. (26 miles) long, was originally built as a steam road and completed in 1902. It is located in northern Norway between the degrees of latitude 68 and 69 and runs between the seaport Narvik and the Swedish border, where it connects with the railroad on that side, which is also electrified. The road is normal gage (the same as in the United States) and the maximum grade is 1.73 per cent. The highest altitude is 522 m. (1,700 ft.) above sea level.

The chief reason for existence of this railroad is the transportation of iron ore from the vast deposits in Swedish Norrland. It is estimated that the rate of speed of the trains after electrification will be increased about 70 per cent and the capacity in proportion. In 1920 there were hauled more than 2,000,000 tons of iron ore over this road.

The electric power is taken from the water power plant at Porjus, Sweden. The length of the transmission line is about 200 km. (125 miles) and the voltage 30,000, the highest tension ever used in Norway. There are two substations along the road where the voltage is reduced to 16,000, which is used for the locomotives.

There will be required nine locomotives to replace the sixteen steam locomotives previously needed to take care of the traffic.

This is the fourth electric railroad in Norway. The last one was that between Kristiania and Drammen, completed in 1922, a distance of about 45 km. (28 miles).

Norway has no coal deposits but plenty of water power, about 14,000,000 hp., of which about 1,400,000 hp. is developed. The electrification of the towns and rural districts is rapidly progressing and it is only a question of time when all the railroads of the country will be electrified.

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Financial and Corporate

Reorganization Reviewed

Total Capitalization of Successor to San Francisco-Oakland Terminal Railways Is $26,588,440

Under the plan of reorganization of the San Francisco-Oakland Terminal Railways, subject to the approval of the Railroad Commission, $15,125,000 of old common stock is wiped out, $13,050,000 of preferred stock is exchanged for $3,262,500 of new common, and the fixed charges heavily reduced by the substitution of preferred stocks for many of the old bond issues.

As noted previously in the ELECTRIC RAILWAY JOURNAL the properties of the railway were sold at foreclosure on July 17, 1923, to a committee of bondholders, thus giving effect to the plan of reorganization of this system dated July 7, 1922. The stock of the successor company will be placed in a voting trust for a period of seven years. During this time the board of directors is to consist of fifteen members, of whom four will represent the bondholders, eight the preferred stockholders and three the common stockholders.

The new company will be known as the Key System Transit Company. It will own the physical properties as well as all the stock of three subsidiary companies. Two of these subsidiary companies were formed in order to preserve, after the reorganization, the status of two of the old divisional mortgages; the third was formed to take care of the so-called "Halsey Notes."

CAPITALIZATION AND VALUE OF SAN FRANCISCO-OAKLAND TERMINAL PROPERTY

The capitalization of the new company will be as follows:

*Stocks—	Authorized	To be issued
7 per cent cum. prior preferred	$8,350,000	$6,000,000
7 per cent non-cum. preferred	6,100,000	3,800,000
Common	3,300,000	2,059,700
Bonds — (Parent Co.) —		
First mort. bonds, due 7-1-1938	10,000,000	2,500,000
Gen. and refund. 6s, 7-1-1938†	20,000,000	1,391,868
Gen. and refund. 5s, 7-1-1938†	20,000,000	7,871,871
Subsidiary Cos.—		
Oakland & Hayward R. Co. 6s, 1938	236,000	236,000
East Oak. Ry. Co. 6s, 1039	229,000	229,000
Oak Rail. ("Halsey Notes") 6s	2,500,000	2,500,000
Total capitalization		$26,588,440

(* Plus collateral on "Halsey Notes.")

(†This mortgage is virtually closed, as further bonds can only be issued to refund the first mortgage bonds or those of the subsidiary companies as listed in this table.)

In contrast with these figures the balance sheet of the company as of Dec. 31, 1921, showed among the liabilities stock to the amount of $28,175,000, long-term debt to the amount of $18,719,180 and current liabilities $8,114,054.

In a comprehensive review of the situation which it made the investment banking house of J. Barth & Company explains that to take care of the old securities on an equitable basis, they were divided into groups, and pending the issuance of the new securities, the old ones are traded in under the name of the group to which they belong. Coupons on the old bonds commencing with Jan. 1, 1920, having remained unpaid during the voluminous discussion preceding the settlement upon a plan of reorganization, it is now the intention to pay these back coupons in new securities at par. Thus, the principal and four years' interest of the old securities will be exchanged par for par for new securities.

The various groups into which the old securities are divided, and the treatment they will receive under the plan, are shown below:

Group 1-A (6 per cent)—Oakland-San Leandro & Haywards 1st 6s, 1922; Twenty-third Avenue Electric Railway 1st 6 per cent, 1923.

Each $1,000 bond of this group will be exchanged for $1,000 par value of the new divisional lien 6s, due 1938, known as Oakland & Hayward Railway Company 6s and East Oakland Railway Company 6s, respectively. The back interest on these two divisional liens will be paid in cash.

Group 1-B (6 per cent)—Oakland Transit Company 1st Cons. 6 per cent, 1918.

Each $1,000 bond of this issue will receive $1,240 par value of Key System Transit Company general and refunding mortgage 6s, due 1938.

Group 1-B (5 per cent)—Oakland Transit 1st Consolidated 5 per cent 1931; Oakland Transit Consolidated 1st consolidated 5 per cent 1932; San Francisco, Oakland & San Jose 1st 5 per cent 1933 ("Key Route 1sts"); East Shore & Suburban Railway Co. 1st 5 per cent 1940.

Each $1,000 bond of this group will receive $1,200 par value Key System Transit Company general and refunding mortgage 5s, due 1938.

Group 2 (5 per cent)—Oakland Traction Consolidated general consolidated 5 per cent 1933; San Francisco, Oakland & San Jose Railway 2d 5 per cent 1933 ("Key Route 2ds").

Each $1,000 bond of this group will receive nine shares Key System Transit Company 7 per cent cumulative preferred stock, three shares Key System Transit Company 7 per cent non-cumulative preferred stock.

Group 3 (5 per cent)—Oakland Traction Company general consolidated 5 per cent 1935; San Francisco, Oakland & San Jose consolidated railway, general consolidated 5 per cent ("Key Route 3ds").

Each $1,000 bond of this group will receive six shares Key System Transit Company 7 per cent cumulative preferred stock; six shares Key System Transit Company 7 per cent non-cumulative preferred stock.

Other securities—Oakland Railways Collateral Trust 6 per cent notes 1913 "Haisey notes").

Each $1,000 note will receive a $1,000 note of a subsidiary company formed for the purpose. These new notes will be dated July 1, 1923, due July 1, 1933, callable on any interest date at par and interest; guaranteed as to payment of interest by the Key System Transit Company, and secured by pledge in closed collateral trust of the following stocks for each $1,000 note; 6,512 shares Key System 7 per cent cumulative preferred; 6,512 shares Key System 7 per cent non-cumulative preferred; 4,811 shares Key System common.

The stocks thus to be held in trust will not bear dividends and are not included in the amounts to be issued.

San Francisco-Oakland Terminal Railways, A preferred; San Francisco-Oakland Terminal Railways, B preferred.

Each share will receive one-quarter share Key System Transit Company common.

San Francisco-Oakland Terminal Railways common.

This entire issue, 151,250 shares, will be wiped out.

The $2,500,000 of first mortgage bonds mentioned will be sold to provide funds to clean up the floating indebtedness of the old company, most of which was incurred to pay interest on the old bond issues prior to 1920; to retire equipment obligations by which the purchase of new cars and ferries has been temporarily financed; to pay the pro-rata of upset price to bondholders not participating in the plan and to meet all other necessary payments.

In considering the following estimate of earnings, it should be borne in mind that the interest charges shown include interest on the new first mortgage bonds, the proceeds of which are to be invested in the property and are expected to earn their interest by increasing the gross income and reducing operating expenses.

Estimates of earnings for 1923, applied to new capitalization, based on actual figures for first five months of 1923, and 1922 figures for last seven months are as follows:

1923—	Gross Rev.	Oper. Exp.	*Net Avail.
January	$596,490	$898,439	$106,792
February	547,738	365,724	98,033
March	662,373	402,336	129,052
April	611,847	406,476	108,578
May	621,519	394,592	127,053
1922—			
June	595,208	382,871	127,037
July	596,945	382,772	130,137
August	613,192	402,242	130,053
September	589,384	381,739	124,257
October	621,884	401,503	145,351
November	595,504	385,183	110,028
December	615,327	349,871	201,830
Totals	$7,267,425	$4,653,754	$1,538,207

* Net available for interest and dividends after all charges, including taxes and depreciation.

Estimated net earnings available for interest and dividends		$1,538,207
Annual interest new bonds	$650,000	
An. int. "Halsey Notes"	150,000	800,000
		$738,207
Annual dividends on cumulative preferred ($6,000,000 at 7%)		420,000
Annual dividends on non-cumulative preferred ($3,800,000 at 7%)		266,000
Estimated surplus after meeting full dividend requirement on both classes of preferred stock		$52,207

Actual figures first five months of 1922, for comparison:

1922			
January	$562,974	$390,854	$85,421
February	500,915	353,615	47,763
March	578,022	402,780	97,364
April	597,062	380,216	123,251
May	600,214	398,522	114,618
Year 1922	7,075,537	4,612,081	1,437,115

Approval of Securities of Successor to Michigan United Sought

Approval is being sought from the State Public Utilities Commission of Michigan of the securities intended to be issued under the plan for the reorganization of the Michigan United Railways as the Michigan Electric Company. The successor company desires to issue $6,500,000 property purchase first mortgage bonds, $6,300,000 of 5 per cent cumulative stock, $1,603,000 of 5 per cent non-cumulative preferred stock and $98,750 of common stock of no par value. To obtain working capital, the company has asked for a right to sell $600,000 of first mortgage bonds and 1,250 shares of common stock at not less than $20 a share. The date for the hearing has been fixed for Aug. 30.

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Interurban Seeks to Purchase Kansas City-Outer Belt Property

The Kansas City, Kaw Valley & Western Railway, Kansas City, Kan., has applied to the Interstate Commerce Commission for authority to buy from Emil Metscham, Kansas City, Mo., the property of the Kansas City-Outer Belt Electric Railroad, purchased by him under foreclosure sale. The Kansas City, Kaw Valley & Western Company operates an electric interurban road between Kansas City and Lawrence, Kan., and now seeks to secure a right to use a part of the Outer Belt trackage for the purpose of entering Kansas City, Kan., and Kansas City, Mo.

The interurban company has agreed to purchase from Mr. Metscham the first mortgage bonds, amounting to $379,000, and preferred stock in the sum of $481,000 and common stock to the amount of $962,000 to be issued to him by the Kansas & Missouri Railway & Terminal Company. The Kansas City Southern has agreed to purchase from the applicant one-half of these stocks and bonds for the purpose of securing joint and equal control of the carrier. The point is made in the application that the combined strength of the two companies is necessary to finance the property properly.

The Kansas City-Outer Belt Line was conceived by Arthur E. Stillwell about twenty years ago. The project he had in mind was an ambitious one for encircling the twin cities in Missouri and Kansas by an electric belt line. Seven miles of the line was graded and some rail laid, but the program was never carried to conclusion. Much real estate intended for switching and terminal purposes was bought. In all $2,500,000 was spent. Latterly J. J. Heim and his associates in the Kansas City, Kaw Valley & Western have become interested in the proposal. A map of the route of the road and a statement regarding the plans of Mr. Heim were published in the ELECTRIC RAILWAY JOURNAL for Aug. 5, 1922, page 208.

Negotiations looking toward the carrying out of Mr. Heim's ideas with respect to the road have been under way since then.

Saginaw Property Sold

Another step toward the resumption of electric railway service in Saginaw has been taken in the sale of the Saginaw Bay City Railway property in Saginaw and Bay City in the Federal bankrupcy court. George E. Wedthoff, representing the Northern Title & Trust Company, Bay City, bid in the property at the sale on Aug. 18 for $225,000. He was the only bidder and deposited $12,000 as a guarantee of good faith with the referee who conducted the sale. Under the terms of the order made by the referee on petition of the trustee, Otto Schupp, this leaves the property free and clear of all mortgages.

The Northern Title & Trust Company will hold the property until the formal organization of the Saginaw Transit Company, which is to operate the property under the street car-bus franchise granted at the special election on June 25.

At present a temporary organization is functioning and will act at the hearing before the State Public Utilities Commission on Aug. 30, when the commission will consider the petition for financing and the right to file the articles of association with the Secretary of State.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were no sales of electric railway securities this week.

Small Loss at Albany for Quarter.—The first three months of 1923 netted the United Traction Company a loss of $41,472, according to the company's report covering the first quarter. The same period of 1922 showed a gain of $7,968. Operating expenses increased $67,568. The net revenue for the first quarter of 1923 was $124,987, compared with $170,627 for the first quarter of 1922. Revenues from other sources brought the gross income for the two periods to $138,337 and $185,348, respectively. Fixed charges totaling $179,809 caused the loss of $41,704. The first quarter of 1923 showed 10,991,873 passengers carried, compared with 11,022,749 in the first quarter of 1922.

Mr. Mitchell Elected to New Orleans Board.—S. Z. Mitchell, president of the Electric Bond & Share Company, New York, has been elected a director of the New Orleans Public Service, Inc. He will represent the purchasers of the bonds of the New Orleans Public Service, Inc., and, with G. M. Dahl, is the only other member of the directorate from New York City.

Receiver Appointed for Illinois Line.—R. H. Hayward, general manager of the Galesburg & Kewanee Electric Railway, operating the city lines in Kewanee, Ill., and the interurban service between Kewanee and Galva, has been appointed receiver for the company in the Circuit Court at Cambridge by Judge C. J. Searle. The appointment was made in response to an application by the bondholders' committee.

Cities Service Earnings Are Improving.—The Cities Service Company earnings statement for the twelve months ended July 31, 1923, shows improvement over the corresponding twelve months of the preceding year, as well as a gain over the month of June. Gross earnings in the twelve months period totaled $16,523,677, as compared with $13,844,852 in the preceding year. Net earnings were $16,009,628, as compared with $13,402,254, and net to stock was $13,394,999, as compared with $11,236,187. Preferred dividends were earned 2.70 times as compared with 2.29 times in the preceding year, and after the payment of preferred dividends, net available for common stock was equivalent to $18.13 a share. This compared with $13.63 a share earned on the common stock in the twelve months ended July 31, 1922. Gross earnings in July were $1,296,673, as compared with $1,060,862 in July, 1922. Net to stock increased to $1,031,829 from $832,326, while net to common stock and reserves in the month increased to $615,956 from $422,488.

Conspectus of Indexes for Aug., 1923

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Aug. 1923 **6.92**	July 1923 **6.92**	Aug. 1922 **7.01**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	July 1923 **169**	June 1923 **171**	July 1922 **181**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages 1913 = 100	Aug. 1923 **214**	July 1923 **212**	Aug. 1922 **208**	Sept. 1920 **232**	Apr 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	July 31 1923 **5.91**	June 30 1923 **6.39**	July 31 1922 **5.78**	July 31 1920 **11.12**	Feb. 28 1922 **4.14**
U.S. Bank Clearings Outside N. Y. City (Billions)	July 1923 **14.69**	June 1923 **15.38**	July 1922 **12.87**	Mar. 1920 **18.54**	Feb. 1922 **10.65**
Business Failures Number	July 1923 **1,496**	June 1923 **1,378**	July 1922 **1,575**	Jan. 1922 **2,722**	May 1923 **1,467**
Liabilities (millions)	**36.58**	**52.00**	**43.12**	**105.7**	**31.77**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	Aug. 1923 **221.5**	July 1923 **222.1**	Aug. 1922 **173.4**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	July 1923 **151**	June 1923 **153**	July 1922 **155**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913 = 9.21	Aug. 1 1923 **12.82**	July 1 1923 **13.09**	Aug. 1 1922 **12.07**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's — Wholesale Commodities 1913 = 120.9	Aug. 1 1923 **166.7**	July 1 1923 **183.7**	Aug. 1 1922 **173.6**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	July 1923 **147**	June 1923 **144**	July 1922 **142**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	July 1923 **161.9**	June 1923 **160.1**	July 1922 **155.6**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

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Traffic and Transportation

Fares Increased in Detroit

Municipal Railway to Advance Cash Fare on Sept. 2 from 5 Cents to 6 Cents

Detroit's municipal railway is going to increase its fares. The advance is to be from 5 cents to 6 cents. Tickets will be sold nine for 50 cents. The charge for transfer will remain at 1 cent. The new rate will be effective from Sept. 2. Announcement to this effect was made on Aug. 21. The decision to advance fares was reached following the announcement of a wage increase to the men by the arbitration board, referred to elsewhere in this issue.

The decision regarding fares was in fact arrived at by the Street Railway Commission at a meeting on the afternoon of Aug. 21, two days after the wage award was filed, but announcement was not made until late on Aug. 21 by Ross Schram, assistant general manager of the lines, who communicated to John J. Barlum and G. Ogden Ellis, two of the three commissioners, the fact that Mayor Doremus had been consulted Monday night and had declared that he would accept the recommendation of the commission for the 6-cent fare.

The statement issued by the Street Railway Commission follows:

The award of an increased wage to the platform employees, effective Aug. 18, 1923, will increase the monthly expense of the department of street railways approximately $50,000. In addition, the retroactive feature of the award, which goes back to June 1, 1923, will cause the department an additional expense of $50,000 per month for three months. This additional monthly expense confronting the department is, of course, in excess of its present income.

Therefore section 14 of the street railway chapter of the city charter obligates the board of street railway commissioners to increase the rates of fare.

Section 14 of the street railways chapter of the city charter reads as follows:

"The rate of fare on said street railway system shall be sufficient to pay, and the said board shall cause to be paid:

"(a) Operating and maintenance expenses, including paving and watering between the tracks;

"(b) Taxes on the physical property of the entire street car system, the same as though privately owned;

"(c) Fixed charges;

"(d) A sufficient per cent per annum to provide a sinking fund to pay the principal of the mortgage bonds issued at their maturity and such other additional per cent per annum to provide, in the sound discretion of the board, a sinking fund to pay the principal of the general bonds issued as soon as practicable, to the end that the entire cost of said street railway system shall be paid eventually out of the earnings thereof."

Therefore, effective Sunday, Sept. 2, 1923, the fare rates will be revised. Tickets will be sold in strips of nine at 50 cents; single cash fares will be at the rate of 6 cents each; transfers will be charged for at the rate of 1 cent each. This new fare plan is required to meet the present contingency as well as the increased power costs effective under the new power contract on July 1, 1923.

In explaining the decision to increase fares, Mr. Schram said that the wage increase will add annually approximately $700,000 to the railway expenses, and with increased power costs in the next year of approximately $200,000, the surplus of $938,000 which has been built up in the last twelve months will be wiped out. He was quoted as follows:

With the increased operating costs offsetting the surplus we have been able to build up, there will be nothing left for higher wages for other employees, which will have to be granted as a result of the increase to platform men, and for rehabilitation of the lines and extension.

To provide funds for these items, it was the decision of the commission that the fares would have to be raised. The increase from 5 to 6 cents will provide approximately $2,000,000 more in revenue annually, we have estimated, and this will permit of expenditures of approximately $1,750,000 annually for new cars, other rehabilitation expenses, and for extensions if moneys for that purpose are not available from the sale of bonds, which the comptroller has held up.

Mr. Schram further called attention to the fact that even with the increase in fares which will go into effect on Sept. 2 the rate in Detroit will be lower than in most other cities. He quoted the figure of 7.08 as the average.

Circuit Judge Harry J. Dingeman, who was the chairman of the board of arbitration in the wage dispute, is reported to have expressed surprise at the decision of the Street Railway Commission to increase fares. He is quoted as having said:

We carefully considered the possibility of an increase in fares resulting from an increase in the wages of the men. After analyzing the figures presented to us, it was the belief of myself and my colleagues in the arbitration that the higher wages granted the men would not necessitate any increase in fares.

Voluntary 6-Cent Fare Asked in Akron

The actual cost of producing a ride on the lines of the Northern Ohio Traction & Light Company in the city of Akron is 5.7 cents. This figure does not include interest on the investment, nor depreciation. It includes only wages, taxes, power and upkeep. On the basis of these figures the company has appealed to the public voluntarily to pay a 6-cent fare. It is not compulsory. The franchise provides only a 5-cent fare. The operating grant of the company expires next February.

The company has explained all these facts to its employees. In concluding a statement in which they are set forth the company says:

"If asked about these points please explain to car riders.

"If 6 cents is tendered as fare, please accept, but please do not request passengers to pay 6 cents.

"We hope they will do it voluntarily. When passengers pay 6 cents, please thank them.

"You can materially assist your company in this movement by courtesy at all times."

Wage Increase a Problem

Cincinnati Traction Will Practice Extreme Economies in Effort to Avoid Fare Increase

Introduction of one-man cars on lines other than those on which they are now operated has been announced by W. Kesley Schoepf, president of the Cincinnati Traction Company, as a measure toward reducing operating expenses and to forestall an increase in fares. This movement, according to Mr. Schoepf, is in line with the company's policy eventually to equip practically all its lines with one-man cars. At the present time the company operates the new type cars on two of its lines. The system comprises approximately forty-two routes, so that it will be some time before the company can replace any very considerable number of the present two-man cars with one-man cars.

Mr. Schoepf said that drastic measures would have to be taken to reduce expenditures in order to keep the rate of fare at 7½ cents. He emphasized the fact that the award of the arbitrators granting the company's many employees increases in wages ranging from 3 to 7 cents an hour would result in additional charges of approximately $250,000 a year. Under the terms of the service-at-cost franchise the company is empowered to raise its fare when a deficit is shown in the operating expenses for two consecutive months. The effort of the company will be to keep the present standard of service at the new wage scale without increasing fares.

As the arbitrators' wage agreement is retroactive to July 1, Mr. Schoepf explained that the operating expenses of the company for the months of July and August would show a substantial deficit.

In commenting on the situation, Mr. Schoepf said:

The wage award is retroactive to July 1. It has been impossible as yet to complete the computation of wages due at the new and higher rate for the month of July. It is, therefore, impossible to determine the actual results of operation for that month, although it is certain that the increase in wages will result in a substantial operating deficit. As an increase in the rate of fare can result only after a deficit for two months, the months of July and August will have to be taken together in governing whether there will be an increase in the rate of fare on Oct. 1.

It is desirable that an increase in the rate of fare be avoided if possible. It will be very difficult, however, to prevent an increase, because of the burdensome increase in the payroll imposed by the arbitrators, which later computations show will be approximately $300,000 a year. In the arbitration proceedings the officers of this company pointed out that a total increase of $100,000 or even $150,000 a year might possibly have been overcome by the practice of super-rigid economy, but with an increase of double that amount, I cannot at this time give any hope that an increase in fare can be avoided.

The month between now and Sept. 15, when the announcement of an increase in the rate of fare, effective Oct. 1, would be made, will afford an opportunity to determine if reductions and economies can be brought about sufficient to accomplish the desired end.

One of the measures to be taken will be the introduction of one-man cars on other lines than those on which they are now operated. The first line to which their operation will be extended will be the East End line.

While the award of the arbitrators of a

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premium of 7 cents an hour to one-man car operators is in excess of the premium paid in other cities and therefore, an added burden for the car-riding public to bear, it is believed that this premium will tend to popularize one-man cars with the employees, as they are already popular with the riding public.

Jitneys Still Operating in Schenectady

At Schenectady the jitney situation remains unchanged so far as operation is concerned. The Schenectady Railway has as yet made no effort to serve contempt papers on the operators.

The next move in the legal battle will probably be made on Aug. 25 at Canton, St. Lawrence County, where the order will be argued, to show cause why the temporary injunction of Justice Angell restraining jitney operation should not be made permanent.

Attorneys for the jitney operators will take appeals as soon as decisions are rendered against them and papers have been served. An appeal has already been filed from the order of Justice Borst setting aside the order of County Judge McMullen, which order set aside the original order restraining the operation of jitneys in Schenectady. The legal tangle is rapidly assuming the aspect of the "house that jack built."

Northern Ohio Takes Progressive Stand on Use of Bus

"Just remember one thing: this company—the Northern Ohio Traction & Light—is in the transportation business!

"When the horse cars gave way to the electric cars this company changed over to electric motive power. When the electric car gives way to the bus, if it does, this company will still be in the transportation business, operating buses!"

The speaker was A. C. Blinn, vice-president and general manager of the Northern Ohio Traction & Light Company, Akron. He was discussing the possibility of buses being substituted for electric cars in the future.

At a meeting of citizens on West Hill recently at which the question of the removal of car tracks from West Market Street was discussed, Mr. Blinn practically repeated this statement. He said at that time:

If the time has arrived when buses should supplant the street cars, then this company is ready and willing to change. I hardly believe the time has come. I believe it would be difficult to handle the people with buses. However, we want to do what you want done. We want to furnish the kind of transportation you want!

In commenting on these statements in the August issue of the *Northern Light*, published for and by the employees of the Northern Ohio Traction & Light Company, the company said that it desired to drive Mr. Blinn's remarks home to every employee. The statement then continued in part:

The point we are trying to make is this: The investments made by this company are not going to be scrapped. We are not going to take the stockholders' money and throw it away. It is invested so that we can assure him or her the return pledged. There are not going to be a lot of losses in investments made in developing this transportation system.

Back thirty or more years ago, when street car lines were operated with horses or mules, a transportation company was organized to handle the business in every city where they were operated. These companies, when the cable car came along and it looked like that was to be the method of transportation, changed to cable cars. Then came the electric cars, and the same companies, still continuing to do business, adopted the electric car as the method of transportation.

"We judge the future by the past" is an old saying. It holds good with reference to the companies in the transportation business. It is perfectly consistent that the recognized transportation company should continue in the business and adopt whatever method of travel the people who ride desire, when that method meets the universal needs of the people as a whole.

Transportation is our business—and we are going to stick to it!

Pass Popular in Paducah

Approximately 775 weekly passes are being sold each week by the Paducah Railway, Paducah, Ky. It was just a year ago that the pass was introduced there. To be exact the date was Aug. 28, 1922. Its coming was heralded by an advertising campaign in the local newspaper. Six hundred and thirty-seven passes were sold the first week. Since the pass was first placed on sale in Paducah, the original advertising has been followed up by a weekly reminder, in the local newspapers, calling attention to its economical and trouble saving features. The railway considers this money well spent. In commenting in the *Paducah Electric News* on the results secured the company says:

The weekly pass is deservedly popular. It has many features which commend it to the riding public. Designed as a wholesale rate, it extends the privilege of unlimited riding for a period of seven days. It is transferable. It does away with the necessity of searching for the correct change, or obtaining transfers. The only formality is the showing of the weekly pass to the operator.

Many of the patrons of the Paducah Railway are making use of this economical wholesale rate, and thus set their own fares per single ride. More are joining this group every week. The Paducah Railway is confident that the sales of the weekly pass will continue to increase as rapidly in the future as they have in the past.

Transportation Survey Planned at Indianapolis

J. Rowland Bibbins has been retained by the City Planning Commission of Indianapolis to advise its transportation committee on the general transportation plan of Indianapolis for both present and future. L. W. Bruck, of the Insley Manufacturing Company, Indianapolis, is chairman of this committee.

A preliminary survey will be made at once for the purpose of directing the further work of the commission in developing the transportation features of the city plan. This work will include the study of the needs and the future development of transit, traffic, thoroughfares, railroads, terminals, motor transport and the special needs of the various commercial, industrial and residential districts with the object of obtaining a well rounded transportation plan best adapted to the needs of all the conflicting interests and for the guidance of the community in its future development.

Commission Has Say on One-Man Cars in Buffalo

The Corporation Counsel of the city of Buffalo has advised Mayor Frank X. Schwab that the city is powerless to prevent the operation of one-man cars on the local lines of the International Railway. Mayor Schwab recently wrote the company threatening court action unless the use of one-man cars was discontinued. The railway ignored the letter.

In his decision, the Corporation Counsel calls attention to the fact that the city of Schenectady adopted an ordinance requiring a motorman and conductor on each local car. In a test of that measure the State Supreme Court ruled that a municipality is without power to enforce such a measure and that the matter is one for the Public Service Commission to determine. It is also pointed out that in the case of the New York State Railways the Public Service Commission ruled that one man is sufficient for a double-truck car, provided the car is equipped with all modern safety devices.

Use of One-Man Cars by Ohio Interurban Sustained

The one-man car system used by the Cincinnati, Georgetown & Portsmouth Railway is safe and affords the public a modern means of transportation. This in effect is the ruling made recently by the Ohio State Public Utilities Commission. The commission dismissed the complaint of Julius Luchsinger, president of the trolley men's union, who sought an order directing the interurban to stop using the cars. The company operates one-man cars exclusively on its lines between Cincinnati and Russelville, Ohio.

Evidence in the case was heard by the commission at Columbus on June 5. The company contended that in order to curtail expenses and furnish better service it adopted the one-man car and started hourly service. Before that service was given every two hours. The union contended that the one-man operation was dangerous.

International Creates Bus Subsidiary

The International Railway, Buffalo, N. Y., recently received a permit from the Public Service Commission for the operation of buses on Bailey Avenue between Broadway and the north city line in conformity with operating rights granted by the City Council.

Coincident with the securing of the right to operate from the Public Service Commission, the company organized the International Bus Corporation with an authorized capitalization of $100,000. The incorporators are: H. L. Mack, Herbert G. Tulley, R. Harland Horton, C. A. Weber and C. A. Cheval.

The International had planned to lay tracks on Bailey Avenue, but lately abandoned the idea and allowed its franchise to lapse.

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Personal Items

G. H. Wilmarth Made Manager

Northern States Power Official Advances to Post with Properties Purchased Recently

R. F. Pack, vice-president and general manager of the Northern States Power Company, has announced the appointment of George H. Wilmarth as manager of the Wisconsin-Minnesota Light & Power Company, with headquarters at Eau Claire. The Wisconsin-Minnesota Light & Power Company was recently made part of the Northern States Power system.

Mr. Wilmarth has been connected with the public utility industry since 1899, when he received his degree in electrical engineering at the University of Illinois. His experience since that time ranges from construction activities in the telephone and traction fields, notably the Chicago Electric Traction, Illinois Traction and Canton-Akron line, to the management of electric and gas companies.

G. H. Wilmarth

Mr. Wilmarth's affiliation with the Byllesby organization began as general superintendent of the Red River Power Company at Grand Forks, N. D., now part of the Northern States Power system. He served in that capacity from 1910 to 1912, and then was transferred to Sapulpa, Okla., as manager. In 1918 he became manager of the Muskogee division of the Oklahoma Gas & Electric Company, from which position he has resigned to go to Eau Claire.

Safety Director Named

E. K. Eastham has been appointed safety director of the United Railways, St. Louis, by Col. A. T. Perkins, manager for the receiver. He has entered upon his duties. It is a newly created office that he will fill.

Mr. Eastham's first work with the company at St. Louis will be to carry out a vigorous safety campaign outlined for him by Colonel Perkins. One of the features of this work will probably be the revival of car folders and the use of more advertising.

In the course of his first plea to 6,000 employees to co-operate in an intensified safety campaign, Mr. Eastham said:

> As you know, accidents are costing the company lots of money—more than $1,000,000 in 1922. Moreover, there is heavy cost in pain and tears which cannot well be measured in money terms. So this is quite a large job Colonel Perkins has handed to me; entirely too big for one man, or two or a dozen, but not too big, I am sure, for you and me and all pulling together.

Besides the three prizes of $100 each awarded to car stations showing the greatest reduction in the number of boarding and alighting accidents, other transportation accidents, and no report claims, respectively, a prize of $10 is to be awarded each month to the motorman or conductor sending in the best suggestion, and the response in a few days has brought a large number of meaty suggestions.

Closer co-operation with the Safety Council and the city authorities will be a feature of the campaign.

Mr. Eastham was born and reared in Catlettsburg, Ky. He has lived in the far South since 1905, serving most of the time in various steam railway capacities, principally in claims divisions.

Dr. Addison Retires

Dr. Thomas Addison, often called the father of the electrical industry in the West, has retired at his own request as Pacific Coast manager of the General Electric Company. He will be succeeded by J. A. Cranston, formerly Northwestern manager.

Dr. Addison has been with the company for thirty-three years, and has held his present position since 1892. He was born in Courtland, Mich., and was graduated from Bellevue Medical College with the class of 1877. He foresook his profession in 1885 to take employment with the United States Electrical Company, Chicago, and in 1888 he accepted a position as apparatus salesman with the Thomson-Houston Company at that city. When the Western branch of the company was reorganized in 1890 he was selected to go to San Francisco as local manager. Two years later he became Pacific Coast manager of the company.

Dr. Addison's great contribution to electrical progress has not been confined to the advancement of his own company. He has taken an active part in the upbuilding of other branches of the industry besides his own and has shown a warm interest in the formation of local technical and commercial organizations and their development to their present importance.

New San Diego Official

Superintendent of Equipment There Is Man of Wide Technical Attainments and Practical Experience

S. E. Mason, recently appointed superintendent of equipment of the San Diego Electric Railway, has been doing electrical work of one kind or another practically all his life. The extent to which this is true is shown by the fact that he paid his way through college by erecting three small electric plants for three municipalities in his native state.

Mr. Mason was born in Texas in 1889. After working himself up to be manager of the electric plant at Honey Grove by his own efforts, he entered the University of Texas and graduated in 1911 with the degree of electrical engineer. Upon graduation, he entered the employ of the San Antonio Gas & Electric company, and for that company and the Bureau of Standards he made an extensive electrolytical survey of San Antonio in 1912. He then entered the employ of the San Antonio Public Service Company, and in the years from 1914 to 1918 supervised the reconstruction of about 50 miles of track in San Antonio. He then became superintendent of equipment for the San Antonio company, which position he relinquished to become connected with the San Diego Electric Railway.

S. E. Mason

As superintendent of equipment for the San Diego company, Mr. Mason has charge of all the railway company's equipment, and also the way and structures and the bonding and welding departments. The position is a new one, created by dividing duties formerly performed by other officials.

D. H. Foote, formerly secretary and assistant treasurer of the Pacific Gas & Electric Company, Sacramento, Calif., has assumed the title of third vice-president and secretary.

R. L. Smith has succeeded Henry H. Lynch as chief engineer and engineer maintenance of way of the Peninsular Railway, San José, Calif. Mr. Lynch will continue in that capacity for the San José Railroads.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Living Conditions in the West Virginia Coal Fields

Peace will never be permanently assured in the mine fields of West Virginia until the public mind is disabused of years of propaganda by which the United Mine Workers of America have sought to excuse periodic violent and bloody attempts to organize the state, according to a brief filed Aug. 18 with the United States Coal Commission by counsel for the Bituminous Operators' Special Committee. The members of the commission are urged to visit the West Virginia mining regions in person.

The following are the facts as to living conditions and wages as summarized in the brief:

The eight-hour day is universal among the non-union miners.

The earnings of non-union miners range far in advance of farm laborers and other unskilled workers.

The earnings of miners in non-union fields are at least as high as those in union fields. In 1920, in a substantial number of mines in the non-union fields, 29 per cent of the machine miners, pick miners and loaders who worked 100 days or more earned over $2,500. In 1920 and 1921 a few such miners earned more than $4,000.

The miner is more nearly his own boss as to whether he will work when the mine is running, how long he will work and how he will work than almost any other class of laborer.

The housing and living conditions of the miners are those of a progressive industrial community and compare favorably with mine communities the country over in union and non-union fields.

Finally, the miners of southern West Virginia, far from being held in subjection and kept from unionization by force of arms, have themselves taken up arms to resist forcible attempts to impose unionization upon them.

Of twelve average communities in the Mingo County field, the brief relates, ten had piped water systems; five had partial or complete piped sewage systems and ten had regular garbage collection. Three had company doctors devoting their entire time to employees and nine had from one to three contract doctors; four conducted some form of welfare work for the benefit of their employees. Eleven had schools for white children in or adjacent to the communities, the twelfth using the town school 1 mile distant. Of these there were six schools, where, by supplementing the teachers' salaries, the school term was made longer than the county provided. Five towns had separate schools for colored children. All either owned church buildings or utilized the schoolhouse for religious services.

Houses in the field generally are equipped with electricity, and miners' wives in the community were found using such conveniences as electric washing machines, iron, fans, toasters and ranges, generally without any charge beyond the small flat rate charged per lamp. The living conditions illustrated by these facts were superior to those found in the non-company owned towns.

A Railway that Thought It Saved by Building Its Special Work

A few railway companies build their own special trackwork, usually with the idea in mind that they save money by so doing. This has always been a doubtful economy for it seems highly probable that the manufacturer whose sole business is to make special trackwork would not only produce a better product but could do it more economically, when having an organization experienced and constantly engaged in this kind of work as a specialty. Information comes to hand that one such railway company thought it was saving about 40 per cent by building its own trackwork. This saving was arrived at by comparing the labor payroll plus the material cost with the cost supplied by manufacturers. No overhead expense was included, not even engineering supervision.

Substitutes for Anthracite

Spokesmen for the administration at Washington have let it be known that plans have been perfected to forward heavy shipments of substitutes for hard coal — bituminous coal and coke — into the anthracite-consuming sections should a cessation of operations in the collieries come September 1, or at any date. It is realized that to provide substitutes will entail longer railroad hauls in many cases, place a strain upon open-top car supply and create other problems, yet the plan, it is felt, will insure the people and the industries of the anthracite-consuming regions against suffering from cold or a shutdown of plants.

The Federal fuel distributor, F. R. Wadleigh, will be placed in charge of distribution of substitutes if production of anthracite ceases. The broad powers of the Interstate Commerce Commission will be employed to execute the plan. Mr. Wadleigh's office as Federal fuel distributor expires by limitation Sept. 22, but he can be appointed an agent by the Interstate Commerce Commission, and this will probably be done if the necessity arises.

The National Coal Association, through its president, J. C. Bryden, speaking for the bituminous operators, has offered a plan to the government of supplying soft coal to the anthracite-consuming areas, with voluntary committees of operators to assist and with traffic experts to aid the distribution, while at the same time agreeing in advance to submit to voluntary price regulation or supervision by the Federal government. It is highly probable that the offer of the bituminous operators will be accepted, should occasion arise, at least in major part.

British Railway Electrification

Contracts are now being let for the conversion to electric traction of all suburban lines of the Southeastern section of the Southern Railway, within a radius of 15 miles of Charing Cross. There is a pre-war obligation on the part of the London, Midland & Scottish Railway to electrify their lines from London to South End, a distance of about 40 miles. The exact date when this will be done, however, is not known.

All four of the railway companies mentioned above are now spending large sums of money in development work. It is said that the work planned will cost about £8,000,000. Except in the case of the Southern Railway, however, these developments have nothing to do with electrification.

In this connection interesting suggestions have been made with a view to relieving unemployment by advocating the electrification of steam railways. The following schemes are specifically suggested:

1. The extension and electrification of the London & Southern section of the Southern Railway.
2. The completion of suburban electrification of the London, Brighton & South Coast section of the Southern Railway, and the electrification of the main line as far as Brighton.
3. The suburban electrification of the Great Eastern section of the London & North Eastern Railway.
4. The electrification of the main line of the London & North Eastern Railway from York to New Castle.
5. The electrification of the line of the London, Midland & Scottish Railway from London to Tilbury and South End.

Metal, Coal and Material Prices

Metals—New York	Aug. 21, 1923
Copper, electrolytic, cents per lb	13.75
Copper wire base, cents per lb	16.75
Lead, cents per lb	6.55
Zinc, cents per lb	6.45
Tin, Straits, cents per lb	39.50
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.325
Somerset mine run, Boston, net tons	2.625
Pittsburgh mine run, Pittsburgh, net tons	2.075
Franklin, Ill., screenings, Chicago, net tons	1.675
Central, Ill., screenings, Chicago, net tons	1.375
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$7.00
Weatherproof wire base, N. Y., cents per lb	18.75
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal	$0.965
White lead, in oil (100-lb. keg), N. Y., cents per lb	11.375
Turpentine, (bbl. lots), N.Y., per gal	$0.96

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Mechanical Snow Handling

An unusually attractive booklet has been prepared by the Barber-Greene Company, Aurora, Ill., to advertise its snowfighting equipment. The popular impression that the average snowfall is decreasing from year to year and that the present winters are less severe than the winters of years gone by is contradicted by the snowfall figures given in the booklet. The dangers incident to allowing snow to remain in the streets are also clearly pointed out. The booklet then goes on to tell of the success of the mechanical snow loader. Many electric railways are listed among those using this apparatus, and examples and pictures showing the loader at work in various cities are included.

Track and Line

Los Angeles Railway is installing new special work at Pico and Grand Avenue. On Larchmont between Beverly Boulevard and Melrose the track is being lowered preparatory to paving the intersections.

Toronto Transportation Commission has announced plans for the extension of its car lines. The proposed route would run along Oakwood Avenue, Rogers and Hillary Avenues to the Weston Road, ending in a loop.

Knoxville Power & Light Company, Knoxville, Tenn., has been granted permission to establish a switch at the corner of Gay Street and Clinch Avenue. The cost of the improvement is estimated at $4,000.

Rockford & Interurban Railway, Rockford, Ill., and the Beloit Traction Company will lay double track in the city of Beloit, Wis., in accordance with the city street improvement program.

Detroit Municipal Railway Department's needs for special trackwork at intersections and for rail replacements were placed at $750,000 by Philip A. Kerwin, superintendent of tracks of the railway, testifying in the recent wage arbitration case. He said that many miles of the lines taken over by the city from the Detroit United Railway are so badly in need of foundations, new rails and repairs as not to be safe to operate.

New Orleans, La.—An ordinance has been introduced by Commissioner Maloney of the Department of Public Utilities providing for the extension of the North Claiborne Street line from its present terminus at Frenchmen Street to Florida Walk on the upper side of Elysian Fields Street. This action was taken as the result of a compromise effected by the city, the Louisville & Nashville Railroad, and the property holders and residents along Elysian Fields Street, who opposed the recommendation contained in the Beeler report, on reorganization, suggesting that Elysian Fields Street be widened 6 ft. and that a belt line be constructed on each side of the area now in use by the Louisville & Nashville Railroad, from Royal Street to Florida Walk.

Power Houses, Shops and Buildings

Trenton & Mercer County Traction Corporation, Trenton, N. J., has been granted permission by the Trenton City Commission to establish a terminal on Perry Street, Trenton. The proposed terminal will cost approximately $250,000. Part of the ground will also be used for car shop purposes.

Louisville Railway, through Vice-President Sam Riddle, has stated that the date is uncertain when new estimates would be obtained on the construction cost of the proposed new interurban terminus and railway office building at Second and Liberty Streets. The postponement of this project was recently announced. Original estimates aggregated more than $1,250,000. He said that now that the company had decided not to build for the time being he was unable to give out any time at all when the contemplated plans might be started.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., following a decision a few days ago dissolving a temporary court order restraining it from entering the electric power field in Indianapolis, is going ahead with plans for the production of electric power on a very large scale. Its program, according to Robert I. Todd, president, calls for an expenditure of approximately $7,000,000 for construction work. This work includes the erection of a super-power generating station, probably on a site adjacent to its present central station, and the construction of high-tension transmission lines across the entire state, the length of its interurban property.

Trade Notes

Diamond Power Specialty Corporation, Detroit, has announced the appointment of Paul E. Theis as sales manager of the Cleveland district with offices at 608 Rockefeller Building.

Portland Cement Association, Chicago, announces the appointment of J. M. Marshall as district engineer of the association office at Atlanta. He succeeds Walter B. Elcock, recently promoted to assistant general manager in charge of the southeastern offices.

Laurence E. Morier has returned to the pole industry as Eastern sales manager for Page & Hill Company, Minneapolis. His headquarters are at 855 Reibold Building, Dayton, Ohio. In this addition to its staff, Page & Hill Company brings about a closer personal contact with its customers through the medium of a representative of long practical experience and wide acquaintance.

Charles H. Ensign, a well known construction engineer of Cleveland, Ohio, and Mark G. Snow, recently engineer of roadway, track and bridge costs with the Froehlich & Emery Engineering Company, Toledo, Ohio, and Detroit, Mich., on the appraisal of the interurban railways of Michigan for the Public Utilities Commission of that State, have established offices at 517 National City Bank Building, Cleveland, for the general practice of civil, architectural and appraisal engineering with special attention to investigations, reports, designs, estimates, supervision and construction problems under the name of Ensign & Snow, Engineers.

L. W. Seeligsberg, who resigned on July 1 as business manager of the ELECTRIC RAILWAY JOURNAL and *Bus Transportation* to engage in industrial advertising service of his own, has established an office at 50 Church Street, New York. He will specialize in the handling of technical and engineering accounts, particularly such accounts as place advertising in trade and technical publications. Mr. Seeligsberg is a graduate of Stevens Institute. He has had more than twenty years experience in the preparation and placing of technical advertising copy, mostly with the McGraw-Hill Company and its predecessors, and knows the markets for materials and equipment, and the possibilities for application and use of technical processes and various types of machinery. Early in his career with the McGraw-Hill Company, Mr. Seeligsberg had charge of its copy service department, a post to which he was advanced because of his ability quickly to discern copy of thought-compelling interest in which the selling points were attractively developed. The ability thus manifested by him naturally led to his advancement with the company to the office of business manager, in which capacity his talents came to be more fully recognized as a force not only in the publishing company itself and among his associates in business, but particularly with advertisers offering service or equipment, or both, for sale. His experience has also covered the solicitation of advertising in the field as a member of the McGraw-Hill sales forces.

New Advertising Literature

Condit Electrical Manufacturing Company, South Boston, has issued a new bulletin, No. 445-2, covering the company's type D-17-A and D-17-B oil circuit breakers.

Sangamo Electric Company, Springfield, Ill., under the title of "Service to the Central Station Industry," has published a very attractive booklet devoted in part to a brief history of the development of the central station industry and in part to views of the works at Springfield, Ill., of the Sangamo Electric Company. The booklet is notable for its attractive typographical make-up.

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New York, Saturday, September 1, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 9

The Biggest Convention Is in Sight

AS THIS issue goes to press, 68,330 sq.ft. of exhibit floor space has been sold for the Atlantic City convention of the American Electric Railway Association, Oct. 8 to 12. This is more than 6,000 sq.ft. more than has ever been sold before at any A. E. R. A. convention. It means that the greatest convention of the association's history is probably to be had this fall. It means that 143 manufacturers have planned to bring before the railway men of all departments, including the accountants this year for the first time, new or improved equipment that will help them do their work better and more economically. Railway men can ill afford to miss such an opportunity as this, for the great need of the day in railway transportation is to modernize. These exhibits will give many new ideas for use in this direction. A lot of development work has been going on this last year and it is going to make the convention unusually interesting and profitable. With this prospect in sight, executives will be justified in authorizing a liberal delegation of department heads and principal assistants to make the trip to the convention.

Systematic Publicity Movement Is Making Headway

THE systematic business-like method of bringing the plain facts about the public utilities to the general public through the work of the state public utility information committees has spread until there are now only fourteen states in the Union without such service, according to a recent report. The movement originated in Illinois, and largely through the initiative of the men behind the Illinois committee this plan of publicity work has been set in operation to cover thirty-four states.

The accomplishments of these committees have already been great, but the combined results of all this work will be a profound influence for good as the accumulative effect is realized, provided the present high purpose of the matter sent out to the newspapers is maintained. On that basis it is believed that the time is well within sight when it will be most difficult for the unscrupulous politician and demagogue to make any headway in trying to spread misinformation about the utilities, for the man on the street will already have a good deal of knowledge of the utility business in his own mind and will not be so susceptible to the derogatory statements and misrepresentation that have been heeded in times past.

Of course the state committee work is just one of many plans for informing the public, but it is one of the best. It is these activities which are at last getting into full swing that give reassurance of the fair treatment of the utilities and of their financial success in the future. The very intelligent manner in which many newspapers have spoken editorially about the recent Public Service Railway settlement plan may be indicative of some of the subtle effect of the railway publicity work, for while the metropolitan dailies have not printed so much of the material sent out by the committees, their editorial writers have been noting and absorbing it. In fact, from their check on the papers, the information committees can cite many cases where an antagonistic editorial policy has been transformed into a friendly one as the continuous flow of facts has made its impression.

Much Is Yet to Be Learned in New Jersey

IN GENERAL the situation in New Jersey, where the Public Service Railway has been shut down since Aug. 1, remains unchanged. A hearing has been held on the company's proposed plan of settlement, as detailed in the news pages in this issue. The hearing brought forth practically no constructive criticism nor substitute plan, although the need for the railway was shown by the insistence, of nearly all the public officials who testified, that the railway start operation at once and talk afterward. There has also been some talk on the part of public officials of the possibility of throwing the company into a receivership. But nothing definite has transpired that would indicate an early resumption of service. Out of the hearing, and as the result of a fairly wide canvass of business men and other people in the Public Service Railway territory by JOURNAL editors, one gathers the following general impressions about the situation.

A great part of the people have not yet come to realize that they must have the trolleys back, nor that they cannot have both bus and railway in competitive services. It may take another month before these things are appreciated, for the month of August has been a particularly poor one in which to demonstrate them. With the return of many residents from their summering and vacation places, with the opening of schools and the beginning of the fall business season, the need for the return of the trolley will become increasingly felt. And of course the continued absence of the trolleys is about the only way that the necessity for correction of the unfair competitive operation that has prevailed can be quickly brought home.

In other words, now that the railway has taken the course of shutting down, it may be best to remain shut down until it is assured an equitable basis on which to operate in the future. It cannot be expected to operate again under conditions that permit the bus to give base service where business is good, leaving the railway to provide the unprofitable long-haul service, the light territory service and the peak-load service. Freed of all

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obligations as to rush-hour reserve capacity, as to unprofitable line service and as to most of the tax burdens which the railway must pay, the buses have been in a position to take the cream, while depending on the railway to make up all their deficiencies. This situation will gradually come to be realized as the people in the outlying territories are heard from. These people are hardest hit by the shutdown, because in the long stretches outside the larger towns they are getting little or no bus service and are enduring a real hardship. Furthermore business is being hurt, though some merchants seem reticent about admitting or discussing it. When this factor becomes more pronounced, business interests will no doubt bring some pressure to bear which may be helpful in developing the viewpoint of public officials on the need for acceptance of the railway plan.

Another aspect that must be learned is this. One of the most commonly voiced objections to the Public Service plan is against turning over the 5-cent buses to the railway to operate at 7 cents. The 2 cents difference indicated is more apparent than real because the 5-cent bus does not issue a transfer, and for a continuous ride in one direction it charges another fare or two as the distance gets much beyond a comparatively short-haul limit. Furthermore, there is scarcely any through service and people must frequently transfer from one bus to another several times in making a not unusual trip and must pay a new fare on each bus. Hence the people must come to understand that the difference between these rates of fare is a matter of difference in value received—a difference probably greater than the 2-cent differential in rate. Or possibly a quicker way would be for the company to set up a 5-cent rate of fare on a basis comparable with the bus, collecting one nickel, pay-enter, on the trip to the center of a city, and another, pay-leave, on the outbound run, as is done on the Eastern Massachusetts Street Railway system. The basic nickel fare has a great appeal and possibly it could be worked out to provide adequate revenue in New Jersey. It might also tend to win public approval in some Jersey communities if the company could get away from the uniform state-wide rate and charge whatever rate was proper for the conditions in each city.

Whatever the details of the solution, it is evident that the public of New Jersey must come to understand that it cannot expect railway service to continue while imposing conditions under which the railway cannot possibly live. If this lesson is brought home, it will serve as the most important of the several precedents established to that effect—Toledo, Bridgeport, Des Moines, Saginaw.

Study the Advance Engineering Reports Before Convention Time

IT IS quite certain that the advance reports of the various committees of the Engineering Association will be distributed about Sept. 1. Their receipt by the membership approximately five weeks before the convention opens at Atlantic City should give every member ample opportunity to study the reports thoroughly and to be prepared to discuss them on the convention floor.

If the advance distribution is effected as planned, there can be no good reason for anyone justly to say there has been no chance to study the reports in order to prepare comments.

The committees have been very industrious, and valuable work has been done. This includes the intensive study given to the Engineering Manual with the intent of providing material for its prospective and much needed revision. The work of the officers and committees deserves the support of the membership, and this will best be shown by ample discussion of reports at the convention, which their early circulation will permit.

Ample time for this will be allowed, and the sessions will be convened on time following the precedent set at Chicago last year. With ahead-of-time reports and on time sessions in prospect, a good convention is assured.

The Day's Work— Is It Better or Worse?

A GOOD many people are fond of saying that the working man of today is worth far less than his predecessor of a generation ago. This statement is frequently coupled with a lament about high wages, and a gloomy prediction of national disaster because bricklayers are paid $14 a day.

One is reminded of the man who complained that "Times ain't what they used to be," and that tart rejoinder "No, and they never were," from the other man who realized that times as "they used to be" are often mere figments of the imagination. Is the better day's work of past times also a figment of the imagination?

Without touching at all on the complex question of wages, it would be interesting to know whether or not the modern working man really does less work in a given time, or work of a poorer quality, than his predecessors used to do. A number of railways incline to the belief now that the quantity and quality of work is much improved over the situation in the war period and is about as good as it ever was. Furthermore, thanks to labor-saving machinery in certain railway operations, more work is actually being accomplished per dollar of cost than was the case in the "good old days." So perhaps we should avoid generalizations about labor's inefficiency, for it appears that, at least in some cases, it is no longer justified.

The Proposed Broadside Investigation of Public Ownership in Europe

A PLAN for "attacking the European public ownership bugaboo" has been proposed by some energetic publicity men, as noted in the news columns in last week's issue. The plan is to organize a "public ownership research commission" from a group of the public relations utility men who expect to attend the world's advertising convention in London next year.

Irrespective of whether the information desired could best be secured in this way, it might be well to point out that not so many years ago a commission to study this same subject was sent to Europe by the National Civic Federation, and the results are embodied in an extensive report published by the Federation. The commission undertaking this study was made up of an equal number of representatives of those in this country in favor of and opposed to municipal ownership of utilities. Conditions cannot have changed so much since that report as greatly to vitiate its conclusions.

Incidentally, it might be said that the political conditions in Great Britain and Europe and in this country are so different that any prosperity which British municipal utilities may have attained is not necessarily an indication that municipal operation would be equally successful here.

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Energy Consumption Reduced in St. Louis

Tests Made on United Railways of St. Louis Result in Installation of Meters on 1,420 Cars—Test Procedure and Results Described—Education of Car Operators Is an Important Factor — Definite Factors Found for Traffic and Temperature Variation — Completed Installation Has Resulted in Peak Load as Well as Over-All Energy Reduction

By Benjamin F. Thomas, Jr.
Mechanical Engineer United Railways Company of St. Louis

DURING the summer of 1922 tests were run on two lines of the United Railways Company of St. Louis, which showed that by the use of Economy watt-hour meters, with proper instruction of the motormen in the handling of their cars, a saving of better than 10 per cent in the energy used for car propulsion could be effected. In consequence the company ordered meters for its 1,420 motor passenger cars, and the installation was completed on March 1 of this year.

For the tests the Park line was selected. This combination east-and-west and crosstown route is considered a very hard line for the platform men, operating as it does through dense traffic downtown and carrying a high number of passengers per mile, while it is enough of a crosstown line to have many stops at the short blocks on all north-and-south streets.

The meters were installed during April. A "blind" test was started on April 26, after all of the cars had been turned in at the carhouse for the night, and was completed the night of May 3. A meeting of the motormen was held the following day, at which the purpose of the meters, the method of keeping records, and the way in which power could be saved were explained. The actual test began the next morning, May 5. The first day showed a saving of 8.5 per cent over the "blind" period. It increased day by day, the average reduction in energy for the first week of operation being 10.42 per cent. The second and third weeks did not quite equal this figure. During these first three weeks nothing whatever was said to any of the men except at the first meeting.

After this period an instructor was appointed to show the men how to operate more economically. The effect was felt at once, the saving in the fourth week being nearly 4 per cent higher than the preceding, and it rose gradually to 16.5 per cent. The saving then remained above 15 per cent until Oct. 1.

The results are shown graphically in Fig. 1, while Fig. 2 gives the energy taken per car-mile for cars of the same type and weight, but equipped with different motors. An exception is made of the cars pulling trailers, which are of a different type and weigh about 2,000 lb. more. This curve shows the effect of motor equipment on energy consumption.

A check test was run upon the Jefferson line, a heavy crosstown route. The energy saving on this line rose gradually to 13 per cent. Based upon the results of the two tests, it was thought that the saving over the entire system would be not less than 10 per cent at the cars, and, since a saving of this magnitude would effect a big reduction in the power bill, the installation of the meters was considered economically desirable.

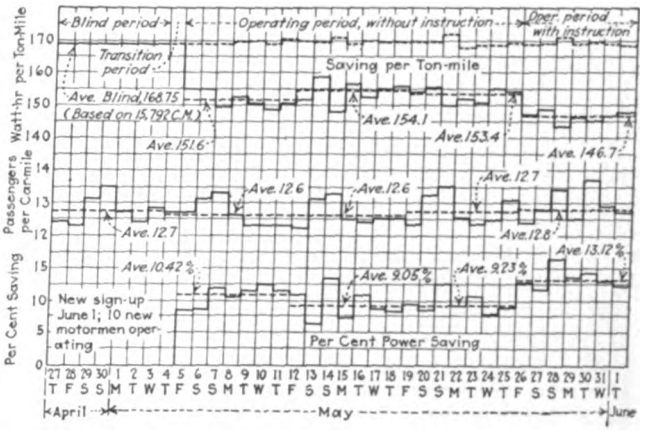

Fig. 1—Results of Power-Saving Test, Park Line

THE BLIND TEST

Each meter, when it was installed on a car, had a black paper mask concealing the dial. When all the cars at one shed had been equipped with meters, a "blind" test was run for one week, the meters being opened and read in one night by men from the office, the readings being repeated one week later. At the second reading the masks were removed. The mileage made by each car during this period was kept, so that from this and the energy readings the kilowatt-hours per car-mile were computed. The figures were tabulated and averaged for each line and type of car to show how much energy the men were using prior to the power-saving campaign.

Adjustment factors for the various types of cars also were determined from these readings. On some lines two or four series of cars may be used that differ in weight and motor equipment. One type was selected as standard for each line and the kilowatt-hours used by other types adjusted to the same basis. As a simple example, the two-car train uses twice the energy taken by the light-weight Peter Witt car, so the adjustment factor for the trains on that line is 0.5. A similar adjustment was made for every line to reduce the readings on each type of car to the same

TABLE I—BLIND AND STANDARD ENERGY CONSUMPTION, DIVISIONS 4 AND 7

Standard Kilowatt-Hours for Each Round Trip

Route	Standard Car Series	Round Trip, Miles	Adjusted Kilowatt-hours per Car-Mile Blind	Adjusted Kilowatt-hours per Car-Mile Standard	Car Series Trains	Car Series 1,100 2,200	Car Series 1,700 to 2,100	Car Series 500 700
Broadway	*	28.93	3.056	2.75	154	85	75	..
Lee	2,100	20.68	3.501	3.15	119	..	65	..
Bellefontaine	1,800	30.33	2.971	2.67	165	79	79	..
Sarah	2,100	9.43	3.064	2.75	...	..	26	..
Grand	700	13.66	2.935	2.64	62	..	..	35
Belt	2,000	8.15	3.199	2.88	46	29	23	..
Jefferson Barracks	500	5.37	1.132	1.02	...	..	..	5

*All single cars.

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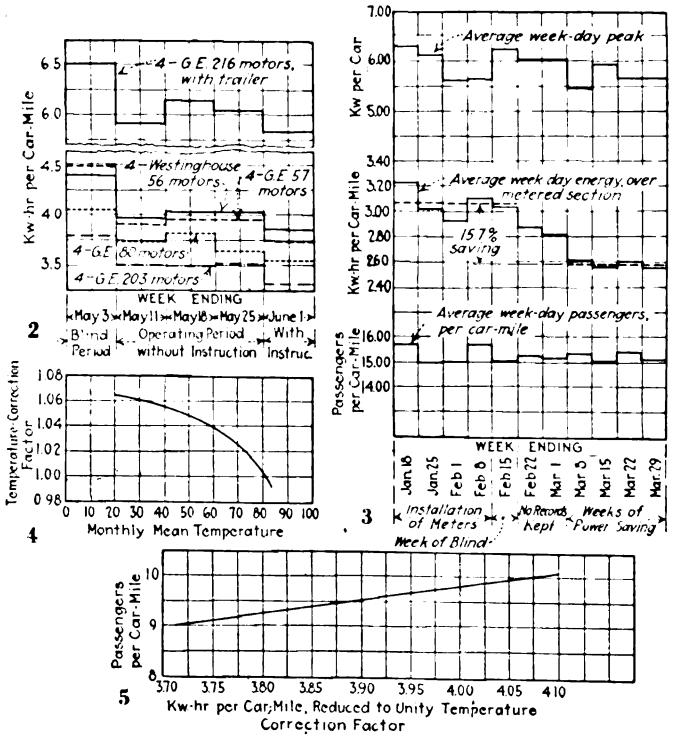
basis as the kilowatt-hours per car-mile for the standard car selected for that line. A "standard" also was worked out for each series of cars on every line in kilowatt-hours per round trip, by reducing the blind for each series by 10 per cent and then multiplying by the round-trip mileage. Table I shows these data for two divisions.

No attempt was made to adjust the blind for each line for variations in the temperature and number of passengers, because it was thought best to have a fixed amount for the men to work against. This causes the indicated saving to appear a little higher or lower than the actual, but the per cent of saving shown on any line is only to keep up the interest of the men, the real saving being calculated at the switchboard.

As a check upon the blind figure, watt-hour meters were installed in the substations upon certain feeder sections of a few lines. These meters were read daily at 3 a.m. and at the beginning and end of the peak



Charts Made for Getting Correction Factors

Fig. 2—Comparison of energy consumption by classes of equipment, Park line.
Fig. 3—Peak load and energy consumption on Grand line feeder.
Fig. 4—Temperature correction factor for energy per car-mile.
Fig. 5—Relation between passenger travel and energy consumption.

hour. Curves were drawn showing the kilowatt-hours per car-mile, and the kilowatts per car during the peak. The curve for the Grand line is shown in Fig. 3. The saving is 15.7 per cent, which compares favorably with that of 15.3 per cent computed from the motormen's cards. Table II shows the results of these metering tests.

A few days after the blind test was completed, two meetings of instruction were held at each shed, one in the afternoon and one in the evening. All motormen and conductors had to attend. At these meetings were explained the purpose of the meters, the ways in which it is possible to save energy, how to fill out the meter cards properly and how the records are kept.

Each motorman fills out a separate card for each car he operates, giving the information from which the mileage can be determined. The cards, which are of the type now generally used for this work, contain spaces for the following:

Motorman's name and badge number; date; car number; line; run number; time, place and meter reading when taking the car; time, place and meter reading when leaving the car; deviations from the regular schedule.

A place for subtraction of meter readings and the calculation of the mileage is left for office use. The men are instructed to note on their cards any and all trouble with their cars, or any occurrence beyond their control that might require the use of more energy than normal.

At the end of his day's work, the motorman turns in to the station clerk his card, properly filled out, and it is sent to the main office the next morning. There the computations are made, after which the cards are filed by the motormen's names and badge numbers with individual index cards. Twice each month these cards for each man are totaled and the kilowatt-hours and car-miles entered on the index cards, which are then sorted in order of standing, the man using the least energy per car-mile being first, etc.

A summarized list is made for each line, showing the standing of each man, his average energy consumption for the last period and the preceding one, and the saving for the entire line. This list is posted on the carhouse bulletin board, copies being kept by the office, the power saving instructor and the division superintendent. The power saving instructors, of whom there are two, ride on the cars with the men far down on the list and instruct them to operate their cars more efficiently. Their value was demonstrated during the tests on the Park and Jefferson lines.

Amount of Saving at the Switchboard

The energy saving computed from the motormen's records is that at the cars. To it must be added the reduction in distribution losses between the substations and the cars. It is at the switchboard that the saving really means money, so that it is essential that it be computed for this point as accurately as possible. For this purpose power statistics were plotted for the past seven years, and from them it was possible to extrapolate the curves for each month after the campaign started to show the amount of power and energy that would have been used under present-day conditions had the meters not been installed.

The first step was to determine the variation in energy per car-mile due to the weather. July was taken as the basic month because the lowest energy consumption per car-mile usually was obtained during this month. The energy consumption in kilowatt-hours per car-mile for each month was divided by that for July of the same year. This ratio was called the "temperature correction factor," and was compared month by month for all years under consideration. A similarity was noted for the corresponding months of each year. This factor was plotted against the mean temperature for the month and this resulted in the very smooth curve shown in Fig. 4. As the temperature decreases the power consumption increases, due to higher friction, unfavorable rail conditions, higher winds causing greater side pressures, slower operation due to snow, sleet, etc. From this curve can be obtained for any month the proper temperature correction factor to reduce all power figures to a comparable basis.

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The next step was the determination of the relation between energy consumption and passengers carried. The figures for passengers per mile were plotted against the kilowatt-hours per car-mile by months for each year and then for a number of years together. These curves showed nearly a one to one ratio, which at first seemed entirely too high, as generally this relation is considered to be about three to one. However, this ratio was confirmed by the plots, and the result is shown in Fig. 5. The actual ratio as determined on this curve is 1.2 to 1. All the data had previously been corrected for temperature.

The next thing done was to figure a "blind" of energy consumption per car-mile. Power saving in St. Louis started in May, 1922, and a slight though indeterminate effect was felt over the whole system shortly after. In order to have no effect of this power saving in the blind figure, the data for the twelve months preceding May 1, 1922, were used. The actual kilowatt-hours per car-mile was determined for each of these twelve months and adjusted for temperature and to a basis of ten passengers per car-mile. The resulting figure was 4.06 kw.-hr. per car-mile at 81 deg. F., about an average for the month of July, and with ten passengers per car-mile. From this base the blind for any month can be calculated from the formula:

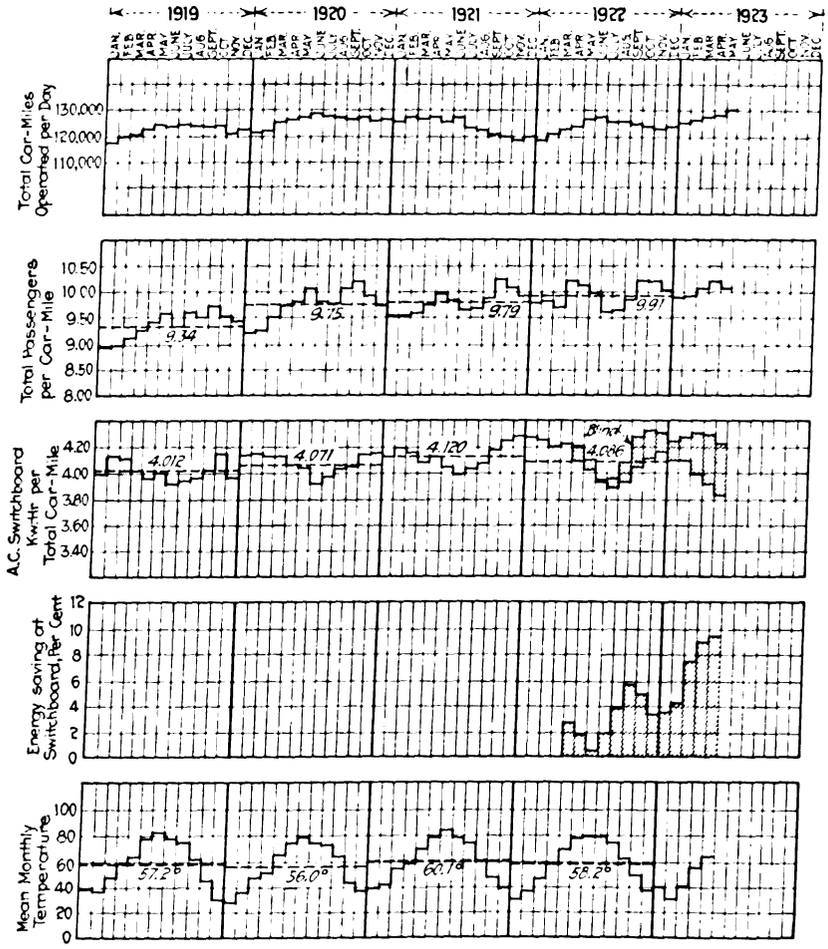
$$\text{Blind} = T \times 0.01 \left(100 \pm \frac{P}{1.2}\right),$$

where T is the temperature correction factor, and P is the per cent change in passengers per car-mile from the standard of 10. For example, the temperature for May, 1923, was 64.1 deg. F., and 10.04 passengers per car-mile were carried. From the curve the temperature correction factor is 1.033, and the passengers 0.4 per cent above 10. The blind for May is then

$$4.06 \times 1.033 \times 0.01 \left(100 + \frac{0.4}{1.2}\right) = 4.21$$

The actual kilowatt-hours per car-mile for May was 3.82, showing a saving of 0.39 kw.-hr. per car-mile, or 9.26 per cent.

The figure used for the blind, 4.06, was calculated by three separate methods and all checked within 1 per cent, so that it can be considered representative. This figure is calculated at the a.c. switchboard. The mileage figures used include all cars, passenger-motor and trailer, work cars, cars to and from shops, chartered cars and the car-miles of the Missouri Electric Company, a subsidiary. No deductions are made from the total energy used, so that it includes all energy for lights, shops and miscellaneous uses. Fig. 6 shows the power statistics plotted for five years, showing the important factors bearing upon the energy consumption.



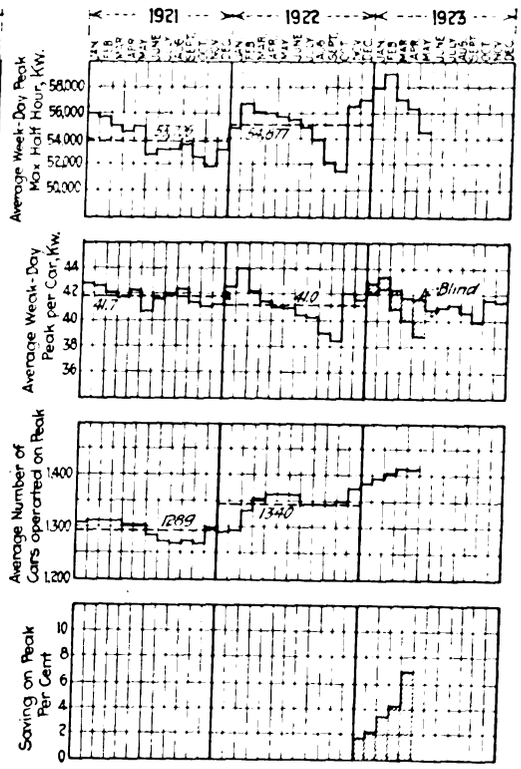


Fig. 6—Power Demand and Energy Consumption, 1919-1923. Fig. 7—Reduction in Peak-Hour Demand

Power Demand Is Reduced at the Peak

The demand charge for power at the peak being a large per cent of the total cost, the reduction of power demand is a matter of much concern with this company. On account of this charge the monetary saving is not directly proportional to the reduction in energy. That there can be a saving on the peak as well as for the twenty-four-hour average it is reasonable to as-

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TABLE II—RESULTS OF METERING CERTAIN SECTIONS OF THE LINES

Line	Blind Period: Number of Weeks	Blind Period: Kw.-Hr. per Car-Mile	Blind Period: Passengers per Car-Mile	Energy-Saving Period: Number of Weeks	Energy-Saving Period: Kw.-Hr. per Car-Mile	Energy-Saving Period: Passengers per Car-Mile
Olive	4	3.51	11.83	5	3.28	11.09
Broadway	3	3.27	8.61	5	2.95	8.53
Grand	5	3.06	15.25	4	2.58	15.20
Jefferson	1	3.62	15.26	7	3.32	15.21

Line	Energy Saving, Adjusted for Decrease in Passengers: Gross	Energy Saving, Adjusted for Decrease in Passengers: Per Cent from Motormen's Records	Power Saving on Peak, Kilowatts per Car: Blind Period	Power Saving on Peak, Kilowatts per Car: Power Saving Period	Power Saving on Peak, Kilowatts per Car: Per Cent
Olive	6.55	1.34	9.56	12.73	12.04	5.42
Broadway	9.79	9.17	8.73	12.65	12.08	4.50
Grand	15.69	15.35	15.26	5.97	5.68	4.86
Jefferson	8.29	8.01	11.89	4.50	4.19	6.89

sume, because a car can be operated economically during the peak as well as at other times. More energy will, of course, be used, and if compared with the average blind, a smaller saving will be shown. Were the blind obtained just for the peak hour, the present use would show almost as great a saving as when the all-day figures are used. The only objection to this reasoning is that the motormen, knowing it is harder to operate economically, make less effort so to do. On the Park line an effort was made during the test period to determine the saving on the peak, by comparing the saving effected by the trains with that for all cars throughout the day. The trains operated only during the morning and evening peaks and in a three-week average showed a saving of 8 per cent as compared with the over-all saving of 9.6 per cent.

A further check was tried by metering certain feeder sections on a few lines. These figures, given in Table II, showed a decrease in the energy used during the maximum hour varying from 4.5 per cent to 6.9 per cent, but only a limited amount of reliance can be placed upon them because of their being obtained by subtracting meter readings differing by a very small amount.

To show the effect on the system peak, the data for 1921, 1922 and 1923 have been plotted in Fig. 7. For May, 1923, the saving in power is shown as 6.8 per cent, while the energy saving for this same month was 9.3 per cent. at the a.c. switchboard. As the men become better instructed it can be expected that this peak saving will rise more rapidly than the all-day energy saving, because it is in this period that they need instruction the most.

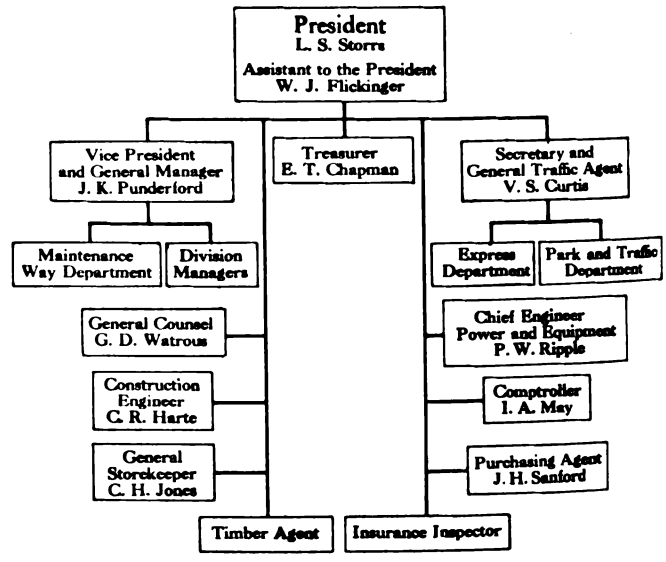
The installation of watt-hour meters on all the cars of this system is, I believe, economically a success. Besides the actual saving in energy there is a reduction in brakeshoe and wheel wear, variously estimated up to 25 per cent, and a decreased maintenance of the electrical equipment.

There is a tendency for the motormen to exaggerate the difficulties of power saving, but this can be overcome by proper instruction. Great savings can be made if a follow-up system is faithfully carried out. By this is meant the prompt, regular and accurate posting of the lists for each line at the stated times; the proper instruction by men not only capable of operating a car very well but able to instruct others, and the proper attitude and backing of the management and the transportation department. It is a combination of all these conditions that has made power saving a success in St. Louis.

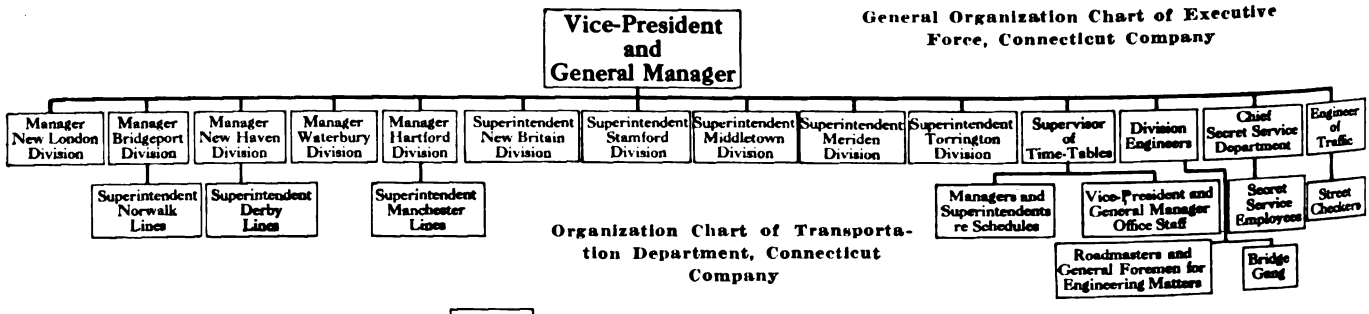
Extensive Use of Charts

All Essential Data Are Recorded Graphically for Quick Reference—Connecticut Company Finds Them Very Useful in All Departments

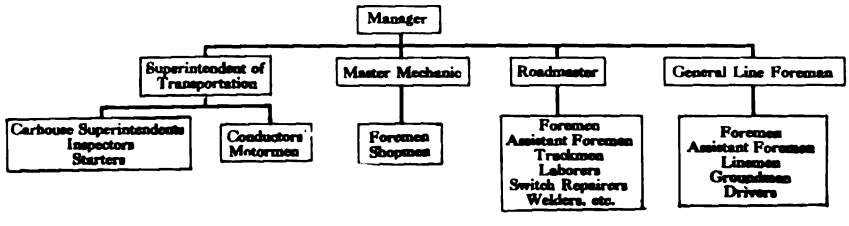
SEVERAL articles have recently appeared in this paper describing the use of graphs by the power and equipment department of the Connecticut Company for tabulating various data needed in that department. The use of graphs and charts, however, is not confined to the power and equipment department of the company. They are used extensively by all departments of the



General Organization Chart of Executive Force, Connecticut Company



Organization Chart of Transportation Department, Connecticut Company



At Left, Organization Chart for Maintenance Forces, Connecticut Company

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company and have been found most useful as a method of tabulating information and keeping it up to date. This makes the figures instantly available in a handy form, and permits of comparisons more readily than when pages of figures must be analyzed. The amount of information that can be put on a single sheet also is considerably more than can be given in figures.

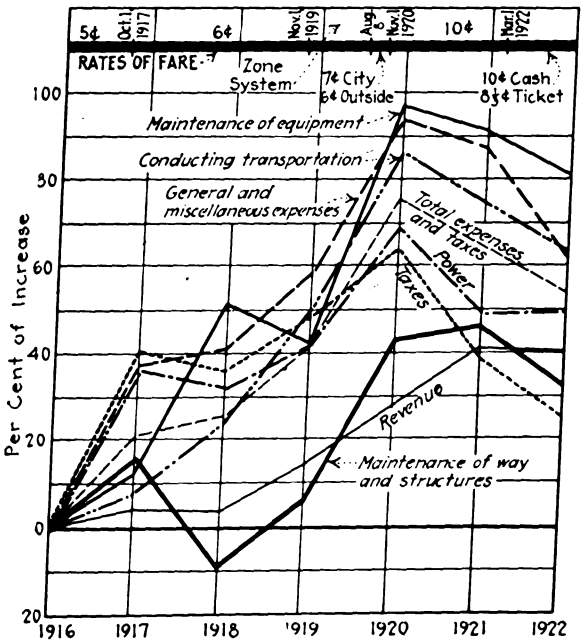
Charts Compiled for Company Executives

Charts are also used for outlining the organization of the company, as shown in the two charts reproduced herewith, one giving the general organization and one the detailed organization of the transportation department, under the direction of the vice-president and general manager.

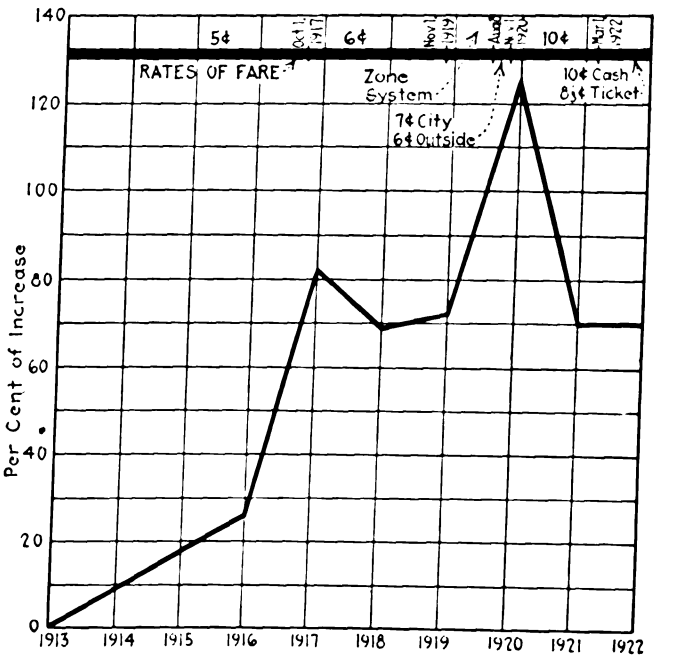
Four other charts are reproduced as typical of those compiled for the executives, and particularly for the transportation department. A feature of these charts is that the rates of fare for the various periods covered are indicated at the top of each chart.

These charts show respectively the percentage for each year; the percentage increase in operating costs over 1916; the percentage increase in cost of materials over 1913, as based on the principal material purchased by the company; the percentage increase in revenue and operating costs over 1916, and the amounts expended for payrolls and per cent of increase over the year 1916.

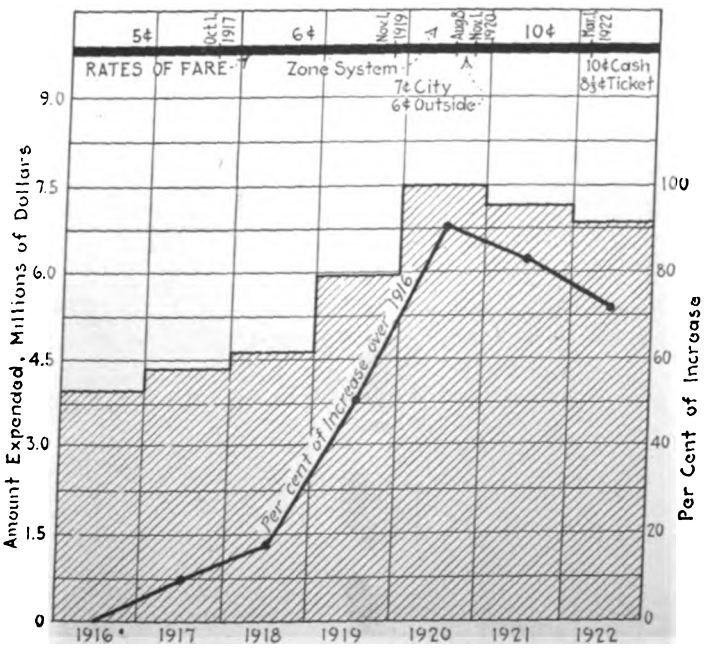
These charts are kept up to date under the direction of the construction engineer and copies are supplied to the various heads of departments and others interested. It gives them the facts, and these are often very useful in any question which may come up on the increased cost of operation in recent years.



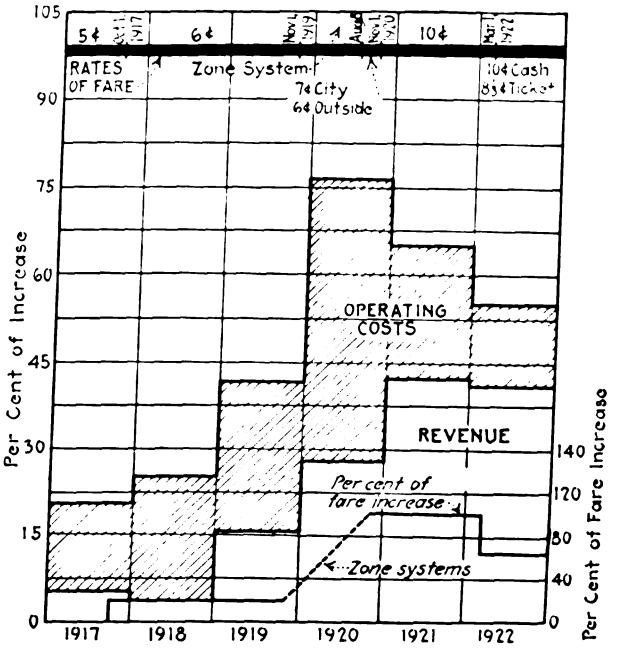
Per cent of increase in operating costs over 1916



Per cent of increase in cost of materials over 1913



Amount expended for payrolls and per cent of increase over 1916



Per cent of increase in revenue and operating costs over 1916

Typical Graphs of General Data Kept Up to Date by the Connecticut Company

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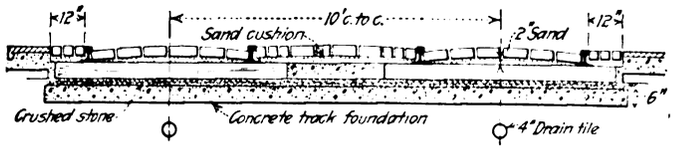
Derrick Removing the Old Rails and Ties Which Will Be Used Again for New Trackwork

Railway Does Better Paving than City

Replacement of Single Track by Double Track in Ft. Wayne Involves Novel Features of Removal and Reconstruction

OPPORTUNITY was afforded the Indiana Service Corporation to observe the effects of time and traffic on its standard paved track construction when it recently became necessary to replace the single-track line on South Calhoun Street, Fort Wayne, with a double-track line. While the surface of the pavement between the rails remained in perfect condition and served to indicate that the construction underneath had not broken down, the tearing up of the track verified the supposition.

The track construction, as is illustrated in the accompanying drawing, is of the wood tie type with a sub-slab of concrete and brick paving separated from the tie by a cushion of sand. Crushed-stone ballast is provided between the ties and the concrete slab, while a concrete mixture is used between the ties. Sawed cedar ties, 6 in. x 8 in. x 7 ft. long, placed at 24-in. centers, are used under the 7-in. 91-lb. plain girder rail. A 4-in. drain tile is placed under each track wherever needed.

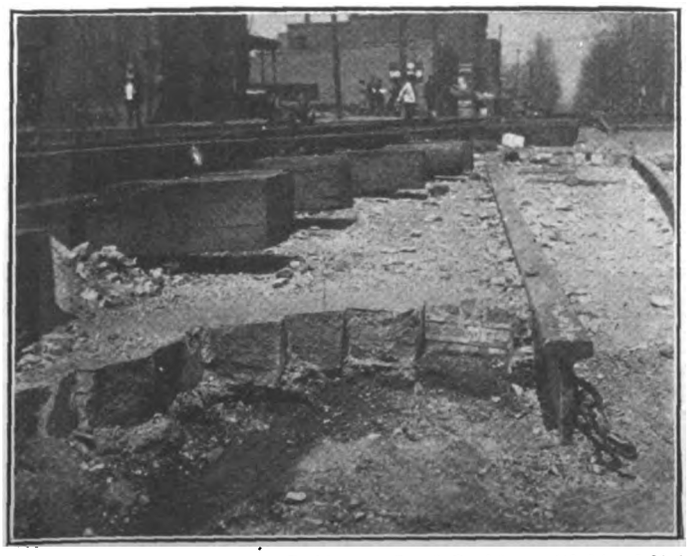


Detail of Track Construction

In the double tracking of this particular stretch of Calhoun Street it was, of course, necessary to remove the pavement on each side of the single track and extend the single-track concrete slab to two-track width. As is shown in an accompanying photograph, a derrick was used to remove the single-track ties and concrete between the ties. A temporary track was laid along one side of the street in order that service might be maintained during the reconstruction period. The rails of the old single-track lines will be moved over and used for one track of the new double-track line. After nine years of service, the ties were still in such excellent condition that they also will be used in the new track construction.

Some idea of the service this particular stretch of track has given may be obtained from the following:

Total interurban cars (two daily freight, twenty-four daily passenger), at 35 tons each	910 tons
Total city cars, 534 daily at 10 tons each	5,340 tons
Total weight	6,250 tons daily
Average weight per wheel	2.7 tons
Number wheels per joint	586 per day
Total tons per joint	1,582.8 per day



Left—Brick Paving Is Laid on a Sand Cushion. Right—Adjoining Pavement Has Worn Less Well than that Laid by Railway

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Although the track was not designed for the heavy vehicular traffic coming in and out of the city, which amounts to about 4,000 automobiles and trucks per day, it has stood up well under these conditions. Some comparison between the pavement laid by the railway and that adjoining it may be obtained from an accompanying illustration, which shows one of many holes at the side. Both pavements were laid at the same time. Although the original construction of the track employed cast-weld joints which have stood up well under the service, all new construction is being made with Thermit weld process.

The total cost of such construction, including the temporary track for operation of the regular schedule during construction, amounted to $6.66 per foot in 1914, at the time that the original construction was made, and it would be $10.98 per foot if reconstructed today. During the nine years that this track has been in service no money has been spent upon it for maintenance or repairs whatsoever.

Modern Cars Double Net Revenue

A Year of Operation of 12½-Ton One-Man Interurban Cars by the Kentucky Traction & Terminal Company Demonstrates Their Economy and Merchandising Ability—They Early and Apparently Permanently Eliminated Destructive Bus Competition

LEXINGTON, KY., is the center of the interurban railway system of the Kentucky Traction & Terminal Company, radiating to Frankfort, Georgetown, Paris and Nicholasville. See map on page 210 of the Aug. 11 issue. The interurban business of the company is about equal to that which it does in Lexington, the only city in which it furnishes local service on a considerable scale.

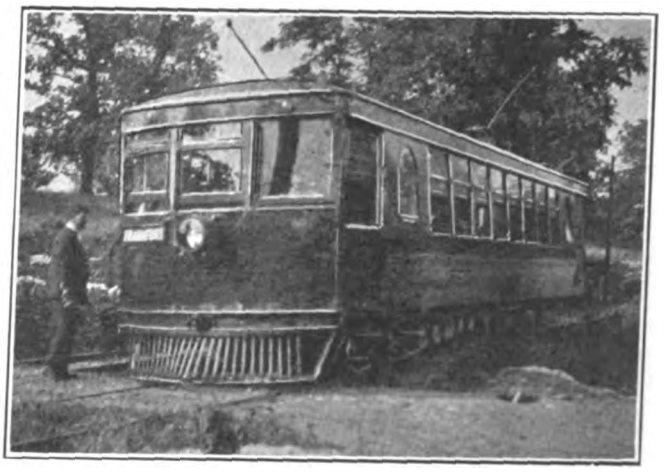
Previous to February, 1922, the company operated, on the interurban lines, ten cars weighing about 38 tons each. These cars were known to be too heavy, and both the railway and the railroad commission were planning for improvement in operating conditions when the matter was brought to a head by the development of bus competition which threatened to absorb all the business. On one line the buses got as high as 60 per cent of the traffic. Radical action was necessary.

Study of what had been done elsewhere and conference with manufacturers indicated that a one-man car could be designed to weigh only about a third of the weight of the heavy cars, and ten of these cars were ordered. The number has since been increased to twelve.

These interurban cars, of which the details were given in the issues of this paper for April 29, 1922, page 736; June 3, 1922, page 893, and Oct. 7, 1922, page 561, weigh completely equipped 25,100 lb. They are equipped with four GE-264 motors, 26-in. steel wheels and K-35 control. They were designed with a view to attractiveness and comfort as well as lightness, and were put into service on a headway reduced one-third, i.e., from one and one-half hours to one hour. Just previous to the date when the new cars went into commission a reduced fare was put into effect, and special concessions were made to induce patrons to purchase tickets. These features were well advertised in advance.

The result of the inauguration of the new service was almost immediately to eliminate bus competition. The new cars reduced the power consumption by 50 per cent on the interurban lines and 15 per cent on the city and interurban lines together. The maximum demand on the power house was reduced about 600 kw. The energy consumption per car-mile on the interurban cars was reduced from 4.8 kw.-hr. to 2.3 kw.-hr. Various other savings were evident from the start.

The cars have now been in use more than a year, so that it is possible to give comparative results over a period long enough to show the accuracy or otherwise of the first estimates. The over-all results of the reduction in weight of the cars used on the interurban lines, the operation of these cars by one man, the improvement in service with consequent elimination of competition, together with minor economies, are as follows: First and most important, the net revenue, or difference between gross revenue and operating expense, for the fiscal year ended March 31, 1923, as compared with the preceding year, increased 102.4 per cent. This is the composite result of a 12.7 per cent increase in operating revenues and a 13.2 per cent decrease in operating expenses.



The 25,100-Lb. Interurban Car Which Has Brought Results in Kentucky

Where the Savings Were Made

The principal savings in operating expenses were in the following items: (1) Power cost, which, due to an 18.1 per cent reduction in total energy consumption, decreased 16 per cent, in spite of a large increase in the price of coal, the kilowatt-hours per car-mile being 40.7 per cent less and per car-hour 40.4 per cent less; (2) equipment maintenance, 35.8 per cent; (3) track maintenance, 34.3 per cent.

The car-miles were 38.4 per cent, and the car-hours 37.4 per cent greater, so that the cost of conducting transportation was not greatly reduced. It actually

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was 7 per cent less. The number of passengers per car-mile was 5.2 per cent and the revenue per car-mile 18.6 per cent less, but much more than offsetting this was a reduction in expense of 37 per cent. The schedule speed of the cars remained about the same, i.e., 19.9 m.p.h. as compared with 19.7 m.p.h.

There were also certain operating savings which were beneficial in several directions. For example, the number of late trains was reduced 64.2 per cent, and the time thus lost 53.1 per cent. The number of cars put out to replace bad-order cars was 30.7 per cent less, and the corresponding cost 53 per cent less. Although less definite as to connection with the operation of the new cars, the fact that 58.8 per cent fewer ties had to be replaced is an indication

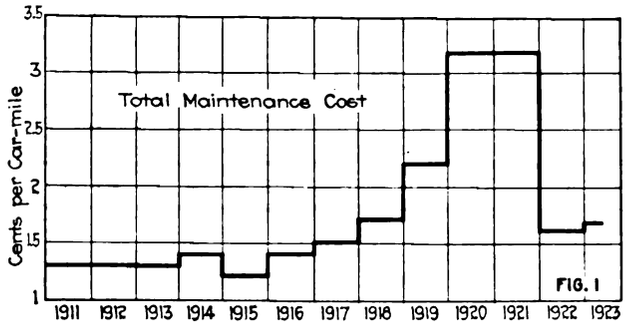
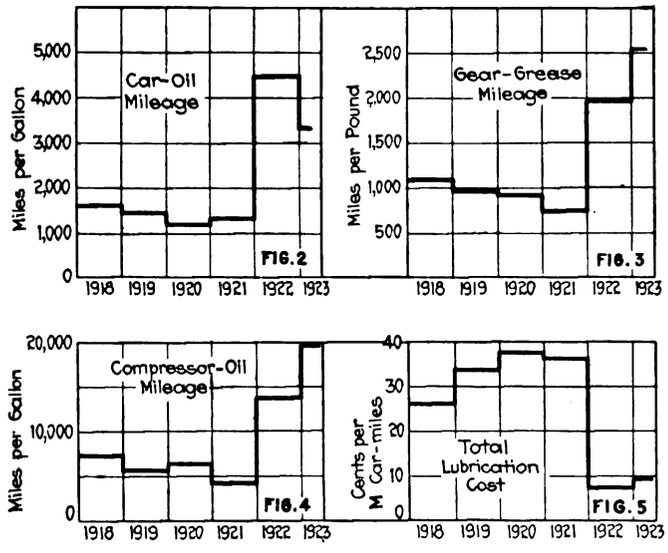


Fig. 1—Interurban Car Maintenance Costs, Kentucky Traction & Terminal Company



Figs. 2 to 5—Lubrication Data for Interurban Cars

of track maintenance savings. Tie replacements were made with an increased spacing; instead of being on 2-ft. centers, the new ties are spaced from 2 ft. 6 in. with 60-lb. rail to 2 ft. 9 in. with 70-lb. and 3 ft. with 80-lb. rail.

Reference was made earlier to the fare situation on the interurban lines. For comparison with the present fares it will be of interest to note that the fare has been modified from time to time as follows: Prior to June 6, 1914, it was 2 cents per mile, but was increased on that date to 2½ cents, except that a mileage-book rate of 2 cents was retained. Four years later both cash and mileage rates were raised to 3 cents, and on Aug. 26, 1920, they went to 3.6 cents, the standard steam railroad rate throughout the country. This was the maximum. On Dec. 1, 1921, the cash fare came down to the present rate, 3.25 cents, and the mileage rate to 3 cents. The following table shows the relative numbers of passengers paying cash, purchasing tickets and using mileage books:

PERCENTAGE OF TOTAL PASSENGERS

Year	Paying Cash	Purchasing Tickets	Using Mileage Books
1914	85.1	6.4	8.5
1915	76.7	10.3	13.0
1916	77.1	12.7	10.2
1917	77.0	12.2	10.8
1918	73.6	17.3	9.1
1919	86.3	10.8	2.9
1920	85.7	12.0	2.3
1921	85.7	11.8	2.5
1922	63.5	36.0	0.5
1923	51.5	48.5	—

It is early yet to draw definite conclusions on the maintenance costs of the new cars as compared with the old. The company has not kept records separately for the interurban cars. From the year 1912 to February, 1922, when the light-weight cars replaced the heavy interurban cars, the maintenance records cover six double-truck interurban cars weighing 72,800 lb. each and nine averaging 52,750 lb.; twenty-seven single-truck city cars weighing 26,350 lb. each and twelve averaging 19,000 lb. each; four freight cars weighing from 40,000 lb. to 70,000 lb.; and two work cars weighing 35,500 lb. each. In February, 1922, delivery on the ten new light-weight cars was begun and in March all the old interurban cars had been replaced, except for extra runs.

The effect of substituting the new cars is shown in Fig. 1. The total cost of car maintenance per car-mile has been reduced materially, and it now is not far from the cost of maintaining the heavy cars ten years ago. The figure for April was 1.3 cents per car-mile. The lubrication results as shown in Figs. 2 to 5 are as would be expected.

Shop Cost and Other Data for Ten Cars of the New Type

It will be of interest to note some facts regarding the new interurban cars from Feb. 1, 1922, to date, although of course the maintenance costs on these cars have not as yet settled down to a steady value. During the eleven months the ten cars made 945,374 miles. The average of car-miles per month was then 67,526, or 6,752 per car per month. This gives an average of more than 225 miles per car per day.

During the period twenty-four sets of wheels were changed for turning, these wheels having made a mileage of 1,878,279. The average mileage per set of wheels changed was, therefore, 78,279.

As to power consumption the average kilowatt-hours per car-mile can be estimated at 1.34. This was determined from actual energy measurements on one car from May to December, 1922, inclusive. During this time the car made 47,498 car-miles, and consumed 63,837 kw.-hr.

In ordinary routine maintenance on the cars, the expenditure was $2,655 for labor, and $1,005 for material, a total of $3,660. This is an average of 0.387 cent per car-mile.

Eight of the cars were overhauled at a cost of $788 for labor, and $169 for material, a total of $957. This is 0.1 cent per car-mile, calculating from the mileage made by ten cars. The overhauling included painting the eight cars at a cost of $658 for labor and $135 for material, a total of $793, or, more exactly, $99.14 per car.

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Freight Accounting on the North Shore

By Sectionalizing of Agents' Accounts and Proving to a Known Total, a Complete Daily Check Is Obtained—An Illustration Shows Methods of Accumulating Totals

By T. B. MacRae
General Auditor Chicago, North Shore & Milwaukee Railroad

WHILE the foundation of the system of daily freight accounts in use on the Chicago, North Shore & Milwaukee Railroad rests on the two general principles of sectionalizing the agents' accounts and proving to a known total, it differs in the method of accumulating totals and in handling the "prepaid received" through the agents' cash books. So far as the writer knows, these two methods are not in use on any other road.

The North Shore line, in its freight department, does principally a merchandise dispatch business, which is akin to that of the American Railway Express, with the absence of pick-up and delivery, but which in its accounting features is similar to the handling of freight on a steam road. The term "freight" used in this article should be understood simply as a convenient term for reference.

On the daily balance reports, no provision is made for ticket accounting, as our freight agents do not handle tickets. Should it be desirable, on some other road, to do this, it would be necessary to provide proper accounts on this and other record forms, so that one report could cover both.

The receiving agent is held solely responsible for the correctness of every item that appears on the waybill. He is required to correct any error that may be discovered in weight, rates, extensions or footings. No correction is sent to the local forwarding agent. The receiving agent, however, is not permitted to change any amount that appears in the "Prepaid" or "Advance Charges" columns of such a waybill, corrections affecting either being made by "P.P.O." (prepaid only) waybill issued either by the receiving or forwarding agent, as the correction may require. On the waybills, the corrections are made by the auditor after the "received abstract" and original waybills have been sent to him. Such corrections may be made by the agent and sent to the auditor for acceptance, but generally they are issued direct from the auditor's office.

Standard Forms Adopted

The standard forms recommended by the (steam) Railway Accounting Officers' Association were adopted for our "Received Abstract" and "Forwarded Abstract," with certain changes to conform to our local and accounting requirements. These forms are uniform in size. We purchase them blocked in pads, as we have found this more satisfactory to the agents than loose leaves. Both the agent's and auditor's copy are filed temporarily in loose-leaf binders, later being bound permanently by McBee binders.

The "Received Abstract" (form 271) is white in color, and is made out in duplicate by the agent. The column at the right, on the auditor's copy, headed "Company Material," is for the auditor's use only, the same column on the agent's copy being headed "Date Paid." On this form are entered all waybills in station and numerical order. Each sheet is footed separately, the totals being recapitulated on the last sheet and a grand total made. Debit corrections on waybills are added to, and credit corrections deducted from, such final totals. In all cases, corrections on waybills are handled by entering the correct amount in black ink and the amount which was corrected in red ink. The red ink figures take out of the agents' accounts automatically the amount originally charged, and the black ink figures include the correct amount. The records then will show the correct amount paid by the consignee without reference to corrections. The accumulated totals thus will always add to the amount to which they would have footed had the error not been made. Clerical errors in the abstract that are discovered and corrected by the auditor are adjusted by the agent, by changing the abstract and handling the error through the last accumulated totals. This may be done if several days have elapsed.

Agents must take a "Debit Waybill" correction into account within a day or two after its receipt, or else return it to the auditor with reasons for non-acceptance. The original freight bill must be returned with the correction, when taken into account, or a waiver must be secured from the consignee, on the correction sheet, if a freight bill has been paid and the original cannot be secured. If the freight bill has not been paid, agents are permitted to take a credit correction into account, returning the original freight bill with the correction. A "Credit Correction" cannot be taken into account, if the freight bill has been paid, until a refund is made, the original freight bill taken up or the waiver secured. If the refund cannot be made, the "Credit Correction" must be returned to the auditor with a full explanation, such corrections being handled through the general books without reference to the agent's account. All corrections accepted are attached to the original waybills in the auditor's office. In case an agent returns a credit correction, due to the inability to make a refund, proper notation is made on the original waybill to adjusting entry.

Interline waybills are abstracted in a similar manner, and the totals, after waybill corrections are handled, are carried to a summary sheet, and the final total for the day established.

The totals for the period are accumulated on the agent's copy. On the first day of the month there is no accumulation, the totals for the first day being listed below the totals for the second day, and the accumulated total for the two days obtained. The totals for the third day are added, giving an accumulation which is continued day by day, until the end of the month.

"Forwarded Abstract"

The "Forwarded Abstract" (form 273) is pink, also being made out in duplicate by the agent. The auditor

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FORM 271 100 pads 3-23 21868

CHICAGO NORTH SHORE AND MILWAUKEE R. R.

Original Auditor's Copy

DAILY RECORD OF WAY-BILLS FOR MERCHANDISE DESPATCH RECEIVED

Sheet No. ____

PRO NO.	WAY-BILL DATE	WAY-BILL NUMBER	CAR INITIALS	CAR NUMBER	CONSIGNEE	FROM	COMMODITY	WEIGHT	Debit Merchandise Despatch Charges: Line Charges	Advances	TOTAL	CREDIT PREPAID	COMPANY MATERIAL
					Day's Totals				350.00	75.00	425.00	130.00	
					Previous Accumulated				650.00	325.00	975.00	170.00	
1					TOTAL-	"			1000.00	400.00	1400.00	300.00	

FORM 269 50 books 3-22 18195

CHICAGO NORTH SHORE AND MILWAUKEE R. R.

Daily Cash Collected at ..... Station ..... 192 ...

Date	Pro. No.	W.-B No.	Check No.	Uncollected Previous Mo.	DEBITS: Freight Charges	Prepaid Forwarded	War Tax	Miscellaneous	TOTAL	CREDITS: Advance Forwarded	Prepaid Received	Miscellaneous	REMITTED: Co. Material	Cash	TOTAL
	Day's Totals			10.00	200.00	25.00		15.00	325.00	70.00	130.00			100.00	300.00
	Previous Accumulated			165.00	800.00	125.00		85.00		180.00	140.00	30.00	50.00	700.00	
2	TOTAL		"	175.00	1000.00	150.00		100.00	1425.00	250.00	270.00	30.00	50.00	800.00	1400.00

Form 268 3M 3-22 BPCo 24544

CHICAGO NORTH SHORE AND MILWAUKEE R. R.

AGENT'S DAILY MERCHANDISE DESPATCH BALANCE REPORT

	DEBIT			CREDIT	
1	Debit from Last Report	1,423.00	18	Credit from Last Report	1,150.00
2	Line Charges	300.00	19	Local Prepaid Received	100.00
3	Local Advances Received	50.00	20	Foreign Prepaid Received	30.00
4	Foreign Freight Received	50.00	21	Advances Forwarded	100.00
5	Foreign Advances Received	25.00	22	Relief Claims	
6	Prepaid Forwarded	50.00	23	Special Credit	
7	War Tax		24	Remittance, Co. Material Received	
8	Switching	10.00	25	Remittance, Cash	100.00
9	Demurrage	5.00	26		
10	Storage	2.00	27		
11	Agents Drafts		28		
12	Miscellaneous	5.00	29	Total Credit to Next Report	1,480.00
13	Special Debit		30	Due from Connecting Roads	20.00
14	Total Debit to Next Report	1,920.00	31	Uncollected, Old	25.00
15	Due to Connecting Roads Advances	50.00	32	Uncollected, Current	450.00
16	Due to Connecting Roads Pr'p'd Received	30.00	33	Cash on Hand	25.00
17	TOTAL	2,000.00	34	TOTAL	2,000.00

3 ____ STATION ____ 192 ____ AGENT

Most of the Forms Are Loose-Leaf

No. 1.—Received Abstract (white).

No. 2.—Agent's Cash Account (bound book).

Memo.—As day's debit totals cross-foot to $250, the difference between this sum and amount in total column, $325, or $75, must be cash at beginning. The difference between the sum of all debit and credit items of "previous accumulated" is likewise $75. As day's credit totals cross-foot to $300, cash on hand must be $25, which is also difference between "total accumulated" debits and credits.

No. 3.—Daily Balance Report (white).

No. 4.—Abstract of Miscellaneous Charges (buff).

No. 5—Forwarded Abstract (pink).

Form 270 5M 9-22 BPCo 24622

CHICAGO NORTH SHORE AND MILWAUKEE R. R.

ABSTRACT OF MISCELLANEOUS CHARGES

No. ____

DATE	No.	CAR INITIALS	CAR NUMBER	FROM	TO	WEIGHT	SWITCHING	DEMURRAGE	STORAGE	AGENTS' DRAFTS	MISCELLANEOUS	TOTAL	DATE PAID
					Day's Totals		10.00	5.00	2.00		5.00	22.00	
					Previous Accumulated		40.00	15.00	8.00	25.00	10.00	98.00	
4					TOTAL	"	50.00	20.00	10.00	25.00	15.00	120.00	

CHICAGO NORTH SHORE AND MILWAUKEE RAILROAD

DAILY ABSTRACT OF WAY-BILLS FOR MERCHANDISE DESPATCH FORWARDED

Form 273 Revised 3M auto 13 22 ...

ORIGINAL—Auditor's Copy

WAY-BILL Date	WAY-BILL Number	CAR Initials	CAR Number	CONSIGNEE	DESTINATION	CONSIGNOR	Commodity	WEIGHT	Line Charges	ADVANCES	TOTAL PREPAID	DATE PAID
					Day's Totals				200.00	100.00	50.00	
					Previous Accumulated				800.00	200.00	150.00	
					TOTAL-	"			1000.00	300.00	200.00	
5												

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uses the column "Date Paid" to stamp the date the waybill is reported by the receiving agent, or the month it is taken into the interline account. Waybills are abstracted in numerical order without regard to local or interline billing. The totals are recapitulated and accumulated, and clerical errors are corrected, in a manner similar to that already described for the "Received Abstract." No waybill corrections are issued for forwarded billing, but certain precautions are taken to prevent the agent from making the same error continually. The agent must send to the auditor receipts for "Prepaid Beyond" and "Advance Charges Paid." The forwarding agent is responsible for the amounts entered in the "Prepaid" and "Advance Charges" columns, the waybills being checked carefully in the auditor's office against such items. Any errors discovered are considered clerical errors. If in the "Prepaid" or "Advances Forwarded" columns, due to error in rates, etc., they are corrected by "P. P. O." waybills exchanged between the receiving and the forwarding agents.

If the forwarding agent discovers an undercharge in the total of a "Prepaid Beyond" waybill, he issues a P. P. O. without consulting the receiving agent. This is done in order to protect the connecting road as promptly as possible. If the agent of the connecting road files a claim with our junction agent for undercharge, he is permitted likewise to issue an "A. C. O." (advance charge only) waybill. This is practically the only use permitted of an "A. C. O."

The "Abstract of Miscellaneous Charges" (form 270) is slightly smaller than the two preceding forms, and is straw color. It is used to report all charges not provided for by the "received abstract" and the "forwarded abstract." Totals are accumulated and clerical errors are handled in a manner similar to that described. Waybill corrections are issued for switching and demurrage. The column "Date Paid" is not used in the auditor's office except for an occasional memorandum. In addition to the specific items called for on this report, agents are required to keep a station record on this form for "Special Debit."

At the close of the month's business the agent lists on the "Received Abstract" all items of every kind he has taken into account during the month and which remain unpaid as of the last day of the month. This statement becomes the agent's "Report of Uncollected" and it must be signed by the agent personally. No other form of monthly freight report is required. The agent makes the proper notation on abstract affected and his monthly accounts are closed. When the items listed on the abstract are paid later, they are stamped off on this form and not on the original record.

The "Daily Balance Report" (form 268) includes debits and credits provided for by daily abstracts and such additional items as enter into the agent's accounts. This is the small loose-leaf form, which is 9 in. x 6½ in. over all. "Special Debit" and "Special Credit" are unusual items charged or credited by the auditor. Credit is taken for "Relief Claims" when claims of this nature have been allowed. These three items are entered in the miscellaneous columns of the cash book the same day they appear on the balance report. Credit is taken on the report for freight charges on company material when the material is delivered and a receipt obtained on the freight bill. Such freight bills are forwarded to the auditor with the balance report. The "Total Prepaid" on a "Prepaid Beyond" waybill is carried as "Due to Connecting Road's Prepaid Received" until settlement is made. Against this the total debit of such a waybill is carried as "Due from Connecting Roads."

Accounts Kept by the Auditor

The auditor keeps an account in his office with each agent on a loose-leaf ledger with twenty-two columns, covering debit items on "Balance Report" (form 268) numbers 2 to 13, and a total debit; credit items numbers 19 to 25, an additional column for cash in transit and a total credit. This form is ruled horizontally with thirty-four lines, one for each day of the month, a balance line at the top and one at the bottom, and a line for total footings. The items on the various abstracts are entered on this ledger after such abstracts have been verified. Debit item 13 and credit items 22 to 24 are not entered until their correctness has been established. Credit for cash remitted is made when the amount appears on the treasurer's report of cash received. When all the entries are posted the various columns are footed and cross-footed, totals of vertical columns being put in with a lead pencil. The total debit to the date on the ledger must agree with "Total Debit to Next Report," line 14 of the balance report. The same is true for the credit side.

The grand total of the various columns for all agents' accounts are recapitulated at the end of the month, and all figures are available for journal entry. Amounts covering interline accounts (debit items 4 and 5 and credit item 20) are transferred to a clearing account pending adjustment. The recapitulation of the totals of the various interline "Received Abstracts" must agree with items so transferred. "Prepaid Forwarded" is credited, and "Prepaid Received" is charged to a suspense account. "Prepaid Forwarded" on interline billing is charged to this account from interline abstracts received from the connecting roads. The balance of such account, when the books are closed, represents the sum of the prepaid on "Unreported Prepaid" waybills, both local and interline. This account is analyzed and balanced each month. "Advance Charges Forwarded" are handled in a similar manner.

The agent's cash account is kept in a bound book, 17 in. x 13 in. (form 269). In the column "Uncollected Previous Month" are entered all items shown on the abstract for the first day of the month as uncollected. In the column "Freight Charges" are entered items charged in the "Total" column of the "Received Abstract." The cash book must be balanced daily and ruled off. The account is opened by entering the cash on hand for the previous day in the "Total" debit column. Receipts and disbursements are entered in detail in the proper columns, and also in the total column, either in detail, or with totals only, as the agent may prefer. "Prepaid Received" items as given in the abstract are entered in detail in the column "Freight Charges" and contra entries in the column "Prepaid Received." We have found from experience that this produces better results when entering prepaid items in the total. Credit is taken on the debit side of the cash book in red ink for refunds made on credit waybill corrections.

When all the entries for the day are in, the various columns are footed and the balance of cash on hand is entered in the "Total" column on the credit side. The totals appearing in the debit and credit "Total" columns must agree, of course. The totals of each column, excluding "Total," are first accumulated and then the last accumulation is cross-footed. Unless all cash has been remitted, which must be done for the last day of the

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month, the accumulated amount now appearing in the debit and credit "Total" columns *will not agree*, the difference being cash on hand.

Principles for Proving to a Known Total

It will be noted that the agent's debit accounts have been sectionalized by the use of three abstracts, and the credit accounts by two abstracts and three columns in the cash book. Proving to a known total is based on the following principles, three of which we believe will find common acceptance, and one which perhaps is debatable:

1. If to the debit of the station on the first of the month, there are added all debits for any period, the sum must be total debit of station. The same must be true of credit side.
2. If to the uncollected freight on the first of the month there is added freight received collectible for any period, and from this sum is deducted freight collected during such period, the difference must be unpaid freight collectible to date. This principle must apply to all other debit and credit items.
3. If from total advances forwarded during any period, there are deducted the advances paid, the difference must be amount due connecting roads. To this sum must be added amount prepaid beyond, if any.
4. For our purpose, we define "freight received collectible" as the sum of local and advance charges, plus debit corrections, minus credit corrections. To determine freight received collectible, as above defined, separate columns must be provided in agent's records and general office records for debit and credit corrections, or debit corrections added to, and credit corrections deducted from freight received. This latter method of handling debit and credit corrections is common practice, though not for the reason stated.
5. As prepaid forwarded is charged by auditor to forwarding agent and credited (in theory) to receiving agent, it follows that receiving agent has cash credit with company represented by the prepaid on waybills to his station and, therefore, when such a waybill is received, he is authorized to take credit in his cash book for such amount and to charge himself back with the freight charges. If a consignee remits direct to the company (the United States government and municipalities often do this) the amount so received is credited direct to the agent by the auditor. As the agent has credit with the company for the amount, he charges himself with the freight charges and takes proper credit ("Special Credit"). There is no difference in principle between such a transaction and forwarding agent collecting freight charges in advance and remitting to company. The difference lies solely in the way the two transactions are handled through the books. In one case, the amount is credited to agent direct, and in the other to a suspense account pending adjustment of the agent's account.

Proving Correctness of the Agent's Balance

The correctness of the agent's balance report may be proved by totals, by accumulating the totals for each day's business, sectionalizing the agent's accounts, handling corrections by adding to or deducting from station debit, taking credit on the debit side of the cash book in red ink for refunds made and handling "Prepaid Received" through the cash book. The procedure is shown by the following illustration.

1. To debit from last report, $1,423 add: total, received abstract, $425; prepaid, forwarded abstract, $50; total, miscellaneous abstract, $22; the sum $1,920 is total debit to next report.
2. To uncollected on first of month (assumed) $200, add the following accumulated totals: total received abstract, $1,400; prepaid, forwarded abstract, $200; total, miscellaneous abstract, $120; the sum $1,920 again is total debit to next report.
3. Add accumulated totals, as below: prepaid, received abstract, $300; advances, forwarded abstract, $300; miscellaneous, $30, company material, $50, cash $800, cash book; the sum $1,480 is total credit to next report.
4. From accumulated total of advances, forwarded abstract, $300, deduct accumulated total of advances forwarded, cash book $250; the difference, $50, is amount due connecting roads' advances.
5. From accumulated total prepaid, received abstract, $300 deduct accumulated total of prepaid received, cash book, $270; the difference, $30, is amount due connecting roads' prepaid received. Contra, total of local and advances is entered on credit side as due from connecting roads.
6. From uncollected on first of month, $200, deduct accumulated total of uncollected previous month, cash book, $175; the difference, $25, is uncollected, old.
7. From accumulated total, received abstract, $1,400, deduct accumulated total of freight charges, cash book, $1,000; the difference $400, is unpaid freight received collectible; from accumulated total prepaid, forwarded abstract, $200, deduct accumulated total prepaid forwarded, cash book, $150; the difference, $50, is uncollected prepaid forwarded: from total, miscellaneous abstract, $120, deduct accumulated total of miscellaneous, cash book, $100; the difference, $20, is uncollected miscellaneous charges; from the sum of the three items as above, $470, deduct amount due from connecting roads, $20; the difference, $450 is uncollected current.
8. From accumulated debit total of cash book, $1,425, deduct accumulated credit, $1,400; the difference, $25, is cash on hand.
9. To accumulated debit total of cash book, $1,425, add all uncollected items on balance report, ($20, $25 and $450) $495; the sum, $1,920, is total debit to next report.
10. To accumulated credit total of cash book, $1,400, add total amounts due connecting roads, $80; the sum, $1,480 is total credit to next report.

It should be understood that our agents do not use all the above proofs every day, but they do use a sufficient number to prove correctness of the daily balance report. Every one of these proofs, however, is used by the traveling auditor when he is checking a station.

Work of the Traveling Auditor

This method of handling the daily station accounts makes it impossible for an agent to leave any kind of an error uncorrected, provided only he verifies his "Uncollected" by drawing off his open items on the three abstracts, and the "Uncollected Report." In tabulating his "Uncollected" he can determine which one of four divisions is out of balance, and the amount. The greatest difficulty the traveling auditor encounters in checking a station arises from the failure of an agent thus to prove his "Uncollected." We have agents, however, who rarely receive a balance report correction from the auditor.

It is extremely easy for a traveling auditor to check a station under the system as outlined. He usually is supplied by the auditor with the total amounts charged on the books for each column on the ledger to the last day the station account has been audited, or he can secure these figures by telephone. He compares such figures with the accumulated totals on the agent's records, and if they agree he has only to check the station to date. Aside from establishing the "Uncollected," the heaviest station on the road can be checked in two or three hours. In fact, practically the entire duty of the traveling auditor consists in checking the "Uncollected." He draws off on the "Received Abstract" form unpaid items from the three abstracts and report of "Uncollected," proving the correctness of the open items by methods 6 and 7. Both the original and duplicate are signed by the agent and the traveling auditor, and the original is sent to the auditor's office. The uncollected charges on freight delivered are verified by telephone, personal call or return postal cards. We also have adopted the policy of mailing such postal cards from the auditor's office for unpaid items on agent's monthly report of "Uncollected."

It readily will be seen that the proving by totals as above outlined can be obtained by any system of daily accounts if some method of accumulating totals is provided. The daily totals of each abstract, for example, could be recapitulated upon an abstract sheet and the totals kept up to date. Unless the "Prepaid Received" is handled through the agent's cash, the unpaid "Prepaid Beyond" cannot be proved by totals.

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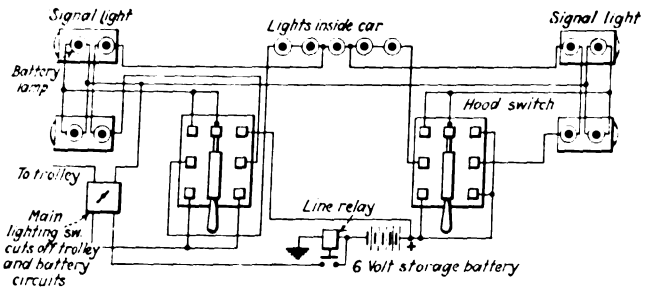
Electric Signal and Tail Lights for Cars

The Use of an Inside Shell, Fitted with Glass of Different Colors, Which Can Be Rotated Between the Lamps and the Lens, Permits a Variety of Indications to Be Given

THE USE of oil lamps on cars for tail lights and signal lights entails considerable labor and annoyance. They must be removed and reinstalled on the cars every day, and the labor of filling and trimming lamps is considerable. To replace oil lamps for this purpose the Lehigh Valley Transit Company, Allentown, Pa., is equipping all of its cars with electric signal and tail lights. Accompanying illustrations show the type of construction employed and the connections for the signal circuits.

For interurban cars four lights are used. These are located one at each corner of the car on the roof. Cars in suburban and city service have two lights, located at diagonally opposite corners of the car, on the front left-hand and rear right-hand sides. Brackets are provided for supporting these on the vestibule corner posts. The

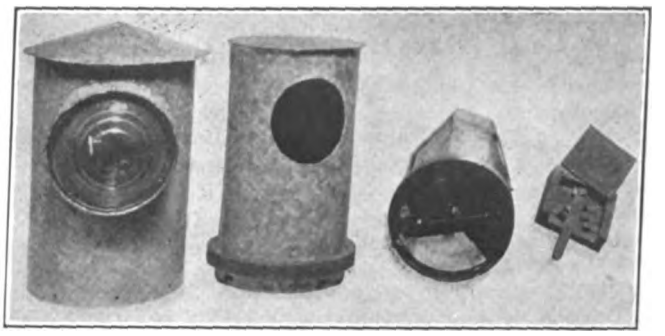


Wiring Diagram for Four Signal Lamps

Signal Lantern Installed on Roof of Interurban Car

lanterns, switches and wiring connections were designed and constructed by the railway company. There are four signal displays for each lamp. These are red, green, white, and a dark signal. Two lamps are installed in each signal, one being operated from the main lighting circuit at times when lights are required, and an emergency light operated from a battery circuit. This operates automatically in case the trolley pole should leave the wire, or the normal lighting circuit be interrupted for any cause. The lighting circuits are so arranged that whenever the signal lights are turned off the lighting circuit is completed through lights installed inside the cars. The diagram of connections shows how this is accomplished.

The lanterns consist essentially of three parts, an outside hood made of galvanized iron with a sloping



Details of Signal Lantern. The Parts as Arranged from Left to Right Are Outside Casing, Middle Unit, Inside Unit and Light Switch

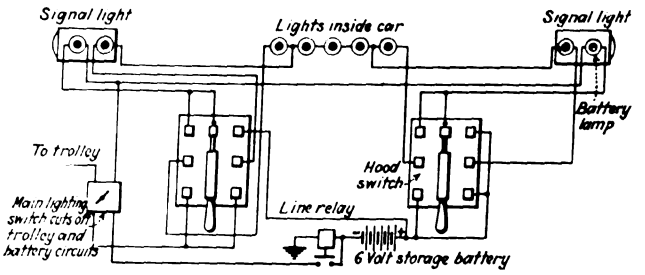


Diagram of Connections for Two Signal Lamps

roof protection and fitted with a clear glass lens. This outside portion on interurban cars is fitted to the outside of the roof, and the other parts installed from inside the vestibule. The second unit of the lamp construction consists of a cylindrical galvanized iron part which fits inside the outside portion. An iron ring is used as a spacing block and provides for riveting these two parts together. The second portion has a hole cut in it for the rays of light to reach the lens. The third unit of the construction has an upper part, which is hexagonal in shape. Three of these sides contain glass of red, green and white color. The lamps are installed inside this third unit, the battery lamp being located in front of the trolley voltage lamp. The base of this third unit is of heavy sheet iron and has four projecting screws for fastening to the second unit of the construction. When the inside unit is installed three screws fit into slots in the second unit and by turning to the right this unit is locked in the position. A bottom spring handle fits into a slot and locks in position when released. To unlock for rotating to change the signal color this handle is pulled down, which releases the lock, and the inside portion then can be rotated so as to change the color for the signal indication. In order that the operator may know readily what color is being displayed, without the necessity of looking outside, the bottom of this third unit is painted with three colors—red, green and white. By having the color desired toward the front end of the car, the operator is assured that the signal of proper color is displayed.

The switch for controlling the lights is of a two-directional type. When the handle is thrown to the left the

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lights are out and when it is thrown to the right the circuit is closed. The battery circuit is controlled through a line relay, so that whenever power is off the dropping of this line relay closes the circuit and automatically lights the battery lamps. Six-volt lamps are used in the battery circuit and 210-volt lamps in the main lighting circuit. Energy for the battery circuit is furnished by an Ohio Brass Company's 6-volt battery.

When Sickness Stops Wages, What?

Survey of 2,000 Group Insurance Beneficiaries Indicates 60 per Cent of Workers Furnish the Only Family Income—94 per Cent Receive No Income During Disability Other than Group Insurance

SOME startling information was developed in the survey recently completed by Dr. William B. Bailey, economist of the Travelers' Insurance Company, to determine the extent of the need for accident and sickness insurance in addition to that afforded by workmen's group insurance, carried by many industrial corporations, including some electric railways. It was found that 90 per cent of the disabilities among wage earners are caused by sickness or non-occupational accidents. The most common cause of absences due to disabilities are influenza, bronchitis, rheumatism, and tonsillar trouble. Of the applications for charity from families ordinarily self-supporting, 50 per cent are the result of sickness. Only one worker in twenty who has group accident and sickness insurance carries any other form of accident and sickness benefit. Twelve workers are the sole support of themselves and dependents to every eight who benefit from additional incomes earned by other wage earners in the family, or by room rent or board money paid to the family. There are nine wage earners without dependents to every eleven with dependents, each of the latter supporting an average of 2.2 other persons.

The average period of absence from work caused by disability is four weeks, and the beneficiaries of group accident and sickness insurance receive an average of $50.84, or at the rate of $12.58 a week for each disability.

In making the survey the company requested its adjusters to visit the homes of the beneficiaries of its group accident and sickness policies and obtain information covering the weekly wages of the worker, statistics regarding those dependent upon the weekly wages, statistics regarding those dependent upon him, and other similar information. This was continued until 2,000 questionnaires were completed. The study is based upon the tabulation of this material.

Amount of Benefits Paid

An analysis of the benefits paid the 2,000 workers showed that 46 per cent of the beneficiaries received under $30, while more than one-quarter received over $50, and about one-eighth received $100 or over. Out of these 2,000 workers 1,887, or 94 per cent, received no benefit except from their group insurance during their period of incapacity. The 113 with additional benefit received a total of $4,408, or an average of $39. If those insured are typical of the average industrial worker in this country, he receives as benefits during a sickness lasting more than a week a total of somewhat less than $2.50. It is quite likely, however, that in many cases when the workman came under group accident and sickness insurance, he gave up any other form of sickness insurance he may have carried. The additional benefit paid the few workers who carried other forms of insurance correspond closely to the amount received under the group insurance policies. It is interesting to note that of those who received less than $75 in benefit from group insurance only 4 per cent received any additional benefit, while of those receiving $75 and over from group insurance 12.9 per cent received additional benefit.

The average weekly indemnity received by the beneficiaries from their group insurance was $12.58. When one realized that in 94 per cent of the cases this was the only benefit received during the period of incapacity, it must have been a very welcome substitute for the earnings of the breadwinners.

TABLE I—WEEKLY WAGES OF BENEFICIARIES DISTRIBUTED ACCORDING TO ADDITIONAL FAMILY INCOME

Weekly Wages of Beneficiaries	Number	Per Cent	Receiving Additional Family Income: Per Cent in Each Wage Group	Receiving Additional Family Income: Average Weekly Additional Family Income
Under $15	352	17.6	64.3	$24.77
$15-19	513	25.7	50.1	27.60
20-24	347	17.3	33.7	27.96
25-29	331	16.6	32.0	30.38
30-34	260	13.0	30.0	26.81
35-39	93	4.6	22.6	23.33
$40 and over	104	5.2	15.4	26.72
$47,175	2,000	100	....	$23.59

Family Income

The income of the 2,000 families came from the wages of the insured together with additional income in some cases, derived principally from wages of other breadwinners and from roomers and boarders. The weekly wages of the beneficiaries are given in Table I.

TABLE II—ADDITIONAL INCOME IN FAMILIES OF BENEFICIARIES

Additional Weekly Income	Number	Per Cent
None	1,190	59.50
Under $10	13	0.65
$10-19	208	10.40
20-29	275	13.75
30-39	178	8.90
40-49	50	2.50
$50 and over	56	2.80
Unknown	30	1.50

The distribution of families with respect to weekly income in addition to wages of the beneficiaries is given in Table II.

Only 810 families enjoyed an income in addition to the wages of the insured, with the additional weekly income averaging $27.61 in these more fortunate cases. The other 60 per cent relied entirely upon the earnings of the insured for their support, and when it is taken into consideration that in 94 per cent of the cases there is no benefit received during incapacity, the problem of financing a protracted illness is not an easy one.

In the 1,190 families in which there was no income

TABLE III—DISTRIBUTION OF BENEFICIARIES ACCORDING TO NUMBER OF DEPENDENTS

Number of Dependents per Family	Number	Per Cent	Number of Dependents
0	886	44.30	...
1	493	24.65	493
2	268	13.40	536
3	162	8.1	486
4	88	4.4	352
5	42	2.1	210
6	26	1.3	156
7	24	1.2	168
8	7	0.35	56
9	3	0.15	27
11	1	0.05	11

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except the wages of the insured the average weekly wages were $22.83, while in the 810 families receiving additional income the wages were $24.70. There were 502 cases in which the additional income exceeded the weekly wages, but in only 11 of these families were the weekly wages of the beneficiaries more than $20.

Number of Dependents

In the 2,000 families there were 2,495 dependents, the distribution of whom is given in Table III.

Although in 886 cases there was no one dependent upon the wages of the insured, as the amount of weekly benefit from group insurance increased, so did the proportion of beneficiaries with dependents and the average number of dependents in the family. Those receiving benefit of less than $5 a week are without dependents in nearly three cases out of four, while of those enjoying a weekly benefit of $25 or over, more than three-quarters have dependents and the average number to the family is 2.5. This difference to a large measure is due to the fact that most of those earning small wages are young and unmarried.

TABLE IV—LENGTH OF DISABILITY

Period of Indemnity	Beneficiaries Number	Beneficiaries Per Cent
Under one week	243	12.15
One week—one week six days	544	27.20
Two weeks—two weeks six days	301	15.05
Three weeks—three weeks six days	196	9.8
Four weeks—four weeks six days	222	11.1
Five weeks—five weeks six days	119	5.95
Six weeks—six weeks six days	109	5.45
Seven weeks—seven weeks six days	64	3.2
Eight weeks—eight weeks six days	44	2.2
Nine weeks—nine weeks six days	25	1.25
Ten weeks—ten weeks six days	31	1.55
Eleven weeks—eleven weeks six days	19	0.95
Twelve weeks—twelve weeks six days	11	0.55
Thirteen weeks—twenty-six weeks	44	2.2
Twenty-seven weeks—fifty-two weeks	28	1.4

It might be expected that the family in which there are many dependents would enjoy the largest weekly income in addition to wages, but the investigation does not bear this out. The number of dependents has but little influence upon the additional weekly income of the family. The deviation from the average of $27.06 is remarkably small, the range being between $22 and $29.

Period of Indemnity

The distribution of the 2,000 beneficiaries according to the period during which they received payments is given in Table IV.

This table shows that the greater portion of the disabilities were short, nearly 40 per cent of them lasting less than two weeks. The average disability was almost exactly four weeks.

The eight leading causes of disability accounted for 1,299 cases, or 65 per cent of the total, as given in Table V.

TABLE V—CAUSES OF DISABILITY

Cause	Number of Cases	Duration of Disability
Influenza	579	2.4 weeks
Bronchitis	192	5.1 weeks
Rheumatism	147	5.1 weeks
Tonsillar trouble	101	2.5 weeks
Non-occupational accidents	96	4.0 weeks
Diseases of the skin and cellular tissue	78	4.1 weeks
Diseases of genito-urinary system (non-venereal)	53	5.5 weeks
Appendicitis	53	6.7 weeks

The largest cause of disability—influenza—accounted for more than a quarter of the total cases, but the duration of the sickness was comparatively short. On the other hand, the average period for which indemnity was paid for tuberculosis was about six months and for pneumonia somewhat over twelve weeks. In more than 10 per cent of the cases the disability continued for more than two months.

One-Man, Two-Man Cars for Hydro-Electric Railways

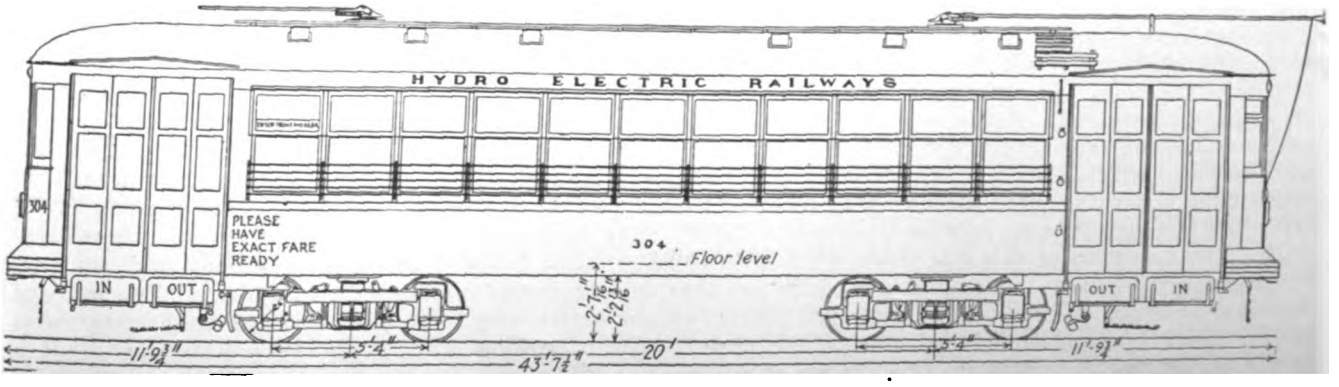
AN ORDER has recently been placed for four double-end, double-truck, one-man two-man safety cars for use by the Ontario Railway Department of the Hydro-Electric Railways. The cars will be of steel construction and of dimensions as shown in the accompanying illustration.

The roof will be built of tongued and grooved poplar $\frac{7}{16}$ in. thick, covered with No. 8 18-oz. canvas. The floor will be laid in two courses, the bottom one to be $\frac{7}{16}$-in. tongued and grooved white pine and the top to be of $\frac{13}{16}$-in. maple, grooved in the aisle to form a mat. Two layers of waterproof paper will be placed between the two floor courses. The floor will be ramped 1 in. in the aisle and 1 in. to both sides of the platform.

There will be two pairs of folding doors for each vestibule. Each pair of doors will be hung on ball-bearing shafts and will be joined with ball-bearing hinges. The doors will be operated independently by pneumatic door engines which are installed in pockets over the doors. The steps are arranged in two units and will operate in conjunction with the doors. A selector valve will control the operation. The doors will have 32-oz. plain glass in the upper panel, 32-oz. wired

PRINCIPAL DIMENSIONS AND WEIGHTS OF CARS

Length over all	43 ft. 7¾ in.
Length over car body	28 ft. 9 in.
Width over all	8 ft. 5 in.
Height from top of rail to top of roof	10 ft. ⅜ in.
Height from rail to top of floor in body	2 ft. 7 $\frac{7}{16}$ in.
Seat spacing	2 ft. 6 in.
Post spacing	2 ft. 6 in.
Truck centers	20 ft.
Approximate weight of car body	20,000 lb.
Approximate weight, control equipment	1,200 lb.
Approximate weight, air brake equipment	1,060 lb.
Approximate weight, motors, gears and cases	4,000 lb.
Approximate weight, trucks	10,000 lb.
Approximate total weight	36,260 lb.



Double-End, Double-Truck Safety Car Hydro-Electric Railways, Ontario

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glass in the center panel and the lower panel will be finished in cherry.

The interior finish of the car will be birch, the head lining will be Agasote covered with birch molding. The wainscoting below the seat rests will be of birch and above will be of Agasote. Curtains will be of Pantasote and all car trimmings will be of bronze.

The seating will consist of nine reversible transverse seats on each side of the car and two longitudinal seats, thus giving a total seating capacity of forty-four. The seats will be spring upholstered and covered with rattan. The car trucks will be the Taylor equalized type. The wheelbase is 5 ft. 4 in., and 26-in. diameter steel wheels will be used with 3¾x7-in. journals. The cars will be equipped with 4 G. E.-264 motors of 25 hp. each and the control equipment will be G. E. type K.

These cars are being built by the St. Louis Car Company, St. Louis, Mo., and will be operated in local series in Walkerville, Windsor and Sandwich, Ont. The intention of the management is to use these with two men during peak hour periods and for one-man operation at other times.

Telephoning Over Power Lines

Michigan Company Installs Wired Wireless to Connect Power Plant with Substations—Tests Made Indicate Value of Plan

THE high-frequency automatic telephone system just installed on the transmission lines of the Consumers Power Company of Michigan has been opened formally. The demonstration was in charge of B. E. Morrow and C. W. Tippy, officials of the company. The visitors, who held conversation with the load dispatcher and operators in a power plant 50 miles distant, marveled at the extreme clearness with which conversation could be conducted.

This system has just been installed by engineers of the Westinghouse Electric & Manufacturing Company. Only two sets are completed, these being located at Jackson and Battle Creek, Mich., while four other similar sets will be installed. In all there will be 600 miles of transmission line utilized for telephone service.

This installation is said to be a long step in advance of anything yet attempted with so-called "wired wireless." Previous installations have been but adaptations of the familiar radio broadcasting equipment providing only one-way communication.

In this system two frequencies are used, the dispatcher's set transmitting approximately 50,000 cycles and receiving 60,000 cycles, while the Battle Creek set transmits 60,000 cycles and receives 50,000 cycles. In effect, there are two transmitting sets and two receiving sets in service working through single telephone instruments, with the result that the service is duplex and both parties may talk and listen simultaneously.

To communicate with Battle Creek, the load dispatcher at Jackson has only to lift his telephone receiver from the hook, which automatically starts up the radio transmitting apparatus. The dispatcher then turns the dial on his instrument to the number assigned to Battle Creek. The operation of this dial sends out modulated high-frequency impulses which are picked up on the receiving antenna at the latter plant and cause a selector there to step around and stop at the proper point and, through the operation of a system of relays, ring a bell or sound a horn.

The Battle Creek operator unhooks his telephone receiver. This automatically starts up his transmitting radio set. The two voices pass each other, carried on different wave lengths, but all is tied into the two ordinary telephone instruments and controlled through them.

Operation of the system is so simple and so stable that it gives not the slightest hint of the months of study and experimentation that have taken place in the Westinghouse organization to combine the automatic telephone and radio elements for transmitting over power lines. Tests have shown that in event of line failure, the radio impulses jump the gaps and communication is not interrupted, even when several miles of the transmission line are down. This feature of the high-frequency telephone system gives it a marked advantage for load dispatching over the wire telephone system.

When the system is extended all the outlying substations will use the same transmitting and receiving frequencies or wave lengths as Battle Creek, so that the dispatcher will be able to talk with any station merely by dialing the proper call number on his desk phone. Outlying stations would not be able, under normal conditions, to talk with each other, but any substation operator, by dialing the number 10 on his phone, will automatically change his transmitting wave length so that, in action, his set then will operate just the same as the load dispatcher's set in Jackson and he can talk with any or all other stations. Another detail of the installation is the arrangement of extra selectors at the various substations through which the dispatcher, by dialing a general call number on his telephone, will ring all substations on the system and be able to transmit emergency orders simultaneously to all substation operators.

High-frequency current is generated by a 250-watt vacuum tube similar to those used in broadcasting stations, but instead of being broadcast through the air, it induces by electrostatic and electromagnetic induction corresponding high-frequency current in the adjacent power line. This high-frequency energy, superimposed upon the energy transmitted normally, is carried on the power line to the receiving station where, by induction, it is led into the receiving set, which is an ordinary long wave, coupled-circuit radio receiver, equipped with a detector and one-step amplifier. The largest broadcasting radio stations use transmitting sets of 500-watt capacity. The energy required to operate this telephone system is 250 watts, or just half the size, and larger than many of the other important broadcasting sets.

Picnic Cements Company Spirit

THE good relations existing between the East St. Louis & Suburban Railway and its employees were demonstrated on Monday, July 23, when the company gave an old fashioned basket picnic to all its employees. The outing was held at Jones Park, not far from East St. Louis. Special cars were run by the company to the park and transportation was free to anyone wearing the picnic badge. All park concessions were similarly free of charge to those wearing badges. The success of the outing may be judged from the enthusiastic reception of President W. H. Sawyer's statement, "This is our first picnic, but it will not be our last one." There was practically 100 per cent attendance of all employees.

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American Association News

Executive Committee

FOR its regular meeting on Aug. 24, the executive committee of the American Association met on board the yacht *Florida* as the guests of Barron G. Collier, and enjoyed a trip up the Hudson River and back. Committee members present were President C. D. Emmons, Britton I. Budd, Robert I. Todd, F. R. Coates, C. E. Morgan, J. N. Shannahan, W. H. Sawyer, C. L. Henry, R. P. Stevens, L. C. Datz, Wallace Muir, Barron G. Collier, J. G. Barry, H. D. Shute, A. A. Hale, G. M. Haskell representing S. M. Curwen, and Secretary J. W. Welsh. J. P. Barnes and E. C. Faber also made this trip.

Brief reports of standing and special committees were heard, including that of the nominating committee whose report was confirmed by the executive committee. The nominees, which included Britton I. Budd for president, were announced in last week's issue of this paper. The membership committee reported two new railway members and nineteen new manufacturer members whose applications were approved.

F. C. J. Dell reported for the exhibit committee that on Aug. 24, 67,744 sq.ft. of exhibit space had been sold, of which 81 per cent had been paid for. This space sold compares with 62,219 sq.ft. total sold in 1919, 51,928 in 1920 and 62,095 in 1922.

The executive committee approved an amendment to the constitution which will come up for vote at the October convention. This provides that the action of a meeting at which there is not a quorum present may become official and binding if ratified by the next succeeding meeting at which a quorum is present.

Secretary Welsh reported that a beautiful wreath of flowers had been placed in the rotunda of the Capitol at Washington for President Harding's funeral, in the name of the Association.

The American Museum Association had requested co-operation of the railway association in establishing museums in every city. The executive committee approved and suggested that the company in each locality work with the Museum Association in supplying exhibit material.

A request from the Society of Automotive Engineers for the privilege to discuss at the convention the report of the T. & T. Association committee on trackless transportation was approved with the understanding that the discussion will be a prepared paper which will have the approval of the S. A. E. executive committee and will be passed upon by the executive committee of the American Electric Railway Traffic & Transportation Association. The society expressed its desire to co-operate with the railway association.

The next meeting of the committee will be held at 10 a.m. on Oct. 8, at the Marlborough-Blenheim Hotel, Atlantic City.

Valuation Committee

A MEETING of the valuation committee of the American Association was held in New York on Aug. 23. The draft of the committee's report to be submitted at the annual meeting was considered. Several changes were proposed and were incorporated in the report. With these amendments the report was approved for printing and distribution to the membership.

Those present were J. P. Barnes, chairman; W. H. Maltbie, W. B. Tuttle, Frank Silliman, Jr., A. S. Richey, A. B. Bennett representing A. T. Perkins, E. J. Bechtel, W. H. Sawyer, L. R. Nash and E. J. Murphy.

Programs of the American and Affiliated Associations

Dates: Monday, Oct. 8, to Friday, Oct. 12
Place: Young's Million Dollar Pier, Atlantic City, N. J.

Registration Headquarters on the Pier will be open on Sunday, Oct. 7

American Association

Monday Morning, Oct. 8

9:30 A.M. to 12:30 P.M.

Registration.

Tuesday Morning, Oct. 9

10:00 A.M. to 1 P.M.

Address of the President.
Report of the Executive Committee.
Report of the Executive Secretary.
Report of the Treasurer.
Appointment of the Committee on Resolutions.
Reports of Committees:
- Finance—J. H. PARDEE, president The J. G. White Management Corporation, New York, N. Y., chairman.
- Policy—B. I. BUDD, president The Metropolitan West Side Elevated Railway and the Chicago, North Shore & Milwaukee Railroad, Chicago, Ill., chairman.
- National Relations—C. L. HENRY, president Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., chairman.
- Committee of 100—GUY E. TRIPP, chairman board of directors Westinghouse Electric & Manufacturing Company, New York, N. Y., chairman.
- Joint Committee of the National Utility Associations — RANDAL MORGAN, chairman of the executive and finance committee the United Gas Improvement Company, Philadelphia, Pa., chairman.
- Trackless Transportation—H. B. FLOWERS, president New Orleans Public Service, Inc., New Orleans, La., chairman.
- Uniform Motor Vehicle Regulatory Laws—C. D. CASS, general manager Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, chairman.
- Construction and Maintenance of Highways for Motor Vehicles—W. J. HARVIE, vice-president and general manager Auburn & Syracuse Electric Railroad, Auburn, N. Y., chairman.
- Discussion on "Co-ordination of Electric Railway and Bus Transportation," led by ALFRED REEVES, general manager National Automobile Chamber of Commerce, New York, N. Y.; L. S. STORRS, president the Connecticut Company, New Haven, Conn., and D. W. PONTIUS, vice-president Pacific Electric Railway, Los Angeles, Cal.
- Luncheon of Committee on Co-operation of State and Sectional Associations, W. H. SAWYER, president East St. Louis & Suburban Railway, East St. Louis, Ill., chairman.

Wednesday Morning, Oct. 10

10 A.M. to 1 P.M.

Report of Nominating Committee —J. H. PARDEE, president J. G. White Management Corporation, New York, N. Y., chairman.
Election of Officers.
Report of Committee on Valuation —J. P. BARNES, president Louisville Railway, Louisville, Ky., chairman.
Report of Committee on Special Taxes—W. H. MALTBIE, special counsel United Railways & Electric Company, Baltimore, Md., chairman.
Address on "Essential Operating Costs," by F. W. DOOLITTLE, vice-president North American Company, New York, N. Y.

Symposium on Governmental Regulation

Address entitled "A Review of Recommendations of the Federal Electric Railways Commission as Result of Experience of the Last Four Years," by CHARLES E. ELMQUIST, of Clapp,

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Richardson, Elmquist, Briggs & McCartney, attorneys-at-law, St. Paul, Minn.

Addresses on "Public Utility Commission Regulation," by HENRY C. ATWILL, chairman Massachusetts Department of Public Utilities, Boston, Mass.; HENRY C. SPURR, editor Public Utilities Reports, Inc., Rochester, N. Y.; HARRY V. OSBORNE, president Board of Public Utility Commissioners of New Jersey, Newark, N. J.; CHARLES C. MARSHALL, commissioner the Public Utilities Commission of Ohio, Columbus, Ohio; LEWIS E. GETTLE, chairman Wisconsin Railroad Commission, Madison, Wis.; WILLIAM MILNES MALOY, chairman State of Maryland Public Service Commission, Baltimore, Md.; SHERMAN T. HANDY, commissioner Michigan Public Utilities Commission, Lansing, Mich.; DWIGHT N. LEWIS, commissioner Iowa Railroad Commission, Des Moines, Iowa.

Thursday Morning, Oct. 11

10 A.M. TO 1 P.M.

Reports of Committees:

Community Sections—C. E. MORGAN, vice-president Brooklyn City Railroad, New York, N. Y., chairman.

Constitution and By-Laws—C. L. HENRY, president Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.

Company and Associate Membership—W. H. SAWYER, president East St. Louis & Suburban Railway, East St. Louis, Ill., chairman.

Company Section and Individual Membership—MARTIN SCHREIBER, manager southern division and chief engineer Public Service Railway, Camden, N. J., chairman.

Publicity—F. R. COATES, president Toledo, Ottawa Beach & Northern Railway, Toledo, Ohio, chairman.

Publications—L. S. STORRS, president the Connecticut Company, New Haven, Conn., chairman.

Co-operation of Manufacturers—E. F. WICKWIRE, secretary Ohio Brass Company, Mansfield, Ohio, chairman.

Mail Pay—L. H. PALMER, general manager United Railways & Electric Company, Baltimore, Md., chairman.

Insurance—J. T. STAUB, treasurer United Railways & Electric Company, Baltimore, Md., chairman.

Education—EDWARD DANA, general manager Boston Elevated Railway, Boston, Mass., chairman.

Co-operation with State and Sectional Associations—W. H. SAWYER, president East St. Louis & Suburban Railway, East St. Louis, Ill., chairman.

Charles A. Coffin Prize—C. D. EMMONS, president United Railways & Electric Company, Baltimore, Md., chairman.

Address on "The Relation of Management and Employees," by DR. C. A. LIPPINCOTT, the Studebaker Corporation, South Bend, Ind.

Unfinished Business.

Installation of Officers.

Accountants' Association

Monday Afternoon, Oct. 8

Inspection of exhibits.

Tuesday Afternoon, Oct. 9

2 to 4:30 P.M.

Address of the President.

Report of the Executive Committee.

Report of the Secretary-Treasurer.

Appointment of Convention Committees:

(a) Resolutions.

(b) Nominations.

Report of committee appointed to represent Accountants' Association at Annual Convention of National Association of Railway and Utilities Commissioners—W. L. DAVIS, auditor Lehigh Valley Transit Company, Allentown, Pa., chairman.

Report of Budget Committee—T. B. MACRAE, general auditor Chicago Elevated Railways, chairman.

Address on "Construction Cost Accounting," by WESTON J. HIBBS, treasurer U. G. I. Contracting Company, Philadelphia, Pa.

Wednesday Afternoon, Oct. 10

Joint session with Engineering Association

2 to 3 P.M.

Report of Joint Committee on Engineering Accounting—L. R. BROWN, office and field engineer New York State Railways, Rochester, N. Y., and G. F. DINEEN, auditor Holyoke Street Railway, co-chairmen.

At the conclusion of the discussion of the report of the Joint Committee on Engineering-Accounting, the accountants will adjourn to their meeting room, where their session will be continued.

3 to 4:30 P.M.

Report of Committee on Standard Classification of Accounts—ROBERT N. WALLIS, treasurer Fitchburg & Leominster Street Railway, Fitchburg, Mass., chairman.

Report of Committee on Relations with Other Associations—M. W. GLOVER, general auditor West Penn Railways, Pittsburgh, Pa., chairman.

Paper on "Operating Reports and Their Usefulness to the Management," by EDWIN H. REED, auditor Brooklyn City Railroad.

Thursday Afternoon, Oct. 11

Past-Presidents' Day

2 TO 4:30 P.M.

Report of Committee on Stores Accounting—R. A. WESTON, special accountant the Connecticut Company, New Haven, Conn., chairman.

Address on "The Utility Accountants' Obligation to the Public," by DWIGHT N. LEWIS, president National Association of Railway and Utility Commissioners, Des Moines, Iowa.

Report of Convention Committees:

(a) Resolutions.

(b) Nominations.

Election of Officers.

Installation of Officers.

Claims Association

Monday Afternoon, Oct. 8

2:30 to 5 P.M.

Address of the President.

Report of the Executive Committee.

Report of the Secretary-Treasurer.

Reports of Special Committees.

Appointment of the Nominating Committee.

Paper on "A Code of Ethics," by HON. RUSSELL A. SEARS, general claims attorney Boston Elevated Railway.

Report of Committee to Investigate and Report on the Proper Organization of the Claims Department—W. E. ROBINSON, claim agent Cincinnati Traction Company, chairman.

Written Discussion—H. V. DROWN, Public Service Railway, Newark, N. J.

Submission of questions for the Question Box, answers and discussions to be taken up at Thursday afternoon session.

Tuesday Afternoon, Oct. 9

2:30 TO 5 P.M.

Report of Committee on Automobile Accidents—G. T. HELLMUTH, general claim agent Chicago, North Shore & Milwaukee Railroad, Chicago, Ill.

Discussion on Automobile Accidents:

From the Transportation Standpoint—RALPH W. EMERSON, general manager Cleveland Railway, Cleveland, Ohio.

From the Claim Department Standpoint—L. F. WYNNE, general claim agent Georgia Railway & Power Company, Atlanta, Ga.

Wednesday Afternoon, Oct. 10

2:30 to 5 P.M.

Joint session with Transportation and Traffic Association

Report of Joint Committee on Accident Prevention—H. B. POTTER, assistant to the president United Railways & Electric Company, Baltimore, Md.; H. O. ALLISON, safety engineer Beaver Valley Traction Company, New Brighton, Pa., co-chairmen.

Discussion led by W. G. FITZPATRICK, general claims attorney Detroit United Railway.

Report of special committee on Co-operation with National Safety Council—L. H. PALMER, general manager United Railways & Electric Company, Baltimore, Md., chairman.

Paper on "Maintenance of Men," by DR. HART E. FISHER, chief surgeon the South Side Elevated Railway, Chicago, Ill.

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Thursday Afternoon, Oct. 11
2:30 to 5 P.M.

Paper on "Preparation of Litigated Claims," by E. F. LIVINGSTON, chief investigator of litigated claims, Boston Elevated Railway.
Answers and general discussion of questions previously submitted for the Question Box.
Report of Nominating Committee and Election of Officers.
Installation of Officers.
Presentation of Past-President's badge.

Engineering Association

Monday Afternoon, Oct. 8
2 to 5 P.M.

Address of the President.
Report of the Executive Committee.
Report of Secretary and Treasurer.
Appointment of Convention Committee on Resolutions.
Reports of Committees:
Methods of Voting on Standards —C. S. KIMBALL, engineer of way and structures, Washington Railway & Electric Company, chairman.
Revision of Engineering Manual—R. C. CRAM, engineer of surface roadway, Brooklyn Rapid Transit Company, chairman.
Unification of Car Design—H. H. ADAMS, superintendent of shops and equipment Chicago Surface Lines, chairman.
Heavy Electric Traction—SIDNEY WITHINGTON, electrical engineer New York, New Haven & Hartford Railroad, New Haven, Conn., chairman.
Wheel Tread and Flange Contours and Rail Head Contours—H. H. ADAMS, superintendent of shops and equipment Chicago Surface Lines, chairman.

Tuesday Afternoon, Oct. 9
2 to 5 P.M.

Reports of Committees:
Equipment—F. H. MILLER, vice-president Louisville Railway, chairman.
Buildings and Structures—N. E. DREXLER, chief engineer Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., chairman.
Wood Preservation—H. H. GEORGE, engineer of maintenance of way, Public Service Railway, Newark, N. J., chairman.
Air Reservoir Specifications—R. H. DALGLEISH, chief engineer Capital Traction Company, Washington, D. C., chairman.
Paper on "Organization and Accomplishments of the Association of Electric Railway Men in Mechanical Departments of Southern Properties," A. D. McWHORTER, general superintendent Memphis Street Railway.

2 to 5:30 P.M.

Simultaneous Session of Purchasing Agents and Storekeepers under auspices of Committee on Purchases and Stores of the Engineering Association.

Address of Welcome—L. C. DATZ, president American Electric Railway Engineering Association and chief engineer Little Rock Railway & Electric Company and Memphis Gas & Electric Company.
Report of Committee on Purchases and Stores—B. J. YUNGBLUTH, supervisor of purchasing and supplies Philadelphia Rapid Transit Company, chairman.
Outline of Purpose and Constructive Work Planned by the Committee on Purchases and Stores —W. H. STAUB, purchasing agent United Railways & Electric Company, Baltimore, Md.
Proper Control and Handling of Materials and Supplies—P. F. McCALL, superintendent of materials and supplies Chicago, North Shore & Milwaukee Railroad, Chicago, Ill.

Wednesday Afternoon, Oct. 10
2 to 3 P.M.

Joint session with Accountants' Association (See Accountants' Association Program).

3 to 4:30 P.M.—At the conclusion of the joint session the accountants will adjourn to their meeting room and the program of the Engineering Association will be continued.
Reports of Committees:
Purchases and Stores—B. J. YUNGBLUTH, supervisor of purchases and supplies Philadelphia Rapid Transit Company, chairman.
WAY Matters—W. F. GRAVES, engineer, New York City, chairman.
Welded Rail Joints—Research—W. W. WYSOR, chief engineer United Railways & Electric Company, Baltimore, Md., chairman sub-committee No. 5 of the Committee on Way Matters.
Automatic Substations — W. E. BRYAN, superintendent of power United Railways of St. Louis, chairman.

Thursday Afternoon, Oct. 11
2 to 5 P.M.

Reports of Committees:
Power Distribution—M. B. ROSEVEAR, superintendent of distribution Public Service Railway, Newark, N. J., chairman.
Power Generation—C. A. GREENIDGE, chief engineer J. G. White Management Corporation, New York City, chairman.
Standards — MARTIN SCHREIBER, manager southern division and chief engineer Public Service Railway, Camden, N. J., chairman.
Report of Convention Committee on Resolutions.
Report of Committee on Nominations—F. R. PHILLIPS, acting general manager for receivers, Pittsburgh Railways, chairman.
General Business.
Election and Installation of Officers.
Presentation of badge to retiring President.

2:30 P.M.

Meeting of Executive Committee and Committee on Subjects.

Transportation and Traffic Association

Monday Afternoon, Oct. 8
2:30 TO 5:30 P.M.

Address of the President.
Report of the Executive Committee.
Report of the Secretary and Treasurer.
Appointment of Convention Committees:
(a) Resolutions.
(b) Nominations.
Report of Committee on Traffic Regulations—H. B. FLOWERS, president New Orleans Public Service, Inc., chairman.
Report of Committee on Merchandising Transportation — SAMUEL RIDDLE, vice-president Louisville Railway, chairman.
Discussion led by F. W. SHAPPERT, traffic manager Chicago, North Shore & Milwaukee Railway, Chicago, Ill.

Tuesday Afternoon, Oct. 9
2:30 TO 5 P.M.

Report of Committee on Nominations.
Election of Officers.
Report of Committee on One-Man-Car Operation—J. P. POPE, general manager Kentucky Traction & Terminal Company, Lexington, Ky., chairman.
Report of Committee on Bus Operation—W. J. FLICKINGER, assistant to the president the Connecticut Company, New Haven, Conn., chairman.

Wednesday Afternoon, Oct. 10
2:30 TO 5:30 P.M.

Joint Session with Claims Association. (See Claims Association Program.)

After the joint session the association will proceed to general business, including the installation of officers and presentation of the Past-President's badge.

Entertainment

SUNDAY, OCT. 7 — Golf tournament in the afternoon. There will be a sacred concert at the Marlborough-Blenheim Hotel in the evening.

MONDAY, OCT. 8—9 p.m.—Opening dance on the pier in honor of the president and officers.

TUESDAY, OCT. 9—3:30 to 5 p.m. —Cards and refreshments in the Vernon Room, Haddon Hall. Carnival with dancing in the evening on the pier.

WEDNESDAY, OCT. 10. — 3:30 to 5 p.m.—Cards and refreshments in the Library Room, Traymore Hotel, 9 p.m.—Grand Ball at the Ambassador Hotel.

THURSDAY, OCT. 11 — 3:30 to 5 p.m. — Entertainment by popular mind reader. Refreshments. Ritz-Carlton Hotel. In the evening swimming and dancing features, Ambassador Hotel. Optional feature, theater party.

The exhibits will be open for inspection on all of the days of the convention including Friday, Oct. 12.

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Maintenance of Equipment

Car Remodeling Job in Chattanooga

THE Chattanooga Railway & Light Company has a number of cars which are out of style, although the bodies are still in good physical condition. These cars weigh, equipped, 36,000 lb., and they are provided with two 60-hp. motors each on maximum traction trucks. It was recently decided to remodel these cars and the work is now under way.

The most striking change in the cars is due to the sheathing of the sides below the belt rail with sheet steel $\frac{1}{16}$ in. thick. The sides were previously curved inward at the bottom, whereas it was desired to have the new sheathing vertical. Hence blocks were built out on the posts, and horizontal strips were attached at the bottom and half way up to the belt rail. The sheathing is screwed to these blocks and strips, and a steel finishing strip is attached at each post to give a paneled effect.

The bulkheads were previously closed by means of doors and central windows. All doors and windows are being removed and the openings cased in, as shown in one of the illustrations. Headlinings of beaver board painted on both sides and all edges are being installed under a wood roof covered with canvas.

Electric heaters are being added in the vestibules.

Washing Costs 17.6 Cents per Car at Nashville

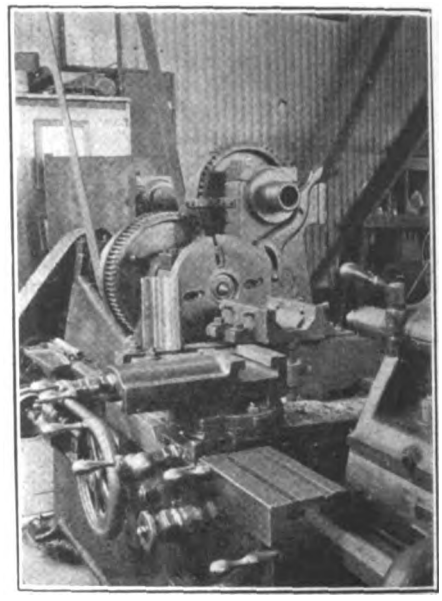
CARS are washed in the carhouse of the Nashville Railway & Light Company as a part of the regular inspection. This work is done during the day by three negro women, who wash on an average thirty-five cars per day. They use in this work the Royal car cleaner, made by the Clymer Chemical Company, Mount Vernon, Ill.

The labor cost per car is 11.6 cents, the cleaner 2 cents, the water 3 cents and sundries such as wear and tear of hose, etc., 1 cent, making a total of 17.6 cents per car.

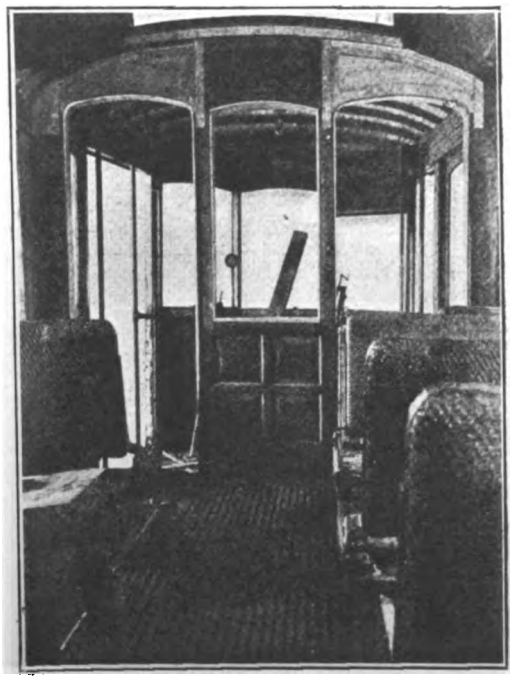
Quickly Adjustable Jig for Journal Bearing

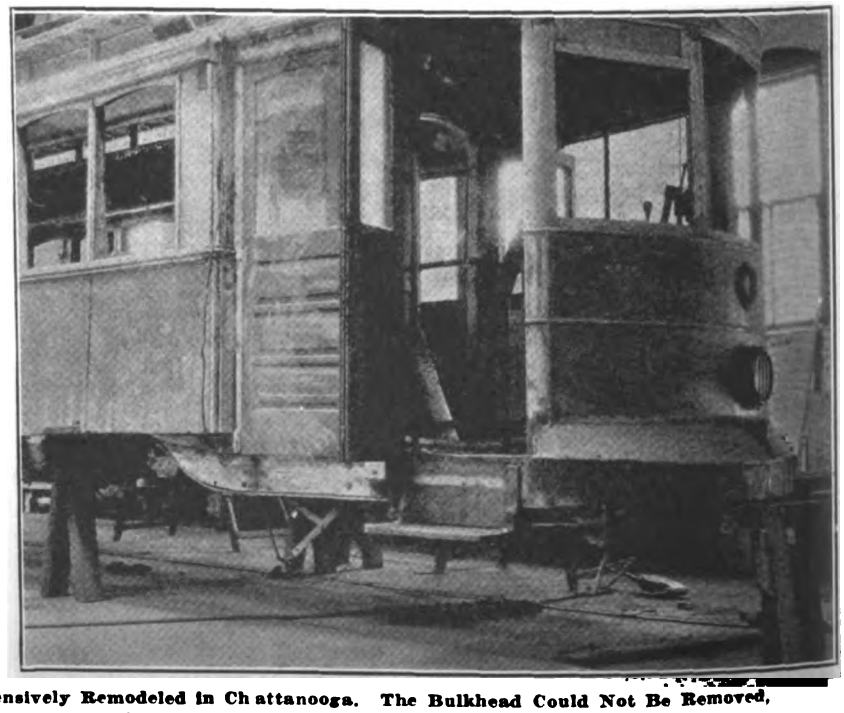
THE Knoxville Railway & Light Company uses a lathe set-up for boring journal bearings, which permits quick and accurate adjustment of the jig.

The jig rests on two iron castings, stretching from side to side of the lathe carriage, and bolted securely thereto. The jig is provided at the bottom with four projecting lugs, two on each side, by means of which it is bolted down on the cross-members just mentioned. It does not clamp down tightly on the cross-members, however, but is drawn by the cap bolts firmly against the flat heads of two special bolts, which screw into



Journal Bearing Jig Used by the Knoxville Railway & Light Company





A Number of These Cars Are Being Extensively Remodeled in Chattanooga. The Bulkhead Could Not Be Removed, but This Treatment Eliminates It for All Practical Purposes

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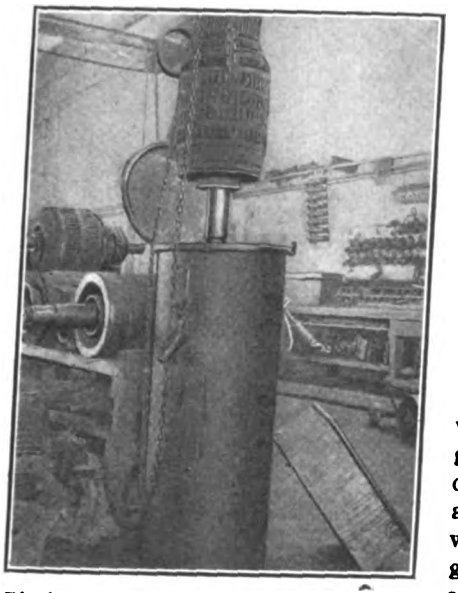
bearings bolted to the sides of the cross-members under the end of the jig and in line with its axis. These end supports provide for up-and-down adjustment, while the other bolts allow a rocking adjustment.

The bearing is clamped in the jig by means of four set screws, an operation requiring but a few seconds.

Once adjusted, the jig moves with the lathe carriage in perfect line under the boring bar mounted in the lathe centers.

A Dipping Tank that Is Economical of Varnish

IN THE armature section of the overhauling shop of the Virginia Railway & Power Company, Norfolk, a cylindrical tipping tank for armatures is used that is only slightly



Dipping Tank that Closely Fits Armature, Minimizing Amount of Varnish Required

larger than the largest armature to be dipped. The tank stands near an electrically heated oven in which the armature is heated previous to dipping and is baked thereafter. Armatures are handled into and out of the dipping tank by means of a jib crane.

A hinged, gasketed cover held by spring clamps is closed to prevent evaporation when tank is not in use.

Good Fitting Record

THE mechanical department of the Knoxville Railway & Light Company has a motto to the effect that good fitting keeps down maintenance costs. A recent report from this company states that in twelve years it has not had a loose wheel or gear, and not more than three loose pinions, the result of consistent adherence to this motto.

New Equipment Available

Radial Swing-Frame Track Grinder

A NEW type of portable track grinder has been developed and is being marketed by the Railway Track-Work Company, Philadelphia, Pa., under the trade name of "Hercules." In this design special attention has been given toward developing a light-weight portable grinder, with a permanent shaft connection between the motor and grinding wheel instead of a flexible shaft. The shaft of this new grinder is entirely incased, as are also all moving parts except the lower half of the grinding wheel. By pivoting the entire grinding mechanism from an upright post attached to the frame structure, increased flexibility is obtained. A horizontal arm swings about the vertical support, so as to provide for sidewise movement of the grinding wheel, and the pivoted joint which supports the mechanism makes it easy to raise and lower the grinding wheel without effort as well as to push it back and forth along the track during the grinding operation. This arrangement of joints is also very convenient in transporting the grinder. By releasing the pressure on the two handles, which the operator uses during grinding, the weight of the motor raises the grinding wheel, and by pushing ahead the arm swings about its vertical support, raising the inside end of the truck framework, so that the entire mechanism is readily transported on the two wheels.

The grinding wheel head can be turned completely around by releasing a lock pin on the grinding wheel head, directly in reach of the operator. A 2-hp. compound-wound motor is used for driving, and a switch and control box is mounted in an upright position on the motor frame. "Diamond Brand" grinding wheels are used, and ball bearings are used throughout. The connection from the shaft to the grinding wheel is made through steel beveled gears which are entirely inclosed in an oil-tight gear case packed with transmission grease. The grinding wheel is of 12-in. diameter, 1½-in. face, and operates at 750 r.p.m. The weight of the entire machine complete with motor is 500 lb.

Arcing Removed from Controller Contacts

THE Lehigh Valley Transit Company is equipping some of its cars on its Easton division with "No-Arc Drum" controller equipment, manufactured by the Automatic Re-

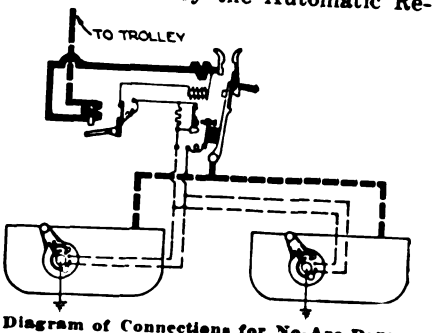
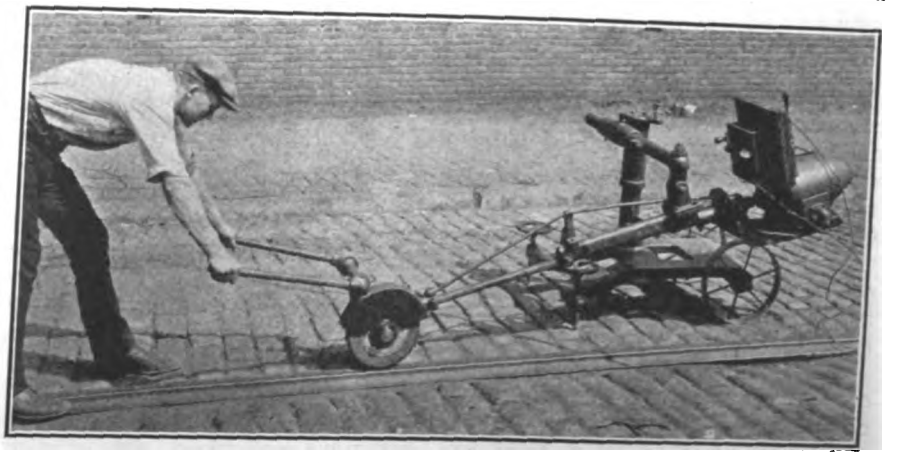


Diagram of Connections for No-Arc Drum Control Equipment

closing Circuit Breaker Company, Columbus, Ohio.

No-arc drum controller equipment can be applied to any of the standard



Swing-Frame Track Grinder

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types of platform controllers without changes in them. The new equipment comprises an operating handle and a magnetic contactor with overload relay. The operating handle can be readily attached to the cap plate or top of the drum controller and takes the place of the regular handle. The magnetic contactor is connected in the main operating circuit and may be mounted in any convenient place, preferably underneath the car body.

In addition to providing for moving the controller drum in its regular manner, the operating handle controls the opening and closing of the magnetic contactor. The first movement of the operating handle forward from its "off" position closes the circuit for the magnetic contactor. This closing occurs before the first point of the drum controller is reached. Successive resistance steps are cut out in the regular way by continuing to rotate the controller drum forward by means of the operating handle.

Control Circuit Opened at Contactor

In returning the controller handle to its "off" position, the first movement from any running point opens the control circuit for the magnetic contactor, causing it to open instantly and break the main circuit. Further movement of the operating handle returns the controller drum to the "off" position. The main circuit is thus made and broken by the magnetic contactor and all arcing is removed from the controller fingers and contacts.

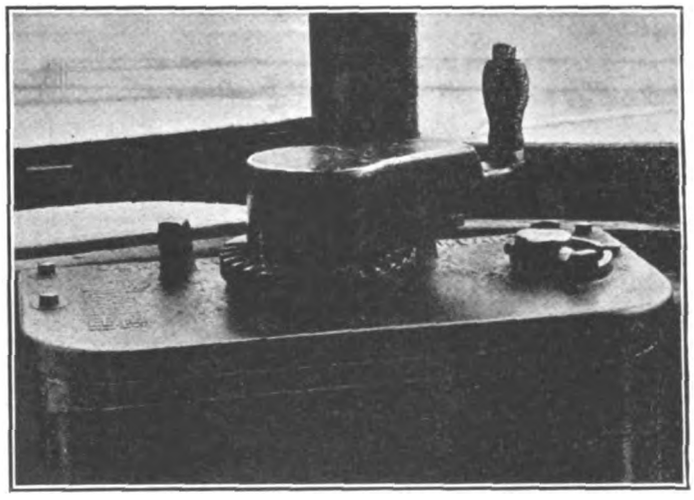
The overload relay of the magnetic contactor provides for opening the circuit by dropping out the contactor in case of a short circuit or overload. To reset the circuit breaker it is necessary to return the controller drum to its "off" position, when the overload relay is automatically reset. This equipment also provides for opening the circuit in case of failure of power, so that it provides a safety feature in that it prevents the equipment from being energized upon the return of power as the load cannot be picked up and the contactor closed for operation until the controller is returned to its "off" position.

Accompanying illustrations show the operating handle and magnetic contactor as installed on one of the cars of the Lehigh Valley Transit Company, and an accompanying diagram shows the connections necessary. With double-end control equipment, two wires run from each controller handle and are connected to the magnetic contactor. The first movement of the operating handle closes the circuit for the magnetic contactor. There are, however, two circuits, one a closing circuit and the other a maintaining circuit. With the forward movement of the operating handle, the maintaining circuit is closed and the closing circuit is opened. This maintaining circuit is carried through a maintaining contact on the magnetic contactor, so that the contactor remains closed in any position of the operating handle as long as it is not moved backward toward the off position.

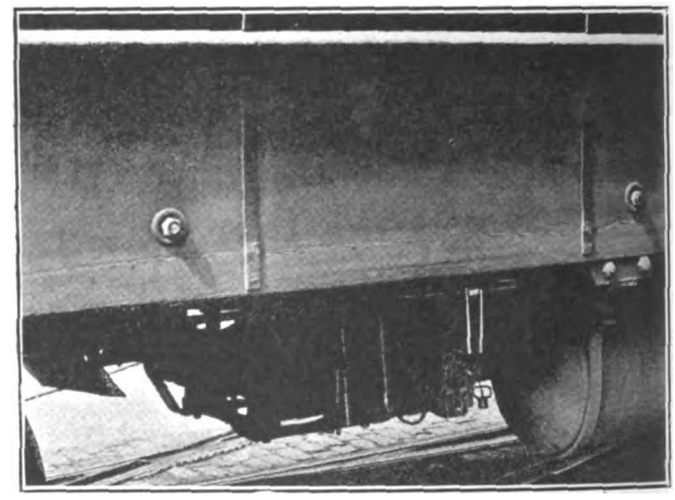
A slight backward movement of the handle, however, opens the maintaining circuit and the contactor opens. Likewise if the overload relay functions the maintaining circuit is broken, and the contactor opens.

The operating handle is of rugged construction, designed for continuous service without excessive wear. The magnetic contactor is of light weight and small dimensions and has ample capacity of current carrying parts for handling the arcing under overload and short circuit conditions.

In Easton this type of equipment has been installed on K-12, K-14 and K-28 controllers on both single and double-truck cars. On double-truck cars the practice of the company is to install the magnetic contactor underneath the center of the car body. On single-truck cars it is installed under one platform. The reduction in controller maintenance is particularly noticeable, as replacement of fingers and segments is comparatively infrequent, and blistered and pitted segments or fingers are done away with.



Controller Handle in Position on Cap Plate



The Magnetic Contactor Is Installed Underneath the Car Body

Two Types of Under-Voltage Relays

TWO types, PQ-25 and PQ-26, of under-voltage relays are being marketed by the General Electric Company, Schenectady, N. Y. These relays are for tripping electrically operated circuit breakers when the voltage has decreased to a certain predetermined value. Motors are thus automatically disconnected on under voltage, thus preventing them from restarting unexpectedly on return of voltage with possible damage to the driving machine.

The relays are of self-resetting plunger type and may be supplied for operation on either direct or alternating current control. Type PQ-25 is for single circuit control, while type PQ-26 is for two-circuit control. The former is made in two forms, instantaneous pick-up and time delay drop-out, or instantaneous pick-up and drop-out. The latter is made in one form only, instantaneous pick-up and drop-out.

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The News of the Industry

Arbitration Concluded

Final Arguments in the Boston Elevated Wage Issue Submitted—Vahey Stands for "A Decent Living Wage"

Final arguments have been presented in the Boston Elevated Railway wage arbitration proceedings before George L. Mayberry, the neutral arbiter. Charles W. Mulcahy, counsel and arbiter for the Elevated, submitted his side on Aug. 20 and was followed by James H. Vahey, counsel and arbiter for the men.

Three principal points were emphasized by Mr. Mulcahy as the main questions of the arbitration. The first, he said, was what rate of wages shall be paid to all employees of the company who are members of the union; the second, what differential shall be paid to motormen who operate one-man cars and buses, and, third, how shall the short-hour day be established for work on Sundays and holidays.

Mr. Mulcahy said the Elevated has 6,417 employees; of these 4,089 are blue uniformed men and 2,328 miscellaneous employees. Continuing, he said the Elevated represents an investment of $143,000,000, and is run at cost by public trustees. Fares must meet the cost of service, he pointed out, and if the cost goes up, the fares must go up. If the cost comes down, he went on, the fares will come down.

He declared there is no profit in the operation and that the company is required by the terms of the Public Control act of the Legislature of 1918 to make a fair return on the investment. That, he added, is taken as meaning 5¼ per cent, which is the rent the state pays for the use of the property.

He said that the parties to the arbitration are the organization of employees, the public as represented by the car-riders and the taxpayers. The trustees do not represent the public against the employees. They represent the public as a whole, and the employees are an important part of that public.

Mr. Mulcahy then took up the question what shall be the basis of determining wages. The cost of living is not on a settled basis, he said. In 1921 the trustees took the position that they should follow the cost of living as a basis, said Mr. Mulcahy. "When that cost goes up wages should go up; when it comes down, wages should come down," he declared.

James H. Vahey, for the men, opened his argument by saying that he appreciated the fair treatment of the subject by Mr. Mulcahey. Then he held that present wages are inadequate and should be largely increased, a point which the trustees have already recognized, he declared, by their proposal to raise wages 4 cents an hour and by making various adjustments of wages. Then he gave an outline of the history of the Elevated company.

Mr. Vahey argued that the men are entitled to "a decent living wage," which they are "not receiving now." He said the stockholders are well taken care of by the public control act, which guarantees dividends, but there is nothing in the act protecting the rights of the employees.

United Traction Will Help in Capitol Development

The United Traction Company, Albany, through General Manager Murphy, has pledged its full co-operation in the development of the Capitol District. Mr. Murphy recommended a conference of mayors and other city officials, Chamber of Commerce representatives, railroad, railway and real estate men to work out a practical solution of uniting the cities of the Capitol District in one great city. He said that his company would be "open-minded" in the matter of extensions into proposed newly developed territory. He mentioned several new lines which might be considered prospects for extensions if the industrial and residential development warranted such action.

Discussing the construction of new lines by his company, Mr. Murphy said that paving costs charged at present to the company were exorbitant, and that the company must pay for all paving between the rails and 2 ft. outside of each outer rail. He said that in his opinion this assessment should be eliminated or at least reduced.

Wages Continue for Another Year in Springfield

The Springfield Traction Company, Springfield, Mo., has entered into an agreement with its employees for the period of one year from Aug. 15, 1923, covering wages and working conditions. It is a continuation of last year's agreement.

The schedule of wages in cents per hour for two-man cars is as follows:

First year	42
Second year	44
Third year	45
Thereafter	46

For one-man cars the above rates are increased 4 cents an hour, the maximum being 50 cents. The company is operating 100 per cent one-man cars on all regular runs on its system.

Application Refused

Examiners Recommend Denial of Staley System—Charge Estimated Cost Too Low and Expected Revenues Too High

A recommendation that the application of the Staley System of Electrified Railways for a certificate of public convenience and necessity for the construction of 1,240.5 miles of railroad in Arizona, New Mexico, Colorado and California be denied has been filed with the Interstate Commerce Commission by Attorney Examiner J. H. Agate and E. Gray, engineer-examiner.

The two examiners reported to the commission on Aug. 27 that the applicant had not completed detailed surveys and therefore the estimated cost of construction might be, and probably is, too low; that estimated revenues have been placed too high; that economies estimated to be effected through electrical operation, contrasted with steam, hardly would be as great as estimated, and that the territory proposed to be served is now adequately served by existing transportation facilities.

In the ordinary course of procedure in such cases, the applicant usually files a protest against acceptance of the examiners' report, and a hearing is held before the commission, before that body takes action in the case.

The Southern Pacific and the Atchison, Topeka & Santa Fe Railroads had protested against authority being granted the Staley system for construction of its lines, which it proposed to finance through sales of stock. The California Railroad Commission had reported that there was no lack of transportation facilities in the portion of that state which the Staley system would penetrate.

The Staley system proposed a main line of 745 miles at the Mexican line in Arizona, through New Mexico and into Colorado. It also proposed six branches. It proposed a line in Mexico, not covered by the application, 66.5 miles long, to the Gulf of California, where it was proposed to create a port. Its estimated cost for the 1,307 miles of road, including $6,000,000 for port terminals in Mexico, was $76,024,000; it estimated $30,014,000 for equipment the first year, including $4,000,000 for shops, and estimated an outlay of $26,866,000 for electric power plants and transmission lines.

Coal and coke traffic is counted upon too heavily by the applicant, the examiners assert. They conclude that estimates of revenue traffic have been "greatly exaggerated" by the applicant.

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Views Are Aired at Hearing in New Jersey

No Substitute Plan of Constructive Nature Advanced in Place of Company's Proposal for Restoring Service—Municipal Authorities Urge Railway to Resume Operations and Then Talk Terms—Conference Arranged to Discuss Terms

FOLLOWING a hearing on Aug. 20 before the Board of Public Utility Commissioners of New Jersey the controversy there growing out of the strike was referred to a committee representing the municipalities and the bus men and officers of the railway for further discussion. At the hearing opinions were expressed by the representatives of the municipalities and the bus men regarding the plan of settlement advanced by the company, and E. W. Wakelee, vice-president of the railway, further explained the company's stand.

Sentiment for Settlement Strong

The hearing resulted in bringing out the fact that sentiment in the larger cities favored a settlement whereby railway service would be provided. This was extremely desirable, but certai features of the plan presented by the railway were unacceptable. The principal points stressed in opposition to the plan were the acceptance of a valuation figure of $110,000,000 and the operation of buses at a 7-cent fare. Above all, the municipal representatives present were inclined to insist upon the restoration of railway service at once with the discussion of the merits of the provisions of any agreement afterward.

President Osborne of the commission in opening the meeting said that it was held to permit the municipalities to be heard. He asked for criticisms of constructive nature. "We are not here," he said, "to do anything else than make such contribution as we can toward a solution of the problem that confronts the community."

Many municipalities were represented, mostly by their Mayors or other officials. The bus men and the railway employees also had officials present. Mr. Wakelee said there were other propositions to be considered than wages to the men. Since the last meeting the company had submitted its plan of settlement as promised. This plan was intended to bring about a broad solution. It was not dictatorial. The nature of the situation, however, demanded that the plan be considered as a whole. He said that the plan does four principal things:

1. It gives the men a substantial increase in wages.
2. It provides a means whereby the people of New Jersey will get good, adequate, safe service.
3. It provides service at the lowest reasonable rate possible, and also provides the means whereby the rate may be reduced.
4. It provides the means and method whereby new capital may be caused to flow into the business continuously.

"There is no reason," said Mr. Wakelee, "why the people of New Jersey should not be afforded the best transportation in the country." This was indicated in the plan so that he who runs may read.

With regard to the jitney question Mr. Wakelee said that the jitneys were now operating under cover of a state law effective since March, 1921. According to the opinion of the company every transfer of a bus permit to operate was as much a new license as was an original bus operating grant. Great numbers of jitneys were now operated in competition with the trolleys under the guise of "transfers" illegally licensed by the board and many others were operating under transfers of rights that had not even come to the attention of the board. This latter criticism applied to changes in the vehicle operated on a specific license without a transfer of ownership.

So far as the company's plan was concerned Mr. Wakelee said it was an honest plan devised for an honest purpose. It was not the company's plan in that the company got all that it wanted or that the men wanted. All that the company asked was the cooperation of the public officials to create an atmosphere in which the company could live. He then read from the New York *Times* an editorial quotation on a decision by the Maine Utilities Commission, referred to elsewhere in this issue. He said that the stand taken by the Maine Commission against unfair competition reflected the position of his own company. In conclusion he said that he had tried to sketch the situation in its broadest aspects.

Cities Present Their Sides

Director Raymond speaking for the city of Newark asked if the company were willing to amend the terms of the plan. Mr. Wakelee said he could not say what action would be taken but that he was open to suggestions. Upon this assurance Mr. Raymond stated that the city of Newark wanted to approach the company's plan in a conciliatory way. He suggested that a conference be held between railway and city officials in order to reach an agreement. He said the plan had the appearance of having been put forth in a peremptory way and in a take-it or leave-it attitude. In referring specifically to the tenth paragraph of the plan which states how service may be resumed temporarily Mr. Raymond said that it seemed to him that the company might consent to operate its cars pending a settlement. If the Public Service would consent to a 5-cent bus fare the terms of the plan could be discussed in a conciliatory spirit, but Newark could not discuss a 7-cent basis for buses operated by the railway. He said that he realized the need of the company to get on a sound financial basis.

Assistant Corporation Counsel Brogan of Jersey City said Jersey City wanted to keep as far away from a public service transportation monopoly as possible, but was willing to make a fair settlement. If the company would start the trolleys he was willing to discuss the plan with the company.

In answer to a question about the suggestion that the company be relieved of paving obligations, Mr. Wakelee stated that the company contemplated no change in this respect unless the public desired it. He felt that it was unjust to require the railway to provide paving for others to use. If the public wanted lower fares it should shift some of this burden to the other users of the streets.

Elizabeth wanted the trolleys back, but wanted the jitneys continued in competition with them, said Mr. Griffin. Representatives of that city were willing to sit at a round table discussion with representatives of the company.

Joseph P. Bradley, traffic supervisor of the city of Paterson, stated that the jitneys in that city were handling the transportation situation satisfactorily. The city was opposed to the Public Service plan in its present form.

Mayor Furber of Rahway stated that since the strike his city has had better service than ever before. People could get anywhere in the city. The buses in Rahway were not in competition with the trolley except on one line. "We are taken care of," said Mr. Furber, "and cannot enter into any discussion of the plan."

W. G. Miller, representing West Hoboken, favored the buses being limited to streets parallel to the trolleys. He felt that the present competition was unfair. In his town, with a population of about 40,000, the Public Service had approximately 4 miles of track. In 1922 the railway paid $34,694 to the city as compared with $520 from the buses. In 1921 the corresponding figures were $19,322 and $520, while in 1920 they were $28,556 and $720.

Mr. Moore, representing twenty municipalities in Bergen County, stated that a vote had been taken showing that fourteen towns were in favor of the plan to three against it. The merchants in the territory which he represented were losing business and a vote showed they were keen for a settlement. He asked that Public Service plan be accepted.

E. T. Sharkey of Bayonne said the people in his city wanted the trolleys and also wanted the buses. They were willing, however, to enter into any discussion looking toward a settlement of the matter.

Mayor Loizeaux of Plainfield said that in principle he was in favor of any plan that would eliminate unfair competition with the Public Service Railway. The franchise gave the company

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rights that should be protected. To permit jitneys to operate on the same route as the trolleys was unfair. In Plainfield there were only two jitneys in operation prior to the strike. He would, however, oppose any plan that would curtail any of the rights of the city incorporated in the old franchises. He thought that the people of Plainfield would stand back of the plan.

Representatives of various other municipalities made statements similar to those expressed above.

Lucius T. Russell, publisher of the Newark *Ledger*, stated that it was necessary to start all over again order to arrive at a settlement. Immediate action was needed now. The prestige of the Public Service would be enhanced ten-fold with the trolleys in operation. Not only did each municipality have a problem different from every other one, but in each municipality there were various individual needs. The entire problem was purely local. It could never be made to spread over the state.

Views of the Bus Men

George L. Record, representing several groups of bus owners, thought the Public Service plan was unworkable and that it was unfair to the bus owners. The jitneys were started in order to fill a need. They accepted the risks of competition. The bus, itself, was not worth much. It was the business the operators had built up that was valuable. The proposition to take over the buses at their physical value depreciated was preposterous. If the trolleys could not operate successfully under the changed economic conditions they should go into the hands of a receiver and be reorganized on a sound basis. The only way out was to adopt a service-at-cost along the lines of the Cleveland plan, provided a start was made with a valuation fair to the public.

George F. Seymour, representing the Essex County bus owners, stated that if a franchise was granted to the bus owners they would put on additional service adequate to carry the people. The bus men would incorporate and buy such buses as were needed. He thought that the Public Utility Commission should prepare a memorandum to the Governor asking him to proceed against the railway by requiring it to live up to its franchise or relinquish its franchise rights.

Business Men's Views

Horace A. Bonnell, president of the Newark Chamber of Commerce, read a statement in which he said that the organization he represented did not believe that either the trolley or the bus alone could meet the requirements of the growing population in Newark and surrounding communities. The two services should be co-ordinated in the interests of the public under one management with efficient regulation. Competition in connection with any public utility under regulation was economically unsound and not in the public interest. The existing crisis could be met only through the orderly process of sound thought and sober action. He filed his statement together with a printed copy of the statement of the board of directors of the Chamber on Aug. 24 in support of the Public Service plan as submitted to the commission. Mr. Moran of the Chamber of Commerce of Camden stated that his organization endorsed the plan with modifications.

Trolley Men Are Represented

Harry Jones, representing the 6,000 employees of the railway, believes that more than a question of wages was involved in the settlement. The competition between the cars and the buses was unfair and could not lead to lasting results. What the public wanted was cheaper transportation. The way to get it was to put all modes of transportation under one management and create a natural monopoly. P. J. O'Brien, second vice-president of the Amalgamated Association, referred to the somewhat similar suspensions that had existed previously in Bridgeport, Des Moines, Saginaw and Augusta.

At the request of Chairman Osborne Mr. Wakelee summed up the results of the meeting from the company's standpoint. He said that as a result of the opinions expressed he was impressed more than ever with the need for the railway. The jitneys in particular, he felt, needed the street railway to help them out in their business. He reiterated that the plan advanced by the company was an honest effort to solve a difficult problem. While he was impressed by Commissioner Raymond's idea of service first and talk afterward, the company's position was not what it wanted to do but what it could do. It could not resume without the means of doing so. He thought that the company's plan was the only practical one that had been presented in the course of the discussion.

When Mr. Wakelee had finished the chairman said that it was apparent that the municipalities would not agree to the plan in toto. He wanted quick action and to that end suggested a conference be held immediately between the representatives of the principal municipalities involved and the officers of the railway.

The representatives of the municipalities agreed to comply with this request, but felt that a conference of this kind should contemplate the presence of President Thomas N. McCarter. With this in mind the representatives of the company and the leading municipalities held a conference immediately following the meeting to arrange for a time and place for the conference of these parties.

Trolley Suspension Hurts Business

Sentiment Growing in New Jersey in Favor of Restoration of Railway Service — This Fact Established in Survey "Journal" Editors Made Among Retail Merchants—Company's Plan Generally Approved

THE enthusiasm manifested at first for the auto bus as a substitute for the trolley has waned in the territory where the Public Service Railway formerly operated, and people are gradually becoming more anxious for the restoration of railway service. Up to the present, however, the heaviest burden of the shutdown has been borne by the business men, who have suffered actual financial loss. Personal inquiries made by ELECTRIC RAILWAY JOURNAL editors in several municipalities show that the merchants want the trolley back and are generally favorable to the company's plan of settlement.

The head of a large department store in Newark stated that his business had fallen off 10 or 15 per cent. In his opinion it will be a calamity if trolley service is not resumed, because the bus is not yet sufficiently developed to enable it to replace the street car. He expects conditions to get worse if the shut-down continues, and he approves the company's plan of settlement except the valuation feature.

An official of another Newark department store said that telephone and mail orders had increased, but not enough to balance the loss in "over the counter" trade. Many of his employees are getting to work late. "That fellow on the radio the other night had the right idea," he said, referring to the talk by H. L. Brown, editor of ELECTRIC RAILWAY JOURNAL, which was also published in the JOURNAL of Aug. 18. "The bus has its place, but the trolley and the bus are not interchangeable." He favored the adoption of the company's plan without modification, and expects conditions to get worse in September if the shutdown continues.

A third department store admitted feeling the effects of being without trolley service. "Customers will not come downtown in crowded buses," according to the president of that company. "Any truthful person will say that business has been hurt."

Another large department store claimed to have felt little bad effect so far, but thought that in the long run business will suffer if trolley service is not resumed.

Clothing and haberdashery shops in Newark report their trade to be much affected. One man said his business had fallen off more than 10 per cent. He thinks politics will prevent the adoption of the company plan. A second could give no figures, but said that he had noticed a decrease even though August is ordinarily a dull month. September will hurt more, but a settlement will have to wait until the public

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is really suffering. Another ascribed the loss of business to the lack of women shoppers on the streets. He would rather pay 15 cents and ride in a trolley than 5 cents to ride in a bus. "Anybody who prefers the jitneys," he said, "would make one of Roosevelt's Rough Riders look like a selling plater." He approves the plan.

A large jewelry store admitted that its business had been badly hit by the shutdown. People may travel by crowded buses to buy the necessities of life, but they will not travel that way to buy jewelry. In spite of decreased business, however, their delivery force has had to be augmented because customers will now carry nothing home themselves. The owner approves the Public Service plan but would like a 5-cent fare in the city.

The children's department of a retail shoe store in Newark might as well be closed, according to the manager. "Nobody brings children downtown now," he said. The plan is all right in his opinion, but politics will block it. A hardware store also reported a loss of trade.

No More Reading As You Ride

"Business is pretty bum," was the way the owner of a news stand in the center of the city expressed his sentiments. "People riding in the jitneys can't read papers," said another, "and anyhow they don't come downtown the way they used to." A barber shop reported business dull before the shutdown and still dull now. The head of the shop hoped for the restoration of trolley service at a 10-cent fare with 5-cent buses.

These statements of fewer people traveling are borne out by traffic checks made in Newark since the shutdown.

The figures show during a 16-hour period approximately 75 per cent of the former passenger traffic on the important arteries. In the rush hour in spite of a 250 per cent load factor the buses are carrying only about 50 per cent of the former rush hour riding.

Restaurants and caterers, on the other hand, appear to be but little affected. One such establishment claimed better business in August than in July. Much of their trade comes by automobile, however. Another said that business was off a little now and would be worse in September. "All sensible people favor the company plan," said the latter, "but there are very few sensible people in Newark."

Newark bank officials interviewed agreed that retail business was being hurt. "The jitney is a failure," said an officer. "Service is worse now than when the trolley shutdown began." At another bank it was said that conditions are really worse than the merchants will admit. Both thought the plan to be fair and reasonable but were afraid that politics would prevent its adoption. A prominent real estate man also favored the plan except in regard to the valuation figure.

Moving picture theaters are feeling the lack of railway service although no definite figures on loss of revenue are obtainable. The manager of a large house in the center of Newark strongly favored the plan of settlement. He criticised the jitney service bitterly. A large vaudeville theater believes it too soon to tell the exact result, but thinks that any disturbance to the transportation system is bad.

In the Centre Market, Newark, merchants appear to be much disturbed about their trade. The manager of one concern there claimed that business is fine, but thinks it may be poor in September. It is rumored, however, that officials in charge of the market do not wish any criticism to be made against the bus service.

The transportation of workers to and from their places of employment is most unsatisfactory in many cases. Only where the factory is located on the outskirts of the city and workers are traveling against the general traffic do they get to work on time.

The Newark Chamber of Commerce says that there is no doubt about business being hurt by the suspension of trolley service. The time has come to endorse some plan of settlement, they think, and the Public Service plan is the best one yet proposed.

In the smaller municipalities there seems to be less trouble than in Newark. Traffic officers in eight or ten towns, with whom the situation was discussed, claim that traffic is less congested now than formerly. A large department store in Paterson said there was no unusual tardiness among their employees.

The bus system has been developed to a greater efficiency in that city, however, than in any other. Routes are short and traffic is heavy, so the buses are making a good profit. The vehicles themselves are mostly new and of a very good type. They are well painted and kept clean inside and out. Prior to the shutdown the buses were carrying about 75 per cent of the local traffic, so they have been pretty well able to handle the situation. The leading store for women's wearing apparel, however, says that business has fallen off, principally because people from the suburbs are not coming in.

Moving picture theaters in Paterson, Passaic, Hackensack and other places claim to have had the best August they have ever had. Probably this may be accounted for to some extent by the unusually cool weather that has prevailed. The manager of a group of ten movie houses said that people in Paterson are touchy about anything that hits the pocketbook. They don't like the idea of a 7-cent bus fare. They ride the present 5-cent buses in preference to the trolleys because they are "sore" at the 8-cent fare. It has seemed unreasonable to them to have to pay 8 cents for a short ride and only 1 cent additional for a transfer which increased the length of ride several miles. In his opinion the fare features of the Public Service settlement plan will prove unacceptable to the public.

Public Service Answers Writ

Company Blames Utility Board for Failure to Provide Revenue and for Bus Competition

The Public Service Railway, through its general counsel, Frank Bergen, filed a return on Aug. 28 to the alternative writ of mandamus issued by the Supreme Court of New Jersey Aug. 17 on motion of the Board of Public Utility Commissioners. The company states that it has not complied with the board's order of Aug. 14 to resume service because of the latter's "unlawful and oppressive conduct" in denying wholly or in part requests made by the company, and also because of the increased wages demanded by its employees. The statement also says that the board's order is illegal and void because it is not in accord with the evidence, and because compliance would take the property for public use without just compensation in violation of the state constitution and of the Fourteenth Amendment of the Constitution of the United States.

The return sketches in considerable detail the history of the company from its inception. It now constitutes a united and complete system of about 850 miles of street railway tracks in 142 municipalities of New Jersey, containing more than 2,000,000 inhabitants. In recent years the system has carried about 1,000,000 passengers a day.

"By the year 1915," states the return, "said street railway system had come to be 100 per cent efficient; that is, as good as new for practical operation, and was regarded by electrical street railway experts as one of the best constructed and equipped urban transportation systems in the country, and more favorably located for expansion than any other, its tracks extending from points on the Hudson River opposite New York, through populous and growing cities and towns, to points on the Delaware River opposite Philadelphia."

The company calls attention to the fact that since June, 1903, it has expended $38,500,000 in extending and improving its street railway system and providing for new equipment. Prior to 1918, it said, the 5-cent fare under conditions prevailing then was regarded as reasonable in spite of hauls for distances as great as 15 miles. In 1917 cost of maintenance and operations began to increase rapidly so that by July, 1921, increase in operating expenses amounted to 119.1 per cent, taxes increased 63.4 per cent and cost of paving more than doubled. By July, 1918, annual expenses had increased by more than $3,000,000.

From 1918 to July, 1921, the company continued to present facts and figures to the board showing the continuing and rapid increases in costs, and asked for increased rates, but "never succeeded in obtaining an increase adequate for that purpose."

Gross earnings, as shown by a table included in the return, increased from

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$17,574,867 in 1916 to $26,810,664 in 1920, and since then have remained slightly lower, being $26,353,234 in 1922. Operating expenses and taxes have grown out of proportion to this increase, being $11,219,691 in 1916 and $20,492,478 in 1922. Fixed charges have increased from $4,873,929 in 1916 to $5,316,194 in 1922. The principal operating figures are given in a table, of which the following is an abstract:

Year	Gross Earnings	Total Expenses and Charges	Surplus
1916	$17,574,867	$16,083,800	$1,491,066
1917	18,660,360	17,477,817	1,182,542
1918	19,854,393	20,156,110	301,716*
1919	23,114,605	23,704,604	589,999*
1920	26,810,664	27,554,640	743,975*
1921	26,254,000	26,405,251	151,251*
1922	26,353,234	25,828,578	524,655

*Indicates deficit.

The return states that on failure of the board to approve a new schedule of rates in its order of May 20, 1921, the State Supreme Court ordered a revision of that ruling to provide increased income. The board, "on the fourteenth of July following, in pretended compliance with the judgment of this court, permitted defendant to charge 1 cent additional for a transfer, which would yield to the defendant a sum grossly inadequate to meet its lawful requirements and prevent continued confiscation of its property in serving the public."

According to the return, the operations of the company in the years 1918 to Oct. 19, 1921, resulted in its not being permitted to earn its increased cost of operations in those years by the amount of $13,652,543.

"The effect of the unlawful and oppressive conduct of relator [the board] as aforesaid was: (a) to prevent defendant from earning income sufficient to maintain and operate its property; (b) to diminish its operating efficiency; (c) to take property and service of defendant to the value of $13,600,000 for public use without just, or any, compensation; (d) to destroy the credit of defendant; (e) to cause large deficits to accumulate, and (f) to prevent defendant from protecting its property and business against unjust and unlawful competition. Besides, relator has approved more than 200 licenses for auto buses or jitneys to operate in unlawful competition with defendant, and has for a long time and is now permitting unlicensed auto buses or jitneys to operate unlawfully in competition with defendant."

For the above reasons, combined with the demands of the employees, the company states that it is impossible to comply with the order of the board to operate its cars.

Peter Witt Advocates Rapid Transit Plan for Cleveland

Peter Witt, former street railway commissioner at Cleveland, Ohio, has announced a plan for a rapid transit system for Cleveland. He says he will take steps at once to bring about adoption of the plan, which provides for the following:

1. The construction of three elevated rapid transit lines, serving all parts of the city.

2. The construction by the city of a new bridge across the Cuyahoga River, from Huron-Road to Lorain Avenue.

The entire plan would be worked out in conjunction with the Cleveland Railway, and would augment its system, but not supplant it, Mr. Witt said. The money would be derived from a bond issue. He is reported to have said:

> The question of issuing bonds will be submitted to a vote at the earliest possible moment. But whether or not I am elected I shall go forward with the rapid transit fight.

The rapid transit lines, under Mr. Witt's ideas, would not attempt to take the place of the present street railway in the matter of short hauls. They would feed the present surface system and would be fed by it. Their chief mission would be to take care of long hauls.

Maumee Valley Line Advances Wages

A new wage and working agreement has been signed by officials of the Maumee Valley Railway, Toledo, and the union effective until Jan. 1, 1924. The scale is 53 cents for the first three months in service and 55 cents an hour thereafter. The old scale was 40 cents for the first three months, 42 cents for the succeeding nine months and 45 cents thereafter.

The large increase in the scale is due to the starting of the one-man plan of operation of the new equipment placed in service on the line. General Manager B. A. Webster reports that the company is enjoying a 25 per cent increase in business since it has put the new equipment into service.

The line is a belt operating between Toledo and Maumee and Perrysburg on each side of the Maumee River.

Seattle Employees on Hourly Basis

Over the protest of the Seattle Municipal Railway employees, the City Council of Seattle recently changed the wage payment system for platform men from the monthly basis, under which the men have been working for the last year, to an hourly basis. The new system, which goes into effect Jan. 1, 1924, will give the men a slight increase over their present rate of payment, figured on an hourly basis. The efficiency rating system sought by the trainmen was tabled by the Councilmen, the members holding that if the men are paid by the hour instead of by the month no efficiency rating is necessary.

When the budget comes before the Council for final approval in September the trainmen's union will fight the proposed changes, its business agent announces. No action will be taken in the meantime. The change from a monthly to an hourly basis means that the "one day off in eight" for which the trainmen have been fighting is killed, members of the Council say. If the day off is taken under the hourly scale, it will be at the expense of the men, while under a monthly pay scale they had hoped to be awarded the day off without loss of pay.

The new wage scale will give the men 59.735 cents an hour, 62.5 cents and 65.625, according to their length of service. Under the monthly rate, they received 56.25 cents an hour, 60.41 and 64.58 cents. The change will not effect the total amount granted the street railway department under next year's budget.

Advertising Tells of Improvements.—The Indiana Service Corporation, Fort Wayne, is doing some interesting advertising for the purpose of calling attention to improvements it is making. This advertising consists of car cards reading as follows: "The double tracking on South Calhoun Street costs us $77,000. It will take more than 1,000,000 fares to pay for this work."

Gives Life Insurance Certificates.—The Alabama Power Company has presented the employees of its own company and of the Dixie Construction Company who have been in their service continuously for a period of six months or longer a life insurance certificate in an amount from $500 to $2,500, depending on the length of service, and payable at death to a beneficiary of each employee's own selection or designation.

Picnic in Philadelphia.—The first half of the annual two-day picnic of the Philadelphia Rapid Transit Company was held at Willow Grove Park on Aug. 28 and was attended by thousands of the employees. Thomas E. Mitten, in addressing the gathering, told the men that they would own the property and run it. He finished with a word to a delegation of 100 trolley employees from Buffalo. Messrs. Mitten, Nyman and Dunbar all spoke optimistically in reviewing the conditions of the past year.

Franchise Granted.—The City Council of Vancouver has granted to the Portland Railway, Light & Power Company a new franchise, effective for fifty years. The grant follows a dispute over the proposal to insert a clause relating to the joint usage of poles by the Portland Railway, Light & Power Company and the Northwestern Electric Company, which are competitors for local light and power business. The Portland Railway protested the common usage clause, declaring it would be more of a benefit to the Northwestern concern because the former is new to the field and has fewer poles. The clause was inserted with the understanding that it would not become effective for ten years. Under the new franchise, the city will receive $75 a month from the Portland Railway, Light & Power Company, during the term of its franchise, whereas under the previous franchise the city received nothing.

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Financial and Corporate

Valuation Appealed

St. Louis Railway Protests Order of Public Service Commission Fixing Value at $51,781,348

The United Railways of St. Louis has appealed to the St. Louis Circuit Court from an order of the Public Service Commission fixing the valuation of the company for the purpose of rate making at $51,781,348. The petition asked that the court annul the findings of the commission on valuation and to issue a writ of certiorari directing the commission to fix a valuation of $69,100,000 as requested by the company. No order has been made so far.

The city of St. Louis also is dissatisfied with the commission's valuation, holding that it is vastly in excess of the value of company's property. Former City Counselor Henry S. Caulfield, representing the city, filed a certiorari proceeding in the Circuit Court of Cole County asking for an order compelling the commission to reduce its valuation to approximately $29,000,000.

The United Railways in its petition asserts that the commission's order is confiscatory and a Federal question is raised which will enable the company, if it desires, to appeal from a decision of the Missouri Supreme Court, if adverse, to the United States Supreme Court.

Thomas E. Francis, attorney for the company, who filed the certiorari petition, alleges that many of the items in the valuation as fixed by the commission are confiscatory.

The petition quoted from the *Engineering News-Record*, a McGraw-Hill publication, to show that the cost of materials and labor has doubled since 1913. Upon those figures the claim is made that the present fair value of the physical property of the United Railways is $103,645,062.

The value of the United Railways on Jan. 1, 1919, for the purpose of rate making was $69,100,000, the petition alleged.

The petition complains about the valuation fixed by the commission upon a larger number of items making up the total valuation. Among the larger items were overhead construction costs placed by the commission at $5,252,113 and the company at $8,146,877; promoting and financing costs fixed by the commission at $2,700,000 and the company at $5,000,000 and the going value of the company fixed by the commission at $2,500,000 and by the company at $5,000,000.

The company alleged that the commission erred in striking off $15,756,038 for depreciation, contending that $7,500,000 was ample. Complaint is made that the commission disallowed $7,091,415 for unextracted value of the old horse car and other equipment superseded by the present equipment. The disallowance of numerous other items likewise was complained of. While the litigation is pending the 7-cent fare is not likely to be disturbed.

Sun Life Got $30,000,000 for I. T. S. Holdings

It has long been known that the Sun Life Insurance Company, Toronto, Ont., held a very considerable interest in the securities of the Illinois Traction Company. In the deal in which the Studebaker interests became identified with I. T. S. affairs through the medium of the Illinois Power & Light Company the Sun Life Insurance Company is said to have received $30,000,000. The Canadian *Financial Post* says:

> In addition to its usual annual income and its maturing securities, which are in themselves a large sum, the Sun Life this year has an extra $30,000,000, representing the proceeds of the sale of its interest in the Illinois Traction Company. When it received the $30,000,000 cheque for the securities it had held of the Illinois Traction, the Sun Life was handed what is believed to be the largest cheque ever passed in Canada. It probably had also the largest single sum ever ready to be invested at one time in this country.

According to the same authority the Sun company has this year the sum of $70,000,000 to invest.

Receiver in St. Louis Seeking Extension of Bond Maturity

Arrangements are being made by the receiver of the United Railways, St. Louis, to refund or extend $14,800,000 of bonds and receiver's certificates virtually all of which mature Oct. 1. Action is now waiting upon United States District Judge Faris, to whom application for new issues has just been made.

The refunding must primarily take care of the $4,200,000 receiver's certificates now outstanding, which mature Oct. 1. They bear 7 per cent interest. Besides this issue underlying bonds, aggregating $6,100,000, and one junior issue, amounting to $4,500,000, have to be provided for by the same date.

The securities of the Suburban Railway, fall into a different category than the others, because the bondholders started foreclosure suit and may press for a separate receivership.

There are two suburban bond issues, the underlying first mortgage issue of $2,000,000, which matured Feb. 1, 1921, and was extended at 8 per cent to Oct. 1, 1923, and the suburban general mortgage 5s, totaling $4,500,000, which matured April 1, last. Besides the separation of the property in the receivership, alternate courses are the redemption of the bonds with funds derived from the sale of receiver's certificates or the extension of the issues with the expectation that the United Railways would be reorganized before the extended maturity date and the bonds taken care of in the reorganization.

Montreal Surplus Increased

Surplus of $347,553 for Year Just Closed Compared with $187,947 for Similar Item for 1922

The fifth annual report of the Montreal Tramways Commission to the city of Montreal for the year ended June 30, 1923, has just been made public. Passenger receipts amounted to $11,752,441, and receipts from all other sources brought the total up to $12,056,355. The allowance made to the company for operating expenses was 25.91 cents per car-mile for motor cars and 18.73 for trailers at a density of 8.5. Last year the allowance was 26.62 and 19.43 respectively for the same density. The allowance granted at this rate was $5,866,155, as compared with $5,832,844 last year. The actual operating expenses and taxes were $6,099,993, or $233,837 in excess of the allowance. Consequently the commission authorized the company to appropriate from the gross receipts the sums necessary to liquidate the excess expenditure. The company has had to pay, over and above the allowances, $93,316 for snow removal, $140,187 for taxes, and $41,460 for injuries and damages, which fully justifies the expenditure in excess of credits.

The operating profit of the company was allowed at ⅛ of 1 per cent on the average value of the capital during the year, and was $48,304, as compared with $47,959 last year. The average value of the capital during the year was $38,643,734, as against $38,367,983 last year.

The maintenance and renewal fund was fixed by the commission at $2,740,778, being at the rate of 11.22 cents per car-mile for motor cars and 9.853 cents for trailers. The actual expense for maintenance and renewal was $2,618,874, leaving a reserve to the credit of the maintenance account of $121,903. Last year the allowance for this account was fixed by the commission at $2,579,200, the actual expenses were $2,368,235, and the amount transferred to reserve was $210,964.

The additions to capital value in the shape of physical assets, during the year ended June 30, amounted to $481,065, and after deducting the value of properties and materials discarded and scrapped, the net addition to capital value amounted to $15,901. Last year the net addition was $269,211.

The following is a statement of operations for the year ended June 30:

	1923	1922
Gross receipts	$12,056,355	$11,712,525
Operating expenses and taxes	6,099,993	5,769,403
Maintenance	2,492,792	2,579,200
Operating profit	48,304	47,959
Interest on capital value	2,344,681	2,329,457
Financing expenses	181,431	181,431
City's rental	500,000	500,000
Reserve fund	41,597	171,125
Surplus	$347,553	$187,947

The accompanying statistics will show that the better results anticipated have been realized.

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	1923	1922
Revenue, passengers	$193,519,038	$188,201,367
Car-miles	22,318,701	21,547,345
Operating ratio	71.67%	71.69%
Paid to city	1,309,581	947,157
Percentage of gross receipts	10.86	8.32
Average fare	6.23	6.223

The amount paid the city during the past twelve months was made up of $229,629 taxes, $190,800 for snow removal, and $889,151 on rentals. The general statistics of the company show that the length of tracks is now 271,422 miles, of which 253,176 are in operation. The gross receipts per mile of track in operation amounted to $47,620. The operating expenses and taxes consumed 51 per cent of the gross receipts while the maintenance and renewals absorbed 20.67 per cent.

The statistics further show that 79,123,158 transfers were issued, being 40.89 per cent of the number of revenue passengers. The total operating expenses and taxes per passenger amounted to 4.47 cents.

Time Extended Under Reorganization Plan of Chicago "L"

The committee in charge of the reorganization of the Chicago Elevated Railways has notified the holders of the two-year 5 per cent secured gold notes and the ten-year 6 per cent debentures that in order to afford further opportunity for these holders to participate in the benefits of the reorganization plan, dated July 14, 1923, the time for making deposits under this plan and the accompanying agreement has been extended to the close of business on Sept. 25, 1923. More than 92 per cent of the secured gold notes and a substantial percentage of the ten-year 6 per cent debentures have been deposited subject to the plan and agreement of reorganization. Until the close of business on Sept. 25 secured gold notes and ten-year 6 per cent debentures may be deposited with the National City Bank, New York, or with the Continental & Commercial Trust & Savings Bank, Chicago, depositaries of the committee. Upon such deposits the depositaries will issue, in exchange for deposited securities, appropriate certificates of deposit.

William Hughes Clark of Chicago has voiced objection to the reorganization plan of the Chicago Elevated Railways in a letter to noteholders, calling on them to join with him in opposing the plan. He charges that the reorganization plan required "several and unnecessary sacrifices from noteholders."

In a letter to the noteholders he said:

My examination of the reorganization as planned, discloses the noteholders would be obliged (a) to sacrifice their sole and only claims against the very valuable equity in the prosperous South Side Division; (b) to sacrifice their majority claims against an equity in the Metropolitan Division; (c) to sacrifice their large claims against the Northwestern Division, and (d) to sacrifice their pro rata two-thirds interest in $208,000 Northwestern first mortgage bonds and other assets of the railways trust available to the committee, etc., all mostly for the benefit of particular holders of Oak Park receiver's obligations and Lake Street bonds and selected numbers of other securities.

Bonds Offered Locally.—The Lehigh Traction Company, Hazleton, Pa., recently announced that it would offer to its employees, patrons and the public an opportunity to buy $350,000 of first mortgages bonds on the basis of $89.10 for each $100 bond.

More Power Properties Acquired.—The Puget Sound Power & Light Company, a company under Stone & Webster management, has acquired control of the Olympia Light & Power Company, which supplies electric light and power and street railway service to Olympia, Wash. The acquired company's gross earnings for 1922 were $199,581.

Meeting of Stockholders Called.—A special meeting of the stockholders of the Illinois Power & Light Corporation will be held on Sept. 4, 1923, in Chicago for the purpose of submitting to a vote of the stockholders the question of increasing the authorized capital stock of the corporation by increasing the authorized par amount of the 7 per cent cumulative preferred stock from $20,000,000 to $25,000,000.

Indiana Electric Bonds Offered.—Stone & Webster, Boston, Mass., are offering at 99 and interest to yield about 6.57 per cent $2,700,000 of the Indiana Electric Corporation's first mortgage 6½ per cent gold bonds, series "B." The bonds, due August 1, 1953, are non-callable for ten years. The proceeds will be applied toward the cost of construction of high-tension transmission lines and substations.

Seek Bond Issue.—The Georgia Railway & Power Company, the Georgia Railway & Electric Company and the Atlanta Gas Light Co., operating the street railway and public utilities of Atlanta, has filed a petition with the Georgia Public Service Commission requesting permission to issue bonds in the sum of $74,000, $291,000 and $116,000 respectively, the money to be used largely for service improvements.

Auction Sales in New York.—At the public auction rooms in New York on Aug. 29 there were sold 26¼ shares Interborough Rapid Transit Company voting trust certificates, $13½ per share; $1,000 Interborough Rapid Transit Company ten-year 6 per cent note of 1932, interest April and October, 58¾ per cent; $5,000 Interborough-Metropolitan 4½ per cent bonds, 16 per cent, assessment paid, certificate of deposit $50 lot.

Must Return Bonds.—The city sinking fund trustees at Toledo have been formally requested to return $150,000 of 6 per cent bonds of the Community Traction Company to the Doherty interests, by whom they were placed as a forfeit in connection with the Milner ordinance plan of obtaining $1,000,000 of new capital for extensions and betterments of the Toledo system. The time for request from the city and formulation of a plan expired Aug. 1.

Stabilizing Deficit in Youngstown $963,131.—The deficit to the stabilizing fund of the Youngstown Municipal Railway, Youngstown, Ohio, for June amounted to $35,302. The increase places the stabilizing deficit on July 1 at $963,131. Gross revenues for June amounted to $137,793. Operating expense, maintenance cost and deduction from revenue were $124,772, resulting in a surplus of $16,211, which under the terms of the franchise is entered into the stabilizing fund at the end of each year.

Requests Signing Petition.—The shareholders' protective committee of the Quebec Railway has requested that holders who have not yet signed the petition to the president for modification of the terms of exchange should do so without delay. The committee already has representation of about 50 per cent of the aggregate holdings of individual shareholders. The terms of the merger of the Quebec Railway and Quebec Power Company were referred to in the ELECTRIC RAILWAY JOURNAL, issue of Aug. 4.

New Issue to Be Offered.—Greenshields & Company, Mackenzie & Kingman and Aemelius Jarvis & Company will offer, it is expected, at 95, to yield 7⅞ per cent, $550,000 of the 7 per cent cumulative preferred stock of the Jamaica Public Service Company. This offer will complete the financing arranged at the time of the transfer of the property, formerly owned by the West India Electric Company, to the new interests, who are operating it under Stone & Webster management. The first step in the financing was the sale of $1,000,000 of first mortgage bonds of the company.

Invites Bids on Bonds.—The Market Street Railway, San Francisco, Cal., has invited bids for the sale to it on Sept. 1 of a sufficient number of its first consolidated mortgage 5 per cent gold bonds for the investment of $160,000, now in the sinking fund provided for in the mortgage executed by the Market Street Railway to the Union Trust Company, San Francisco, as trustee, under date of July 12, 1894. The lowest bids will be accepted and bonds redeemed to the extent of $160,000. Interest on all bonds accepted under any bid will cease Sept. 1, 1923. Payment for all bonds accepted will be made on surrernder of the bonds after that date.

Gold Bonds Offered.—Stone & Webster are offering at 99 and interest, to yield more than 6½ per cent, $3,807,800 of refunding and improvement mortgage 6½ per cent gold bonds of the Staten Island Edison Corporation. These bonds, dated July 1, 1923, will mature July 1, 1953. The proceeds will be used to retire the floating indebtedness incurred for extensions, additions, new construction and other corporate purposes and to acquire $700,000 par value of underlying bonds which will be deposited with the trustee of this issue as additional security for these bonds. The Staten Island Edison Corporation is successor under reorganization to the Richmond Light & Railroad Company.

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Traffic and Transportation

75,000,000 Tickets for Detroit

Mayor Urges Purchase of Tickets at Nine for Fifty Cents as Economy and Move to Speed Traffic

The Department of Street Railways at Detroit has had 75,000,000 tickets printed to be in readiness when the 6-cent fare goes into effect on Sunday, Sept. 2. The tickets will be sold in strips at the rate of nine for 50 cents. It was planned to put them on sale on Aug. 31 at the City Hall, the carhouses and the terminals and to have conductors sell the tickets beginning Sunday.

William B. Mayo, general manager of the system, is urging the public to purchase tickets on the plea of the saving to the passengers by their use and their value in speeding up the movement of cars. Until further notice "tokens," or metal tickets, now in the hands of the public will be accepted the same as a 5-cent piece, but passengers using these tokens beginning Sept. 2 must deposit an extra cent in the fare box. The new rate of fare will also apply to the buses now being operated on Mount Elliott Avenue.

ARBITRATOR VOICES OBJECTION

The decrease in income of the D.S.R., it has been pointed out, bears out the Street Railway Commission's statement that the increase in wages of the employees and increased power charge would have to be met by the increase in fares if the necessary rehabilitation of the lines is to be provided. Despite this considerable opposition has developed to the commission's policy of increasing fares. Judge Dingeman, chairman of the board of arbitration that decided the question as to the increase of wages for the platform men, expressed the opinion that according to the study of the finances of the department, made during the arbitration proceedings, the increase in fares was not necessary. Judge Dingeman stated that the possibility of an increase in fares resulting from an increase in wages of the men was carefully considered by the arbitrators and after analyzing the figures presented, it was the belief of the board that the higher wages granted the men would not necessitate an increase in fares.

Mayor Doremus, it is stated, in agreeing to the increased fare plan depended mainly on the judgment of the commission in regard to this particular point.

A proposed resolution to be introduced in the City Council by Councilman John A. Kronk, requesting the Street Railway Commission to appear before that body and explain why the increase in fares was necessary, was protested against by Ross Schram, assistant general manager. Mr. Schram pointed out that the commission had made a thorough study of the fare question before deciding on an increase, and while the commission was willing at any time to lay its books before the Council, it protested against interference with its management of the D.S.R.

Councilman Kronk favors a straight 5-cent fare with an increase in the cost of transfers sufficient to meet the increase in operating costs due to the recent increase in pay and the higher power costs which became effective on July 1. Mr. Schram says this plan would penalize the car riders living on transfer lines. Mr. Kronk also favors the plan proposed by Mayor Doremus for refinancing the street railway purchase by issuing twenty-year or thirty-year bonds and with the proceeds of the bond sale to pay off the ten-year mortgage on the system. This arrangement, he stated, would provide for the financing of the extensions, additions and betterments each year from the earnings.

Restraining Order Continued in Schenectady

Supreme Court Justice John C. Crapser in a special term of the Supreme Court at Canton, N. Y., on Aug. 25, granted the motion of the attorneys for the Schenectady Railway that the order of Supreme Court Justice Edward N. Angell restraining jitney drivers from operating parallel to the company's lines be continued during the trial of the case. Attorneys representing the jitney men, whose activities are an outgrowth of the Schenectady trolley strike, opposed the motion on the ground that the city of Schenectady licensed the operation of the jitneys.

Company attorneys also made a motion on an order to show cause why the defendants should not be punished for contempt in disobeying the injunction. Justice Crapser interposed with the suggestion that the opposing factions come to an agreement before proceeding. After a conference of attorneys it was agreed with Judge Crapser that an adjournment be taken for one week and that it be understood that counsel for the defendants explain to members of the jitney men's organization the court order and advise them to maintain it.

Increased Service Kills Jitneys.—Cars on the Point Place lines, operated by the Toledo, Ottawa Beach & Northern Railroad, have put three buses that have been in competition for many months out of business by an increase to a fifteen-minute service. The buses quit about two weeks before the new state license law went into effect.

Bus Licenses Denied

Maine Commission Refuses Authorization for Bus Service Since Present Agencies Are Satisfactory

The Maine Public Utilities Commission has just handed down a decision refusing to grant licenses for bus operations over regular routes between Portland and Old Orchard. The bus applications were in competition with a steam railroad, namely, the Boston & Maine, and an electric line, the Cumberland County Power & Light Company. In dismissing the petitions the commission said:

> Competition, which adds life and force and incentive to ordinary industries, cannot truthfully be said to be desirable in the conduct of public utilities, which in their nature, although owned by private individuals, are dedicated to the use of all the citizens of the community. Public utilities must, of necessity, be limited in number in any given community in order to be at all remunerative and hence able to attract capital for maintenance and development.

The commission brought out the fact that at the hearing no complaint was registered against the agencies operating this service. Further, that adequate service was enjoined by statute from all the public utilities of the state, and it had frequently been ordered by the commission against the protests of the utilities that additional service would not be remunerative. According to the evidence brought out at the hearing, the Portland Railroad, which is operated by the Cumberland County Power & Light Company, for the first six months of 1923 failed to earn its operating fixed charges and rental by the amount of $5,253, and it was shown that only from June 1 until after Labor Day is this branch of the service, between Portland and Old Orchard, self-supporting.

The opinion emphasized the fact that this was the acute problem facing electric railways not only in Maine but throughout the United States; that the mere desire of an operator of a motor vehicle to provide himself with lucrative business during the summer season should not be sufficient to place in his hands an agency of destruction of the electric railway system. The problem, this order said, was squarely presented whether or not a regularly organized and operated street railway service conducting its business for seven days a week and twelve months of the year under the control of the commission, and the duty imposed by the state law that its service shall be reasonable, adequate and safe, shall be protected from a competition that exists only during the summer months, and which ceases when the traffic diminishes by the passing from the border of the numerous tourists who make the community their homes during the summer months.

The commission said further that after reflecting upon the consequences of a discontinued realway service it believed that the general welfare of all the people would be benefited by the refusal of certificates for bus operation between these places.

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Submits Fare Proposals for Superior

The Duluth-Superior Traction Company has submitted two proposals with a view to ending the present fare controversy in Superior.

They are a fare of 10 cents cash with four riders for 25 cents. Service not less than the present schedule, and with no change in municipal requirements affecting operating conditions and a 10-cent cash fare with five tickets for 30 cents. At present the company is charging a 6-cent fare and sells six tickets for 35 cents.

This proposal was made by the company as the result of a request recently made by city officials. The city commissioners stated that if the company would submit an offer they would be in a better position to give it attention and would doubtless reach an agreement sooner than if the whole subject of fares were made the basis of discussion without any definite program or plan being offered.

Will Experiment with Buses.—The Northern Indiana Railway, South Bend, Ind., will start the operation of motor buses on Sept. 1 as an experiment. The company hopes that the bus service will relieve some of the congestion on Miami and Michigan Streets.

Referendum on Bus System. — By unanimous vote the City Council of Buffalo adopted the recommendation of Frank C. Perkins, Commissioner of Public Affairs, that a referendum be held at the next election in November on a bond issue of $1,000,000 for a municipal bus system.

"Safety Always" Issued.—An instructive as well as unusual booklet entitled "Safety Always" has just been issued by the Philadelphia company. Two charts are printed inside the pamphlet, one showing how "you" can become a member of a good health organization and the other giving nine directions for avoiding accidents. It sums up the whole matter in the phrase "A second's thought may add years to your life."

Bus Replaces Trolley Discontinued by Accident.—The city of Corry, Pa., was deprived of service over the lines of the Corry & Columbus Traction Company on Aug. 27 owing to the burning out of a transformer in the power house. Meanwhile, a bus line has been established to replace the trolley between Corry and Columbus.

Applies for Service Restoration.—The New York Transit Commission has applied to the Supreme Court for a writ of mandamus ordering the subsidiary companies of the Brooklyn-Manhattan Transit Company and the Brooklyn City Railroad to restore service on four surface lines in Brooklyn. Oct. 8 has been set as the date for the argument.

Fare Mounts.—The rate of fare of the Cleveland Railway goes up to straight 5 cents on Sept. 1. Since August, 1922, Cleveland car riders have been riding for a fraction under this rate because tickets were sold at the rate of eleven for 50 cents. The present increase is due to the fact that the company's so-called interest fund, the fare barometer, has dropped below the sum of $300,000, at which point the fare automatically is boosted. The drop in the interest fund is caused by a decrease in the number of car riders during the past several months and a 5 cent an hour wage increase given the trainmen on May 1. A 1-cent charge for transfer will continue.

Another Extension of Fare Grant Proposed.—The committee on streets of the City Council of Richmond, Va., has before it for consideration the ordinance granting an extension of a 6-cent fare privilege to the Virginia Railway & Power Company for a period of six months after Oct. 11, when the present permit expires. There has been considerable agitation to amend the grant by requiring the company to sell tickets at the rate of five for 25 cents, or 6 cents a single fare, and to open its viaducts in the city free to all vehicular traffic. In the event the petition of the company is disregarded by the City Council, the original fare rates will become automatically effective after Oct. 11. The franchises demand a 5-cent straight fare, with six tickets for 25 cents; and labor and school tickets at 2½ cents each.

Legal Notes

FEDERAL COURTS—*Valuation Should Be at Present and Future Values, Not Past Values. Five-and-a-Third per Cent Return Wholly Inadequate. Commission's Responsibility Is to Regulate, Not Manage.*

It is a matter of common knowledge that, in costs of material, labor, supplies, etc., used by public service corporations, there were large increases, between the years 1913, 1914 and 1916, and the year 1919. Under the due process clause of the federal Constitution, the fair return on the property of a public service corporation to which it is entitled, and which must be determined in inquiry as to the reasonableness of regulation of its rates, is the fair return on the reasonable value of the property at the time it is being used for the public and not merely its cost with increases of value excluded. It is impossible to ascertain what will amount to a fair return on properties devoted to public service unless consideration is given to the cost of labor, supplies, etc, at the time the investigation is made, and an honest and intelligent forecast of probable future values, made on a view of all the relevant circumstances, is essential.

Where rates for a telephone company fixed by the public service commission would yield the company 11½ per cent of the minimum value of its property, of which 6 per cent concededly should be allowed for depreciation, the remainder, or 5½ per cent on the value of the property, is a wholly inadequate return, when the character of the investment and the prevailing interest rates are considered.

While the state may regulate with a view to enforcing reasonable rates and charges, it is not the owner of the property of public utilities companies, and it is not clothed with the general power of management incident to ownership. Hence a public service commission cannot ignore items charged by the utility as operating expenses, unless there is an abuse of discretion by the corporate officers. (State of Missouri ex rel. Southwestern Bell Telephone Co. vs. Public Service Commission of Missouri. 43 Supreme Court Rep., 544.)

GEORGIA—*Property Owner Not Relieved for Liability for Repaving Because He Paid a Part of the Original Cost.*

A company had a contract with a city by which, for a "franchise, easement or right-of-way" on a certain street, it agreed to pay a certain sum for the purpose of widening and grading the street and an additional sum to cover two-thirds of the cost of the paving. These obligations were carried out, but the court held that they did not exempt the company from a subsequent assessment as a property owner for the cost of repaving the street. [Town of Decatur vs. Georgia Railway & Electric Co., 116 Southeast Rep. 645.]

PENNSYLVANIA—*Pedestrian Struck by Car, Deflected from Regular Route Along Intersecting Street, Held Not Contributorily Negligent.*

One struck by a street car while crossing a street, into which it was suddenly deflected by a misplaced switch from its regular and well-known route, held not contributorily negligent in not looking back down the intersecting street, especially where she stopped at the edge of the track. [Heaps vs. Southern Pennsylvania Traction Co., 120 Atlantic Rep. 548.]

WISCONSIN—*Not Responsible for Derailment Due to Auto on Track.*

It is not negligent to operate an electric train at a speed of 50 m.p.h. on a straight track in the open country. It is also not negligent for the motorman of such trains not to anticipate that there will be a collision on a parallel road between an automobile and a truck which will force the automobile onto the track ahead of his train. Hence a passenger injured because such a train was derailed cannot collect damages from the railway company. [Smith vs. Chicago, N. S. & M. R.R., 193 Northwest Rep. 64.]

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Personal Items

Mr. McCants Manager Market Street Railway

Melnotte McCants was appointed general manager of the Market Street Railway, San Francisco, Cal., on Aug. 23 by Charles N. Black, president and former general manager. Mr. McCants will take over a portion of the duties previously discharged by Mr. Black. Mr. McCants has been serving in the capacity of assistant to the president. His appointment was confirmed by the board of directors on Mr. Black's recommendation. Mr. McCants was formerly traveling passenger agent for the Southern Railway. He joined the Market Street Railway in 1906.

W. R. Phipps in Meridian

William R. Phipps, whose appointment as general manager of the Meridian Light & Railway Company to succeed H. G. Bonner was announced in the June 16 issue of the ELECTRIC RAILWAY JOURNAL, entered the public utility business in the electric light field as arc lamp trimmer at Paris, Tex. Later he became fireman and oiler and engineer in the electric plant. After doing some construction work with the Electrical Construction Company at Dallas, he went as chief engineer of the Interurban Railway, McAlister, Okla. His other positions included erecting engineer for Allis-Chalmers Company in Texas and Oklahoma, chief engineer of the Consumers Light & Heating Company, Fort Worth, Tex; chief engineer, superintendent, general superintendent and general manager of the Brush Electric Company, Galveston, Tex., and director customer ownership division, securities department, Henry L. Doherty & Company, New York.

Mr. Phipps was born in Paris, Tex., in 1880 and was trained in electrical and mechanical engineering. He belongs to many associations and clubs and is an associate member of the American Institute of Electrical Engineers.

D. C. Green Resigns

D. C. Green, vice-president and general manager of the Fort Smith Light & Traction Company and the Mississippi Valley Power Company, has resigned after nearly seven years as manager of the Fort Smith properties.

It was in the fall of 1916 that Mr. Green, then manager of the Salt Lake division of the Utah Light & Power Company, with offices in Salt Lake City, left that position to take hold of the Fort Smith properties. Before taking the position with the Utah Power & Light Company he was connected with the Byllesby interests for several years at San Diego, Albany and Marchfield, Ore., and Everett, Wash. Mr. Green's birthplace was near Patriot, Ind. He was graduated from Purdue University in electrical engineering in 1908.

It is not known definitely whether Mr. Green will continue in the public utility field or branch out into private business. Robert C. Coffy succeeds him at Fort Smith.

R. C. Coffy Appointed Vice-President at Fort Smith

Robert C. Coffy has been appointed to the office of vice-president and general manager of the Fort Smith Light & Traction Company. He has been manager of the central division of the Oklahoma Gas & Electric Company since January, 1918. Mr. Coffy has been connected with the utility industry since April, 1908, when he obtained employment as a meter record clerk with the Oklahoma Gas & Electric Company at Oklahoma City. In March, 1912, he moved to Tacoma, Wash., becoming general bookkeeper with the Tacoma Gas Company. September of that year saw his appointment as treasurer and auditor of that company. He remained there until March, 1915, when he was transferred to Everett, assuming the managership of the company's property in that town. His next transfer occurred in January, 1918, when he was assigned as manager of the central division of the Oklahoma Gas & Electric Company.

R. C. Coffy

J. F. Cunningham, Jr., G. E. Production Manager

John F. Cunningham, Jr., has been appointed assistant manager of the production department of the Schenectady Works of the General Electric Company. Mr. Cunningham was born in Valley Falls, N. Y. After leaving school he entered the employ of the Hoosick Falls Power & Light Company and served that company for two years, doing power station and line work. In 1901 he entered the employ of the General Electric Company in the armature department. In 1906 he was transferred to the turbine section of the production department as production clerk. He was later transferred to the main section of the production department as contract clerk and still later was made assistant to the production manager, in charge of requisition service. In 1919 he was transferred to the works manager's office in the capacity of special representative.

Editor Low Honored

Fred. R. Low was tendered a dinner on Aug. 29 and presented with a fine silver loving cup by his associates in the Mc-Graw-Hill Company in honor of his thirty-fifth anniversary as editor of *Power*. Mr. Low has not only been considered one of the foremost business papers editors but he has given greatly of his time and energy to the work of the American Society of Mechanical Engineers. As chairman of its committee on power test codes he had a large part in drawing up the boiler code which became the basis of the law not only in the United States but in a number of foreign countries. He is now first vice-president of the society and will presumably be its next president. As such his duties in 1924 will be particularly significant because of the World Power Conference which is to take place during his administration.

Mr. Low's great success as an editor was attributed by James H. McGraw to his ability to harness his vision for service. Mr. McGraw said he was a practical idealist in his field. When Mr. Low was offered the position of editor of *Power* in 1888 he said that he did not know enough to take the position. H. M. Swetland, general manager of the company which then owned *Power*, replied that he expected an editor to be more of a scoop than a reservoir.

Obituary

Oliver T. Harvell, who for the past fourteen years has been connected with the Georgia Railway & Power Company, Atlanta, as a commercial engineer, and who was well known as an engineer in public utility circles of the South, died recently at his home in Atlanta at the age of forty years.

J. Alfred Landry, president of the Lake Charles Railway, Light & Water Works Company, Lake Charles, La., died recently at the age of sixty-four. He had the sticktoitiveness to forge ahead despite difficulties and shortcomings. It was through his untiring efforts that the elective railway became a reality in Lake Charles. At the time of his death he was the controlling factor in all public utilities in Lake Charles.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Ready to Start on Rehabilitation Program in Detroit

The Detroit Street Railway Commission plans to begin work on the program of extensions and rehabilitation of the existing lines of the municipal railway. The improvements include the rebuilding of 13 miles of the old Pingree lines, placing new pavements between the tracks where the present pavement is defective, purchasing 200 new cars and repairing and repainting from eighty to 100 cars monthly instead of the twenty-five to thirty as under the present schedule at the Highland Park shop. These betterments, it is expected, will not only exhaust the additional revenue from the fare increase but will also require the $5,000,000 bonds which were authorized last spring but are yet unsold. A resolution passed by the Council last spring authorized the Comptroller to borrow $1,500,000 for street railway additions and extensions. This amount has been borrowed in anticipation of the sale of the bonds.

Paving Brick Production

Continued steady production of vitrified paving brick indicates a healthy business condition in the industry and continued active brick street and road construction work during the balance of the season. The July statistical report just issued by the National Paving Brick Manufacturers' Association, shows production and shipments keeping pace with those of previous months. Production for July was 30,529,000 and shipments 27,092,000, compared with production during June of 31,105,000 and shipments of 27,251,000. Stock on hand of 78,835,000 brick is reported. July shipments were made into thirty states and Canada, with Ohio leading in consumption, followed by Illinois, Texas, Iowa and Pennsylvania in the order named.

Price of Bayonet Base Lamps

Among the ways mentioned in the June 16 issue of the ELECTRIC RAILWAY JOURNAL to prevent the theft of lamps from electric railway cars was the use of a medium bayonet base. Inquiry has been made by railways concerning the cost of such lamps, and the following comparative price list of screw and bayonet base lamps is therefore published:

Watts	Bulb	Medium Screw Base	Medium Bayonet Base
23	S-17	$0.32	$0.42
36	S-19	0.32	0.42
56	S-21	0.37	0.47
94	S-24½	0.95	1.05

The price of the bayonet base lamp is higher in every case because of the special handling required. Some reduction would be possible, however, if this type lamp were bought in large quantities. These prices are subject to change without notice.

Asphalt-Concrete Favored for Street Railway Paving

At the annual conference of the Asphalt Association held at Denver, Colo., Aug. 21 and 22, asphalt-concrete was favored as the best material for paving, especially alongside street railway tracks. A detailed description was given by the city engineer of the methods used in Los Angeles for this purpose. The asphalt-concrete is laid tight against the rail to which it is bound by asphalt cement, and it is guttered out by a special tool on the gage side of the rail to make way for the wheel flanges. This construction has given perfect satisfaction, it was said, the flexibility of the asphalt-concrete absorbing all the vibration of car traffic without any loosening of the bond between rails and the concrete.

It was pointed out also that concrete is likely to deteriorate in the presence of alkali, on account of the replacement of the lime of the cement by soda, leaving nothing but loose dust where once there was cement. This condition may be remedied in two ways, either by mixing asphalt in the original concrete, which reduces its porosity but makes it less strong, or by giving an asphalt coating to the finished concrete.

No Change in Rail Prices

The United States Steel Corporation has announced that its price for steel rails for delivery up to March 31, 1924, will be the same as that prevailing for shipment up to the end of the current year, namely $43 per ton. It is thought that all other makers of steel rails will follow the example of the Steel Corporation and establish this price for the first quarter of next year.

No orders will be taken, however, for delivery after March 31 next at this price. After that date the price may be increased. The announcement has been made at this time because inquiries and orders for rails to be delivered during the first three months of next year have already been received in considerable volume by the steel companies. Such purchases have already reached a total of more than 400,000 tons. A number of the larger railroads are expected to come into the market in the near future and their requirements may total as much more.

The fact that there will be no immediate change in the price of steel rails does not necessarily mean that there will be no change in the price of other steel products. In the past the price of other products has been advanced while the price of rails was kept the same. It is possible that the same procedure will be followed again and a general higher price level of steel products will result from the abolition of the twelve-hour day.

ELECTRIC RAILWAY MATERIAL PRICES—AUG. 28, 1923

Metals—New York

Copper, electrolytic, cents per lb.	13.927
Lead, cents per lb.	6.75
Nickel, cents per lb.	29.50
Zinc, cents per lb.	6.75
Tin Straits, cents per lb.	40.625
Aluminum, 98 to 99 per cent, cents per lb.	25.50
Babbitt metal, warehouse, cents per lb.:	
Fair grade	52.00
Commercial	25.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$5.075
Somerset mine run, Boston	2.50
Pittsburgh mine run, Pittsburgh	2.20
Franklin, Ill., screenings, Chicago	1.675
Central, Ill., screenings, Chicago	1.425
Kansas screenings, Kansas City	2.625

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	3.15
Tie plates (flat type), cents per lb.	2.575
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.125
Steel bars, cents per lb.	2.40
Ties, white oak, Chicago, 6 in.x8 in.x8½ ft.	$1.50

Hardware—Pittsburgh

Wire nails, base per keg	3.00
Sheet iron (28 gage), cents per lb.	3.75
Sheet iron, galvanized (28 gage), cents per lb.	5.00
Galvanized barbed wire, cents per lb.	3.80
Galvanized wire, ordinary, cents per lb.	3.35

Waste—New York

Waste, wool, cents per lb.	12–16
Waste, cotton (100 lb. bale), cents per lb.:	
White	11–13.50
Colored	8–13

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal.	$0.91
White lead (100 lb. keg), cents per lb.	11.375
Turpentine (bbl. lots), per gal.	$0.95
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4.75

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	17.50
Rubber-covered wire, No. 14, per 1,000 ft.	$7.00
Weatherproof wire base, cents per lb.	18.75

Paving Materials

Paving stone, granite, 4x8x4, f.o.b. Chicago, dressed, per sq.yd.	$3.50
Common, per sq.yd.	3.10
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.79
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	54.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.75
Cement, Chicago consumers net prices, without bags	2.20
Gravel, ¾-in., cu.yd., f. o. b. N. Y.	1.75
Sand, cu.yd., N. Y.	1.25

Old Metals—New York

Heavy copper, cents per lb.	11.25
Light copper, cents per lb.	9.75
Heavy brass, cents per lb.	5.50
Zinc, old scrap, cents per lb.	4.25
Yellow brass, cents per lb. (heavy)	6.25
Lead, heavy, cents per lb.	5.75
Steel car axles, Chicago, net ton	$17.75
Old car wheels, Chicago, gross ton	19.75
Rails (short), Chicago, gross ton	20.25
Rails, (relaying), Chicago, gross ton	33.50
Machine turnings, Chicago, net ton	8.75

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British Contract with U. S. Firm

The bid of the United States Steel Products Company for special trackwork in Manchester, England, has been approved by the Town Council. The figure submitted by the American firm was £14,027, while the lowest English bid was £15,465.

Rolling Stock

Northern Indiana Railway, South Bend, Ind., has purchased three buses which will be put into service on Sept. 1.

Detroit Municipal Railway will purchase 200 cars in accordance with the rehabilitation plan recently announced by the Street Railway Commission.

Interborough Rapid Transit Company, New York, N. Y., has been ordered by the Transit Commission to purchase 100 steel cars right away and 150 more as soon as the Board of Estimate provides additional yard space.

United Railways, St. Louis, Mo., will build sixty new cars at a cost of $600,000 this year and forty early next year at a cost of $400,000. This is in accordance with authorization recently given by United States Judge Faris to Rolla Wells, receiver for the company, to spend $1,218,806 during the balance of 1923 for construction, reconstruction, repairs and maintenance of the company's property.

Monongahela-West Penn Public Service Company, Fairmont, W. Va., will put in operation shortly the seventeen new city cars which were ordered in February of the present year from the Cincinnati Car Company and which cost approximately $11,000 each. These cars are equipped with all safety devices and have a seating capacity of forty-eight passengers. The cars are to be pay-as-you-enter, with the motorman collecting the fares.

Track and Roadway

Southern Public Utilities Company, Charlotte, N. C., has just rebuilt its Pegram Street line at Belmont Park.

Philadelphia & Easton Transit Company, Doylestown, Pa., has been ordered by the Common Council of Doylestown to co-operate with the borough and state in rebuilding North Main Street.

Madison Railways, Madison, Wis., will begin work soon on laying new track on Breeze Terrace from University Avenue to Regent Street. Provision will also be made for double tracking this street.

Southern Indiana Gas & Electric Company, Evansville, Ind., is planning to extend the Washington Avenue street car line from its present terminus to the Bosse High School. The construction of this extension will not be made before early spring.

Kitchener, Ont.—The Kitchener Light Commission and a committee of the Waterloo Council have reached an agreement regarding the double-tracking of the railway line between Union Street and William Street in the town of Kitchener.

New York, N. Y.—The Transit Commission has received bids for necessary alterations in the structure of the Fourteenth Street-Eastern subway line in Bushwick Avenue, Brooklyn, to provide for the installation of a crossover to facilitate the turning of trains when the line is placed in operation next year. The lowest bid, which has not yet been checked by the engineers acting for the commission was that of David Levy for $47,148.

Power Houses, Shops and Buildings

Milwaukee Northern Railway, Sheboygan, Wis., will erect a new passenger depot and freight yards with suitable trackage for storage and handling cars and freight on Jefferson Avenue.

Los Angeles Railway has installed new equipment consisting of transformers and switches in the Sentous Street substation to meet the needs and demands of the new division four administration building.

Arkansas Central Power Company, Little Rock, Ark., will improve its system, spending approximately $550,000. Two new substations will be built, costing $100,000. These substations will be of the automatic kind for the redistribution of power and light and for electric railway current.

Detroit Edison Compay has ordered from the Westinghouse Electric & Manufacturing Company seven 1,000-kw., 60-cycle railway converters with single-phase 23,000-volt transformers and automatic switching equipment, to be installed in seven new substations along the line of the Port Huron division of the Detroit United Railways. The Detroit Edison Company is changing the 25-cycle transmission line supplying this railway to 60 cycles and instead of reconstructing the old substations it was decided to build entirely new ones for complete automatic operation. The substation equipment will not include high-tension oil circuit breakers, but three single-phase transformers will be connected to the transmission line through high-tension expulsion type fuses. The fusing of power transformers for supplying industrial service is the general practice of the company. The new stations will be built of sheet steel on steel framing.

Trade Notes

Breda Locomotive & Car Works Company, Milan, Italy, is completing forty street railway cars for the Lima (Peru) Tramways. Electrical equipment is being supplied by the Tecnomasio Italiano Company of Milan and the airbrake apparatus by the Italian Westinghouse Brake Company, of Turin. The cars are of composite steel and wood construction, with plain arch roof, and are of knock-down type.

Texas Creosoting Company, Orange, Texas, was organized on Aug. 1, 1923, by R. S. Manley and associates. Mr. Manley was formerly president of the Creosoted Materials Company of New Orleans. D. E. Roach, formerly secretary-treasurer of the Creosoted Materials Company is secretary-treasurer of the new organization. The creosoting plant, which will be modern in every respect, will consist of two cylinders 90 in. in diameter and 120 ft. long. The estimated annual capacity under ordinary conditions is 30,000,000 ft., which will include railway cross-ties, piles, poles, cross-arms and timber of all kinds. The plant will be located on tidewater, with facilities for shipment by rail or water. It is understood that actual construction work will start immediately and that the plant will be ready for operation early in 1924.

Heine Boiler Company, St. Louis, announces the following changes in the sales organization. George F. Murphy, who has completed the reorganization of the New York office, has taken charge of the Philadelphia territory, with headquarters in the Pennsylvania Building. Harold P. Childs, formerly special representative of the executive offices of the General Electric Company, has become associated with the company as manager of the New York office, with headquarters at 11 Broadway. J. R. Fortune, formerly manager of the Detroit office, has assumed charge of the territories heretofore covered by Pittsburgh, Cleveland and Detroit offices, and will maintain offices in the Dime Bank Building, Detroit, and in the Park Building, Pittsburgh. These changes became effective on Aug. 1. The company also announces the discontinuance of its Cleveland office.

New Advertising Literature

C. L. Downey Company, manufacturer of "Steel-Strong" coin-counting machines, has issued an interesting and extensively illustrated catalog describing its product. The Cleveland Fare Box Company of Cleveland is distributor to street railways.

Nichols-Lintern Company, Cleveland, Ohio, has issued a bulletin descriptive of its new N-L stoplight signal for electric railways. The company has also issued a new catalog, "Superior Ventilation," fully describing N-L ventilators for electric railway cars and motor buses.

General Electric Company, Schenectady, N. Y., has described in Bulletin 47,635 types PQ-25 and PQ-26 under voltage relays, which provide adequate protection of apparatus from damage caused by sudden return of supply voltage after its failure or reduction. The relays are of the self-resetting plunger type and may be supplied for operation on either direct or alternating-current control Type PQ-25 is for single-circuit control while type PQ-26 is for two-circuit control.

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New York, Saturday, September 8, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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HENRY W. BLAKE and HARRY L. BROWN, *Editors*

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Japan Can Be Assisted Through Red Cross Contributions

ELECTRIC railway men the world over will feel a special sympathy for Japan in its disaster. Tokyo is a city of many small homes and consequently of magnificent distances. This has necessitated an extensive transit system in the city, in addition to the electric interurban railway between Tokyo and the port of Yokohama, 17 miles away. The existence of extensive water powers in Japan has encouraged electrical development also throughout the empire. In consequence, Japanese railway engineers and transportation officials have become close students of what is the best practice in other countries, and many of them have gained many friends in Europe and America during visits to these continents.

Details are not available yet of the effect of the earthquake and fire on the transportation systems of Yokohama and Tokyo, but in such a widespread catastrophe they could not have escaped serious damage. The Red Cross has already set in motion relief measures, and readers of this paper cannot show their sympathy with Japan in a more practical way than by contributing to that fund.

Designing the Car to Speed Up Schedules

THAT increasing attention is being shown by operators to means for facilitating speedier operation of trolley cars is evidenced by the studies made in Chicago to analyze passenger movements in boarding and alighting from cars, as described in the issue of ELECTRIC RAILWAY JOURNAL for Aug. 25. These studies, involving an elaborate series of tests, were made in order to determine the relative advantages of the single-door versus the double-door safety car in facilitating the interchange movement of passengers. Out of this test also came a method for quickly determining the fitness of any type of car for the particular traffic on a given line.

With the increase of traffic of all kinds on busy city streets while street car business is simultaneously growing, studies of this character help in a constructive way to bring about the use of such cars as can handle the traffic presented, not only at the same speeds as heretofore in spite of increasing congestion, but at higher schedule speeds. It is significant that the schedules can be increased in ways such as this without any higher speed while in motion, and with the same motor capacity. The gain is entirely in eliminating time wasted in stops.

Although the time saving at each individual stop is small it is a great amount in the aggregate. If a car is making a schedule of 10 m.p.h. with ten stops per mile, the saving of but one second at each stop will give an increase of about 3 per cent in the schedule speed. In a railway system of considerable size it will be possible to utilize most of this gain, so that operating expenses can be reduced or service can be increased almost in proportion. And if the cars are designed right in the first place it can all be accomplished at no cost whatever.

Today, with the small margin that exists between income and outgo, careful attention to such factors as this is of vital importance, as the success of the industry depends on giving good and fast service at the lowest consistent cost. Other industries have been obliged to recognize changing conditions and have adapted themselves to keep in step. The street railway should in its function of a public utility continue to be a leader in this direction. In other words, the need to modernize was never so great as today.

Preparations to Combat Snow Are as Necessary as Ever

FEW people are aware of the frequency or real extent of the snowfall in their own locality. There is a widespread popular belief in many parts of the country that less snow falls now than was the case years ago. Some electric railway men even, who should have been disillusioned by bitter experience, share this belief. The prevalence of the idea that winters are less severe often tends to permit laxity here and there in taking adequate precautions to keep railway lines open. Here is a good place to practice thorough preparedness, and considerations of this matter are now in order, even though it may be 104 deg. in the shade on the day this issue of the JOURNAL reaches its readers.

Statements and figures of the United States Weather Bureau entirely contradict the theory of milder winters. Their records show that there is no outstanding trend either way. In fact, the seasonal snowfall is an extremely variable quantity. For example, the winter of 1918-1919 established a low record at New York. The very next winter, however, snowfall was far in excess of the average. At Philadelphia during the five-year period from the fall of 1913 to the spring of 1918 more snow fell than in any other similar period of which there is record.

The heaviest single winter known to the New York weather bureau was that of 1892-1893. On the other hand the ground was snow covered in 1919-1920 for a greater number of consecutive days than ever before. In New England the winter of 1915-1916 was the equal of many historic snowy ones. At Chicago 64 in. of snow fell in 1917-1918.

The lesson to be learned from these facts is that precautions to combat winter snow storms are as necessary as ever. Every railway needs an adequate equipment of plows and sweepers. Moreover, a comprehensive snow-fighting plan, such as is described elsewhere in this issue, is likely to prove of value. Auxiliary apparatus,

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ice cutters, track scrapers, snow loaders, etc., have their places, too. Money spent to provide proper snow-fighting equipment will usually be saved by subsequent freedom from tie-ups.

Helping to Develop Buses on a Sound and Legitimate Basis

ELECTRIC railway men will be interested to note the respective policies of the several bus papers regarding the relation of different types of transportation, as indicated in the following quotations from their editorial pages.

Bus Transportation, discussing the New Jersey situation and the plan of settlement proposed by the railway, has this to say:

> Considering only the bus aspects of the plan, at its foundation is the recognition that transportation, like electricity and gas, to be sold most economically and with the greatest satisfaction to the user, must not be supplied by separate organizations under competitive conditions. *Bus Transportation* believes that only through proper co-ordination of bus and rail can the best interests of the public and of the two types of transportation be met.

Better Buses, the first issue of which has just recently appeared, states its policy in the first editorial as follows:

> We believe that the motor bus should be regarded as a major transit facility, rather than merely as a feeder to other modes of transportation, even though these have long served a useful purpose and are continuing thus to serve. . . . Highways are built for the public and should be open to every useful business undertaking. We join with those who see injustice in singling out motor bus lines for taxation, from which other commercial users of the public highways are exempt. . . .
>
> We do not expect that all will agree with this outline of policy. It must be admitted, however, that the views herein expressed reflect the opinion of the large majority of motor bus owners. Moreover, our attitude is such as will appeal to the spirit of fairness. This being so, those who now dissent from it must eventually yield.

National Taxicab and Motorbus Journal shows its knowledge of the past history and fundamentals of transportation this way:

> Where a responsible operator of a motorbus or motor freight line, or both, stands ready to render service between points now inadequately served by rail, or on the other hand, adequately served at a loss to the operating rail line, it is a fallacy absurd and uneconomic to refrain from granting the newer and cheaper form of transportation service permission to function.
>
> A few of the narrow-minded rails are constantly beclouding the issue with specious arguments of various kinds. By so doing they show themselves unable to rise to the occasion.
>
> Motor transportation has a long way to go before it will entirely supplant the rails, if ever it will. The narrow-minded element of the rail camp might well bear in mind that the rail and the motor vehicle are not attempting to crowd each other from the field of public patronage, but are agencies capable of developing side by side and of finding their own broadest field in joining resources for the perfecting of the public service of transportation. And this can be done as competitors—there is no need whatsoever of listening to the fallacy that transportation is a natural monopoly.

Bus Transportation has based its program on long experience and knowledge in the passenger transportation business, with full appreciation of the desirability and the necessity of encouraging new development to the fullest extent. During its almost two years of existence, it has made a consistent effort to spread the philosophy of co-ordinated rather than competitive services, and railway men should thus be able to appreciate the value of this paper to them, not only as a service to help them in their own bus enterprises but also as an exponent of sound bus development. And the paper is, for the same reason, of just as great service to the independent bus men, for the philosophy of co-ordination of buses with other transportation lines is best for bus as well as railway and is in fact the only sound basis on which bus men can develop their service if they hope to create a substantial business. It is just a matter of plain economics, provided a community does not choose to subsidize one form of transportation while penalizing the other.

It is increasingly evident, after all, that it is a good thing it was the McGraw-Hill Company that started *Bus Transportation*, and started it early, and made it easily the leading paper in its field.

Proper Assignment of Cars May Result in Large Economy

FOR best results the equipment on each street car route, or sometimes on a group of routes, should be uniform, for the speed of an entire line is determined by the slowest cars assigned to it. This speed may be determined by the characteristics of the motor equipment, or it may be fixed by the time taken at stops. Little argument is needed to show that cars capable of making a fast schedule should not be held down by those of slower types. Sometimes a line can be speeded up as much as 10 per cent in this way.

Car capacity is a second factor that merits consideration. The change from a car with a seating capacity of, say, thirty-nine to one with forty-four seats may make possible a lengthening of rush-hour headway from one and one-half to two minutes. Not only is a reduction in street congestion effected thereby, but the use of fewer cars in the rush hour makes the question of tripper runs less serious.

Another important feature of the car assignment problem is its reaction upon the public. Car riders notice the appearance, both interior and exterior, of the vehicles in which they ride every day. If the cars are all alike and the type is a reasonably satisfactory one, the regular patrons are likely to be satisfied. On the other hand, if four or five different types of cars are operated on a single line, this fact is noticed at once. Patrons are likely to think that the railway is operating "a lot of old junk" on their line. The presence of even a single car of unusual type, such as a car with longitudinal seats where cross-seats are customary, may seriously disturb the complacency of the regular riders.

Traffic conditions on different car lines seldom are exactly alike. The work of the traffic engineer should determine the characteristics of each route and obtain as much information as possible regarding its needs in the way of equipment. He will have to work in co-operation with the transportation and mechanical departments, of course, since many questions arise that must be settled by them. It is plain that there will be need for compromises, particularly when there are several types of cars to be used that have widely different characteristics.

While the traffic engineer usually can determine the type of car best suited to the service on any particular line, few railways having cars of differing ages and various designs will have a sufficient number of each available to equip each line with cars of the desired type. The fact that the ideal is impossible of attainment should not, however, deter the management from going as far as it can in that direction.

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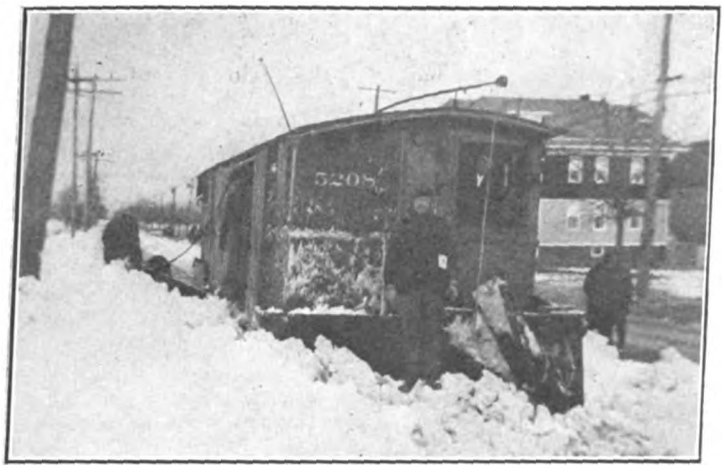

While the Storm Lasts Plows Are Used on the Suburban Lines

Sweeper Routes Are Shorter in This Kind of Territory

Fixed Snow Sweeper Routes Are Desirable

A Carefully Prearranged Plan to Combat Winter Storms Has Proved Its Worth on Many Occasions—Plows Are Used Also as Levelers—Scrapers on Cars Are a Help

SEVERAL years of experience with a comprehensive set of eighty-nine sweeper and twenty-six plow routes, covering the entire Public Service Railway system in New Jersey, has demonstrated the value of this method of handling the snow-fighting problem. The work of snow removal has been more efficiently performed, and delays and interruptions to service have been reduced in number because of the more frequent and more thorough clearing of snow from the tracks.

A set of snow-sweeper routes is made for each operating division, the number of routes depending upon the number of sweepers available, and the trackage of the division being divided into as many parts as there are routes. The mileages of the several routes are made approximately the same, but inequalities of length sometimes occur due to the character of the territory. Track in the open country where snow drifts deeply is likely to be more difficult to keep clear than is city track, and the sweeper routes should in such cases be made shorter. Less mileage may be assigned to an older and weaker machine, if that course appears to be desirable. No attempt is made to have the snow-sweeper routes coincide with routes used in actual passenger operation.

After all the trackage of the division has been assigned to the various sweepers, the routes are grouped together, each carhouse being made responsible for those in its particular vicinity. A table is then prepared showing the numbers of the routes, the names of the carhouses from which they operate, and an exact description of the track covered by each. The larger carhouses operate three or four sweeper routes, while the smaller carhouses operate only one or two.

Each sweeper has a definite section of line to keep clear. Routes overlap only in a few cases where that is necessary in order to reach a cross-over, loop or wye. When the sweepers first pull out of the carhouses a certain amount of duplication occurs when it is necessary for one machine to traverse the route of another in order to reach its own territory. This is reduced to a minimum, however, by having sweepers start out in opposite directions wherever the carhouse is located in the middle of a route. After a sweeper has reached its own route it remains on that and does not encroach upon the route of another sweeper except in case of emergency.

Several advantages have resulted from the adoption of this scheme. In the first place, all of the track is swept at regular intervals. In the center of the city, where several lines use the same street, there would be much unnecessary duplication of effort if a sweeper for each line covered the whole of that line including the portion in the city center. Moreover, there would be no way to control the time interval between sweepers on different routes, and the probability is that several sweepers would pass through the center of the city in rapid succession, after which a long time would elapse during which there would be no sweeping at all. But, by assigning the track in the center of the city to a single sweeper which does nothing but pass back and forth in that area, it is assured that this important part of the system will be swept at regular intervals and no undue accumulation of snow will occur to block the cars.

The elimination of duplication in the heart of the city makes it possible to give the suburbs more frequent sweeper service, because no time is wasted going over track that is already clear. The length of the average sweeper route is less than that of the ordinary operating line, and on this account it is easy for the division superintendent to keep track of his various units.

It is easy also to transfer a sweeper from one route to another. Blueprints of the table of snow-sweeper

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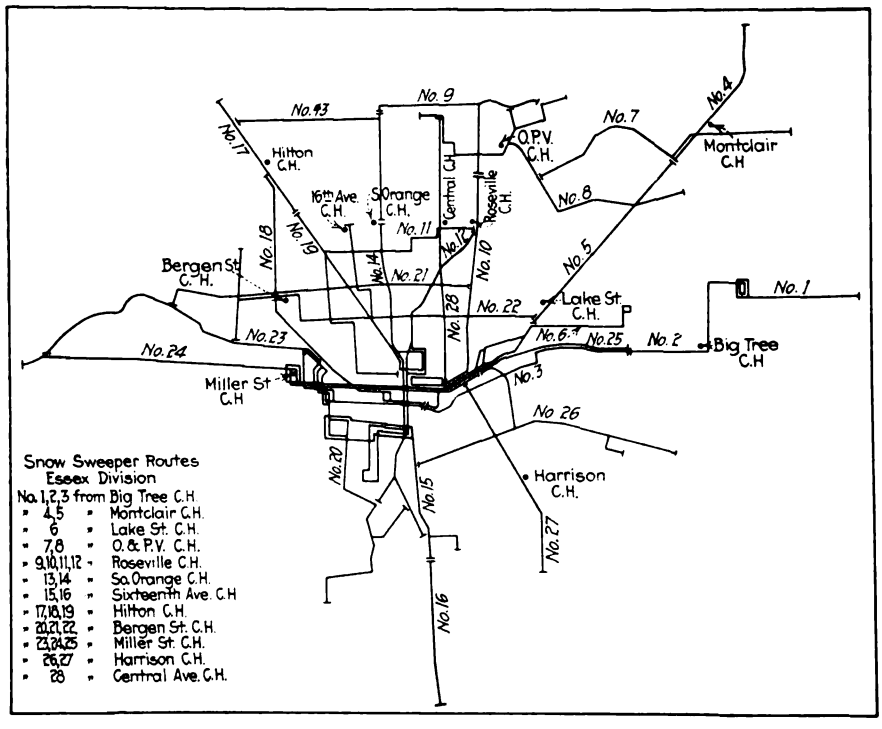

Twenty-eight Sweeper Routes Are Laid Out According to This Plan with Little Duplication

routes are made up by the traffic department and posted in the cabs of all sweepers. Copies of this schedule are provided for the supervisor of each carhouse, the superintendent of the division, and the general superintendent. Instructions to the operators of snow sweepers provide that they shall telephone to their own carhouse immediately in case of breakdown, and always at the end of each half trip. The location of every sweeper at any given moment is therefore definitely known, and in case one machine becomes crippled it is necessary only to tell the crew of a machine on an adjacent route to cover also that of the crippled sweeper. They have in their own vehicle the same schedule of routes that the division superintendent has, and if they are told by number to cover a certain additional route, they need no further instructions, the details of the route being thoroughly explained on the blueprint. The control of the whole operation of snow fighting is therefore much more centralized than would be the case were each line operating its own sweeper independent of the others.

By assigning individual vehicles by number to certain fixed routes it becomes possible to regulate carefully the streets on which they are operated. In case of small clearance due to the presence of an overhead bridge or other obstruction, the danger of accidents resulting from too great sweeper roof height is eliminated by noting in a prominent position on the table that certain sweepers must not operate on certain routes.

To each sweeper is assigned a definite crew of trainmen. These same men operate the same vehicle over the same route in every storm. They therefore become thoroughly familiar with their sweeper and with the characteristics of the territory they cover. The whole procedure of starting the fight against snow is almost automatic. It is necessary only for the general superintendent to give the word that the sweepers shall go out. When this word reaches the carhouses each supervisor knows exactly what men and what sweepers he has to send out, and where they are to go. The men know the same thing and are prepared to commence their work at a moment's notice. No prolonged explanations are necessary in order to be sure that the entire line will be properly covered; that has already been taken care of in the preparation of the table.

Snow plows are assigned to routes in much the same way as are the sweepers. The former, however, have a dual function to perform. While the storm lasts they are used to clear the tracks out in the open country where deep drifts occur, as shown in the accompanying

ESSEX DIVISION

SWEEPER ROUTES

WINGS TO BE USED AT ALL TIMES

ROUTE NO.	SWEEPER NO.	
		BIG TREE
1	5192	FROM C.H NORTH TO MAIN & PASSAIC — RETURN TO GLENDALE LOOP — COVER BETWEEN GLENDALE LOOP AND MAIN & PASSIAC
2	5181	FROM C H NORTH TO GLENDALE LOOP — RETURN TO CITY LINE — COVER BETWEEN CITY LINE AND GLENDALE LOOP
3	5169	FROM C.H SOUTH TO TERMINAL VIA PATERSON LINE — COVER BETWEEN TERMINAL AND CITY LINE VIA PATERSON LINE
		MONTCLAIR
4	5189	FROM C.H TO CALDWELL — RETURN TO ELM ST — COVER BETWEEN ELM AND CALDWELL
5	5171	FROM C H TO BLOOMFIELD & MT PROSPECT — RETURN TO ELM ST — COVER BETWEEN ELM AND BLOOMFIELD & MT. PROS.
25	5112	FROM C H NORTH VIA BROAD — BELLEVILLE TO CITY LINE BELLEVILLE — RETURN TO C.H. REPEAT
		HARRISON
26	5194	FROM C H TO 4TH & HARRISON THEN VIA 4TH - CENTRAL — CLAY — BROAD TO D.L & W LOOP. RETURN VIA SAME ROUTE TO 4TH & CENTRAL — THEN VIA KEARNY AVE TO ARLINGTON DEPOT — RETURN TO KEARNY AVE THENCE TO BELLEVILLE PIKE — RETURN VIA KEARNY — 4TH TO 4TH & MARKET — RETURN TO 4TH & HARRISON — REPEAT
27	5121	FROM C H. TO BRIDGE & BROAD — COVER BETWEEN BRIDGE & BROAD AND FIVE CORNERS JERSEY CITY
		CENTRAL
28	5190	FROM C.H. VIA CENTRAL AVE TO BROAD ST. (CROSSING BROAD) THEN VIA CENTRAL WASHINGTON TO SUBWAY ENTRANCE TO TERMINAL — RETURN TO CENTRAL TO ORANGE — RETURN TO C.H. - REPEAT

Typical Snow Sweeper Table

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illustration. After the storm has ceased the snow plows are used as levelers to push back the snow from beside the track to a point near the gutter, thus making possible the passage of vehicles alongside the cars.

Accordingly there is made up a set of plow routes to cover the outlying districts, and also a set of leveler routes to cover all of the city lines. The number of plows in a division ordinarily is less than the number of sweepers, and each leveler must therefore cover more territory. To level the entire trackage of a division with four or five snow plows means that each one must follow a long and rather complicated route. These have been worked out to the best advantage in the preparation of the schedule, and are explained on the blueprint. There is no danger, therefore, that a plow will stray from its proper path, however long the route may be. All that is necessary is that the operator shall follow the route as described in the table.

As an auxiliary means of keeping the rails clear, the company has found that Root spring scrapers have been of particular value. Air-operated scrapers of this type have been installed on several hundred cars. Their use is usually optional with the individual motormen, although instructions may be given at the carhouse when it is specially desired to have the scrapers used.

Fighting 145 Inches of Snow

Levis, Que., Has a Combined Snow Plow and Ice Cutter that Assists Materially in Keeping the Track Open Despite Severe Weather Conditions

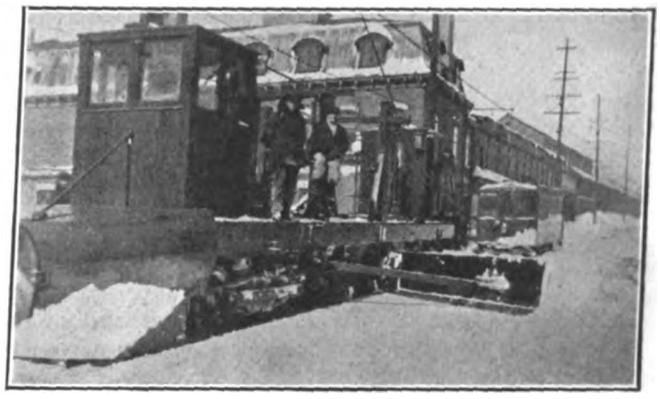
SNOW is always a problem in Levis, Que. While there is considerable snowfall every winter, last year the weather was especially severe, one storm succeeding another with just enough mild weather in between to compact the entire snowfall into a heavy mass hard to remove. During the winter season 145 in. of snow fell altogether, and the greater portion of it remained on the ground until spring.

Much of the equipment used for snow fighting in Levis has been described in various issues of the ELECTRIC RAILWAY JOURNAL. Last year H. E. Weyman, general manager, added to his already complete equipment a new type of snow plow and ice cutter which proved particularly efficacious in dealing with the compacted snow and ice on the tracks. This plow, which is shown in the accompanying photographs, has a double mold board which throws the snow both ways—in Levis the lines are all single track—and in addition has an outboard plow which cleans a path about 10 ft. wide alongside the track.

The most novel feature of the outfit is the device for cutting ice. There are two cutters placed back to back for operation in either direction. Each unit consists of a V-shaped board under the center of the body and transverse to the direction of travel, on which is mounted a set of steel knives 6 in. wide. This cutter may be seen in the photograph of the plow with the outboard plow raised. This small size of knife was chosen to permit easy replacement in case of breakage, each one being a separate unit that can be removed independently.

The entire ice cutter may be raised or lowered by two air cylinders acting through the vertical pillars shown in the photographs. By this means the cutters can be placed in any position down to within approximately 1 in. above the level of the rail head. In order

The Outboard Plow Is Shown Raised. The Ice Cutter May Be Seen Beneath It



The Outboard Plow Is Here Shown in Position for Use

that there may be clearance outside of the track, and the paving will not be torn up, the cutters are raised slightly from the horizontal outside the rails.

In action the plow can be driven by the motors at speeds up to approximately 15 m.p.h. The cutters are strong enough to clear away any thickness of ice that the machine can operate over. They are held in position by the air pressure, which gives a certain amount of flexibility, so that in the contingency that some extraordinary obstruction is encountered, the cutter will rise over it.

According to Mr. Weyman the plow has operated with great success, and it was found essential to keeping the line open under the abnormal conditions encountered. While the snowfall on the level was 145 in., the winds were severe a great deal of the time, so that the snow drifted in many places, reaching a depth of 15 to 20 ft. in the worst locations, which had to be cleared in order to open up a roadway for the cars.

The entire equipment was furnished by the Russell Car & Snow Plow Company, Ridgway, Pa.

The Main Street in Levis After It Had Been Cleared by the Plow and Ice Cutter

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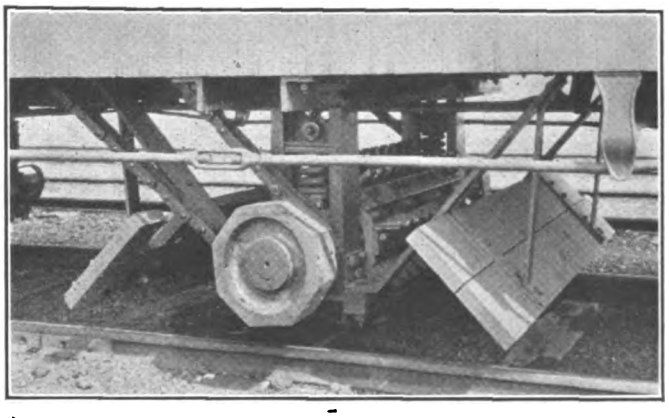


Only Interior Castings Have Teeth, as Rail Head Is Kept Clear by Plows and Sweepers

Revolving Teeth Cut Ice Between Rails

An Old Suburban Car Has Been Rebuilt at Erie—All Equipment Is Inside—Comfort of the Operator Is a Feature

THE damage to motor casings and other apparatus resulting from the presence of a hard ridge of ice between the rails is a familiar feature of winter operation. In the territory served by the Buffalo & Lake Erie Traction Company the danger of such an occurrence is especially prevalent because of the frequency and severity of the storms which sweep in from Lake Erie. For that reason the company has taken an old suburban car of obsolete type, completely dismantled the interior, and refitted it for winter service as an ice cutter.

Six hexagonal castings were pressed and keyed onto a shaft which is suspended under the center of the car. One casting is over each rail and four are between the rails. An angle iron with teeth cut in one flange is bolted parallel to the shaft on each face of the hexagonal castings. At present there are no teeth on the end castings because it has been found that the plows and sweepers keep the head of the rail itself free of ice.

The shaft is chain driven from a GE-87 motor inside the car body. A K-11 controller is used for this motor. The revolving shaft can be raised or lowered by a hand-operated worm gear, the lower limit bringing the teeth down to a level about 2 in. above the rail head. All equipment except the motors required to move the car, and the shaft itself, has been placed in the car interior Air compressor, tanks, piping and wiring are inside, as shown in an accompanying illustration. The car is electrically heated and every effort has been made to have it comfortable for the men who must operate it, for it was felt that otherwise there would be a strong desire to pull the car into the carhouse before the work of ice cutting was thoroughly done.

Seasonal Snowfall Is Irregular

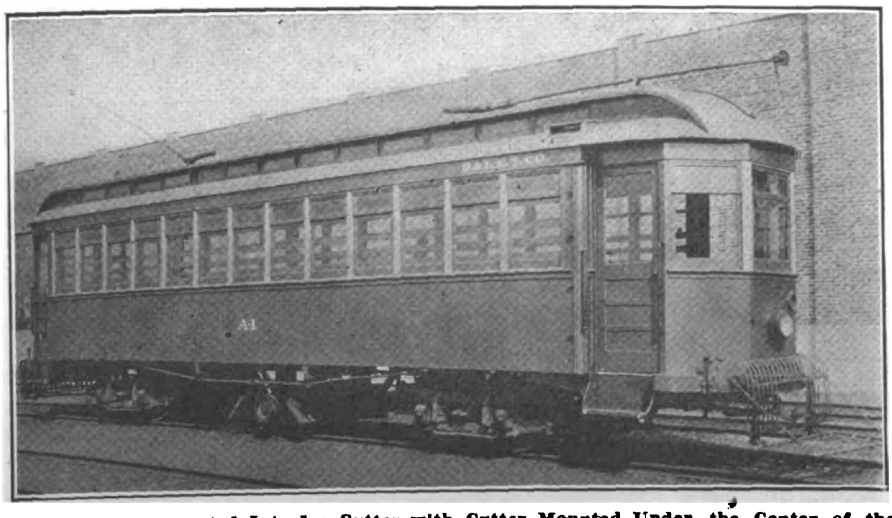
THE records of the U. S. Weather Bureau show that the annual snowfall varies in a most irregular manner. Sometimes there is an immediate reverse from a very light snowfall in one winter to a very heavy one the next. At other times there is a succession of winters with heavy snows or with light snows. The total snowfall by years for various localities is shown in the accompanying tables.

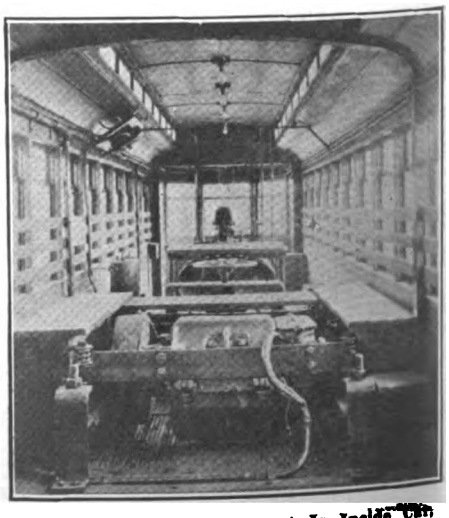
TABULATION OF SEASONAL SNOWFALL, IN INCHES

Winter	Philadelphia	New York	Winter	Philadelphia	New York	Winter	Philadelphia	New York
1885–86	20.2	23.9	1898–99	55.4	58.3	1910–11	28.5	26.0
1886–87	25.8	49.5	1899–1900	20.6	20.1	1911–12	22.5	23.3
1887–88	30.0	46.6	1900–01	10.6	9.2	1912–13	9.5	15.4
1888–89	6.2	21.9	1901–02	28.8	31.3	1913–14	33.1	37.1
1889–90	7.4	34.1	1902–03	16.8	26.0	1914–15	32.5	26.8
1890–91	15.2	39.7	1903–04	29.4	33.0	1915–16	31.1	47.3
1891–92	19.9	36.5	1904–05	43.8	57.8	1916–17	39.6	49.7
1892–93	36.8	77.6	1905–06	20.5	22.1	1917–18	38.9	32.3
1893–94	20.3	56.1	1906–07	38.6	52.4	1918–19	4.5	3.3
1894–95	22.8	36.2	1907–08	25.8	32.2	1919–20	23.2	45.6
1895–96	17.8	42.0	1908–09	20.2	20.7	1920–21	11.7	17.7
1896–97	25.7	39.1	1909–10	36.1	34.7	1921–22	28.0	27.2
1897–98	19.4	20.1						

Winter	Chicago, Ill.	Minneapolis, Minn.	Cleveland, Ohio	Boston, Mass.	Denver, Colo.	Buffalo, N. Y.	Washington, D.C.	Seattle, Wash.	Omaha, Neb.
1912–13	20.7	47.4	33.7	19.4	66.1	62.9	8.8	16.2	20.2
1913–14	27.9	23.0	60.3	39.4	98.9	90.9	28.6	1.1	17.6
1914–15	19.0	50.2	32.8	42.2	44.0	76.2	14.5	T.	51.5
1915–16	26.1	50.7	42.4	79.2	44.1	104.5	17.4	60.9	19.8
1916–17	23.7	84.9	50.0	54.2	79.4	86.8	18.3	16.0	22.9
1917–18	64.1	30.8	51.2	45.7	64.1	110.5	36.4	6.0	26.3
1918–19	28.7	26.7	8.8	21.1	46.3	25.0	3.3	T.	20.6
1919–20	32.2	64.5	41.0	73.4	71.3	69.4	16.4	3.9	31.7
1920–21	9.8	20.6	25.9	34.1	56.7	53.5	6.8	9.0	20.9
1921–22	11.5	43.3	26.8	37.2	54.4	39.8	44.5	12.9	11.4

Official figures furnished by the U. S. Weather Bureau, Washington, D. C.





Left—Car Converted Into Ice Cutter with Cutter Mounted Under the Center of the Car. Right—All Equipment Is Inside Car Including Compressor, Air Tanks, All Wiring and Controller and Motor for Driving the Cutter

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Keeping Track of Snow-Removal Costs

Montreal Tramways Engineering Department Supervises Snow-Removal Work in Co-operation with the Several Communities in Which the Company Operates — Company Divides Cost with the Municipalities

By R. B. Genest
Chief Clerk Engineering Department, Montreal Tramways

SINCE December, 1918, the responsibility for supervising snow-removal work done by municipalities served by the Montreal Tramways has been carried by the engineering department of the company. According to the contract in effect between the city of Montreal and the railway company, the latter is liable for one-half the cost of snow removal. Article 66 of the contract reads as follows: "The company shall, under instructions from the city, keep its track free from ice and snow, and the city may, at its option, remove the whole of such part of the ice and snow from curb to curb as it may see fit from any street or part of street in which cars are running, including the snow from the roofs of houses, thrown or falling into the street and that removed from the sidewalks into the streets, with the consent of the city, and the company shall be held to pay one-half of the cost thereof."

Regulations of a similar nature cover also the surrounding municipalities and suburbs of Outremont, Westmount, Montreal East, Verdun and Point-aux-Trembles. The company pays only one-third of the cost of snow removal in the town of Montreal West, which is a small suburb located on the western outskirts of the city.

Accounting System for Checking Bills

When the engineering department took over this work, it was necessary to build up an organization to handle it both in the field and at headquarters. In preparation for this, the officials of all the municipalities concerned were interviewed and a number of accounting systems were investigated. The co-operation of the municipal officials was obtained, and arrangements were made to standardize the methods of compiling bills.

Arrangements were made so that detailed accounts in duplicate would be forwarded weekly by the city, enabling the company to make a weekly audit and eliminating congestion at the end of the month or on the completion of the winter season.

The forms reproduced herewith were designed to supply the necessary information for checking the bills. The term "snow special" is inscribed on these forms, so as to distinguish them from forms used on other snow-removal work, such as the removal of snow from the track space by the operating department sweepers, and snow and wing plows, and the work done by the engineering department section gangs on surburban lines, in yards, on sidings, etc. Some details of these forms are given below:

Timekeeper's Weekly Report of Working Time. Fig. 1.—This form is used by the city of Montreal and the Montreal Tramways timekeepers to check all classes of labor employed by the city of Montreal on snow-removal work. It is made out daily and is used for auditing purposes. Each timekeeper makes out a time sheet, which is inclosed in a stiff back cover of the loose-leaf system. These time sheets are cross-checked and audited by representatives of both the city of Montreal and the Montreal Tramways, and unless the "hours" and "amounts" shown on each timekeeper's sheet check, the sheets are held up for investigation. The payroll is made up from these time sheets.

Checker's Daily Report on Snow Removal. Fig. 2.—This form is used on the city of Montreal snow-removal work, and is a summary of the information and charges contained in the preceding form. This form enables the Montreal Tramways to make a daily audit as to the daily cost and the cost to date, and is a check against the preceding form. The total amounts shown on the form must check with the total amount shown on a summary of the time sheets. (Fig. 1.)

Checker's Daily Report on Labor Involved in Snow Removal. Fig. 3.—This form was designed for the purpose of checking in detail the working forces employed daily. It enables the Montreal Tramways to ascertain the total number of men of each class employed, not only on the city of Montreal snow-removal work, but also on the work done by the surrounding municipalities. It enables the Montreal Tramways to make a comparison of working the forces employed between the current and previous seasons. It also enables the Montreal Tramways to prevent the employment of an unnecessary number of men, as the timekeepers and inspectors who cover the different districts are familiar with the work being done and are able to render intelligent opinions as to whether the number of men employed is sufficient or not.

Form Used for Keeping Time on Special Snow-Removal Jobs. Fig. 4—This form is used by the Montreal Tramways section gangs and extra forces, for the purpose of checking time expended on the removal of snow from switches, intersections, yards and sidings.

SNOW REMOVAL, CITY OF MONTREAL PROPER

Yearly Costs and Snow Precipitation

Season	Total	Snowfall, Inches	Cost per Inch
1905-1907	$136,750 19	150 5	$908 63
1907-1908	213,379 89	151 9	1,404 73
1908-1909	219,308 89	138 8	1,580 03
1909-1910	109,232 78	97 2	1,123 79
1910-1911	160,511 34	119 9	1,338 71
1911-1912	186,617 07	107 5	1,735 97
1912-1913	131,497 07	102 5	1,282 89
1913-1914	204,777 26	105 9	1,933 68
1914-1915	151,845 39	86 6	1,753 41
1915-1916	256,366 15	103 2	2,484 16
1916-1917	310,309 06	105 3	2,946 90
1917-1918	328,366 32	129 6	2,533 69
1918-1919	213,257 89	104 6	2,038 79
1919-1920	304,980 72	109 2	2,792 86
1920-1921	198,012 81	61 4	3,224 96
1921-1922	212,714 80	80 6	2,639 14
Total	$3,337,927 65	1,754 7	$31,722 34
Average per season	208,620 47	109 7	1,982 64
Maximum	328,366 32	151 9	3,224 96
Minimum	109,232 78	61 4	908 63

Cost per street mile, 1921-1922, $2,352 59

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Its initial purpose is to accumulate the costs of this particular section of the snow-removal work and is made out daily by the divisional roadmasters' clerks.

Data Gravitate to Central Office

The system centers in the head timekeeper's office, where a large ledger is maintained. In this the distribution of snow-removal expenditure is entered daily, showing cumulative costs.

The following instructions to timekeepers will indicate the routine followed in the field:

Snow Special
Instructions to Timekeepers

The following are the instructions to be followed out by all timekeepers for the season 1922-23:

Montreal Tramway Company's timekeepers will meet city of Montreal timekeepers daily, at a starting point on each of the eight city sections convenient to both representatives.

Each timekeeper will cover his district and report at the City Hall at 9:30 a.m. for verification of time sheets.

Timekeepers will again cover districts in the afternoon and report at 4:30 or 5 o'clock at Room No. 207, Royal Trust Building, to make out daily district reports to be handed in to traveling checker when completed.

Montreal Tramways snow special timekeepers will be subject to the same rules and regulations as construction timekeepers.

Timekeepers should be at the starting point on each district not later than 7:15 a.m. in order to cover the ground before reporting at the City Hall.

Timekeepers working in the cities of Westmount, Outremont and Verdun and the municipalities of Montreal West, Montreal East and Pointe-aux-Trembles will get in touch with the timekeepers or representatives of the said cities and municipalities and obtain as much information as possible as to the location and number of men working, also the nature of the work being done.

All timekeepers, in the interest of the work in hand, must report immediately in writing any irregularities in connection with time, loading and size of snow boxes, distribution of men, etc.

Transportation tickets supplied to Montreal Tramways timekeepers are for their use only.

In the event of the absence from work of any timekeeper for a legitimate reason, it is necessary to notify the traveling checker several hours ahead of time so that arrangements can be made to provide a substitute.

Under no consideration whatsoever must any leniency be shown in connection with time.

A working day will consist of ten hours—from 7 a.m. to 6 p.m.—plus the regular allowance for overtime and Sunday work.

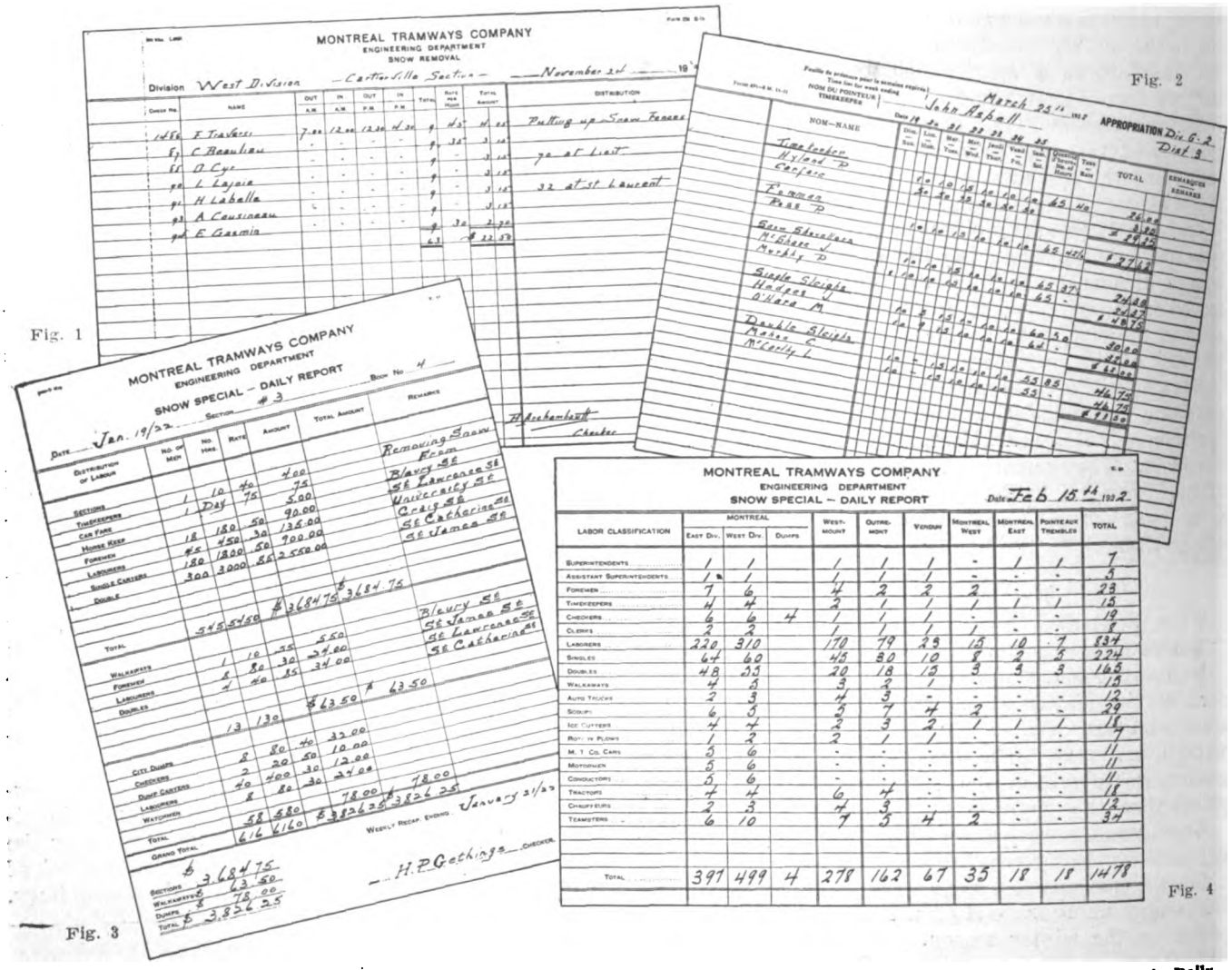

Fig. 1—Checker's Daily Report on Snow Removal. Fig. 2—Timekeeper's Weekly Report of Working Time. Fig. 3—Checker's Daily Report on Labor Involved in Snow Removal. Fig. 4—Form Used for Keeping Time on Special Snow Removal Jobs.

All time sheets must be audited under the supervision of the traveling checker.

All weekly accounts from municipalities must be checked in detail against Montreal Tramways timekeepers' daily time sheets and weekly recapitulation on the form head—"Snow Special Daily Report."

The accompanying table gives a summary of yearly costs and snow precipitation in the city of Montreal. These indicate that snow removal is considerable of a problem in Montreal. It is interesting to note from these figures that the cost is not directly proportional to the amount of snowfall, because wind, rain, the rise and fall of temperature and the amount of sunshine were contributing factors.

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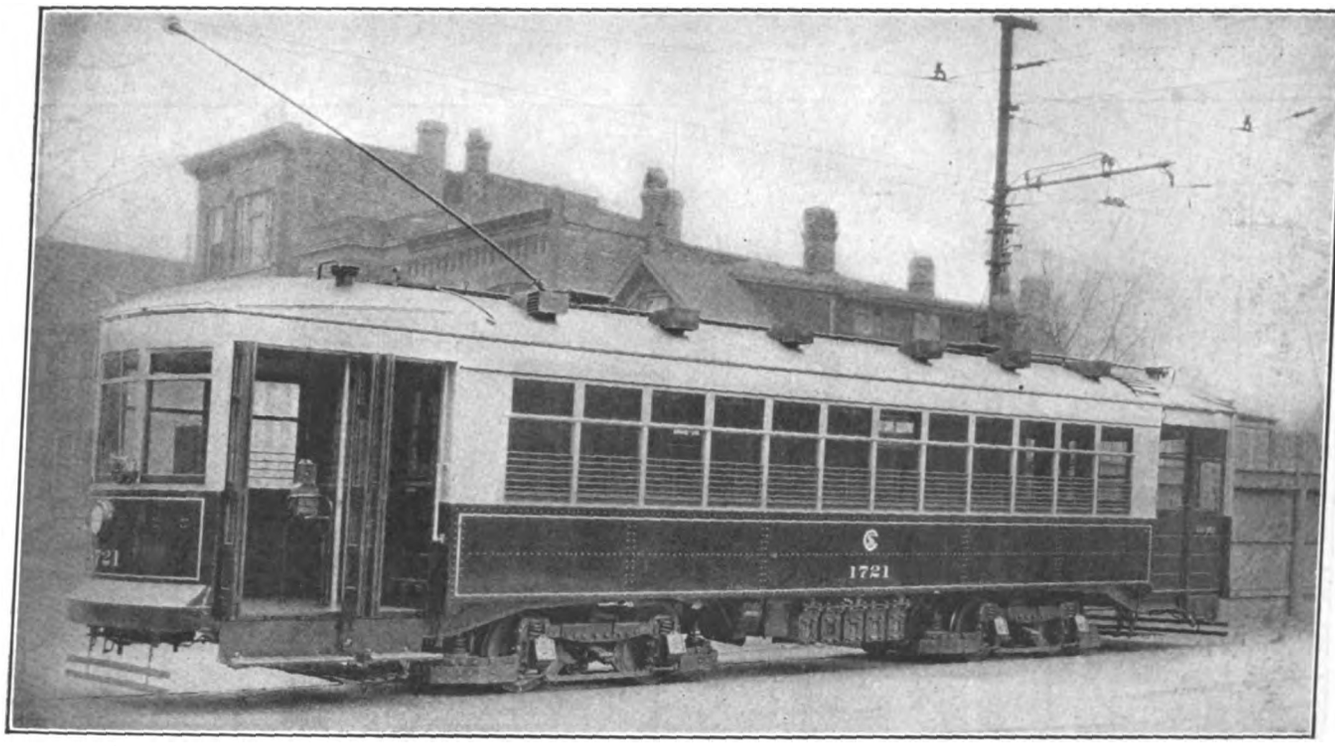
Chicago's Motor Car for Train Service

A Substantial Structure Has Been Combined with a Pleasing Finish and Appearance—Designed by the Railway for Hauling Trailers in All-Day Service—Uniformity in Cars Built by the Company and the Car Builders Reduces the Number of Parts to Be Carried in Stock



Note Streamlines in Body Design of New Chicago Cars for Hauling Trailers All Day

THE first of 169 new motor cars are now being put into service by the Chicago Surface Lines. Of this order, sixty-nine are under construction at the West shops of the company, seventy more are being built in the J. G. Brill plant at Philadelphia, and the remaining thirty are being built by the McGuire-Cummings Company.

The Surface Lines has in the past designed and built a number of cars at its own West shops, among them being the double-truck "automatic door" one-man car. The company is, therefore, familiar with the problems which confront manufacturer and car builder. The car building capacity of the shop, which is about one car a day, was found to be insufficient to handle this entire order, so it was split into three parts, in such a way that each part will be completed at approximately the same date.

To have identical in construction the cars built in three different shops ordinarily is a difficult problem. It was successfully solved by the engineering division of the shops and equipment department under the direction of H. H. Adams. After the general design of the car had been decided upon a complete set of working drawings was made and duplicates furnished to the two car builders, so that when the cars are finished and delivered they will be exactly alike. By doing the detail design work the Surface Lines was able to utilize many existing standard parts in the new cars and thus avoid making a large number of new patterns. This results also in the elimination of duplicate stock parts, a saving which in itself quickly absorbs the entire cost of preparing the additional drawings.

The car is of the double-end type and corresponds in general appearance to the arch roof cars in service on the Surface Lines. Streamline effect, together with the careful selection of finish and trimming, has resulted in a pleasing appearance. The company's new standard color scheme has been used, which is red below the belt rail and cream color above. The interior finish of the car is cherry with a buff ceiling, which gives approximately 80 per cent of the reflection of ivory white and is considerably more economical to maintain.

Ruggedness is the outstanding feature of the car, each part being so built that it will stand up with minimum maintenance under heavy city service requirements. Study of the distribution of weight among the various parts has resulted in a car weighing 46,900 lb., which is 8,500 lb. less than the present cars used for trailer service. The latter has sufficient capacity to haul a trailer during the rush period, but the new car has been designed to haul a trailer all day if necessary. The equipment consists of four GE-275 motors with K-35 control, provided with line switches interlocked with the doors. The motors are mounted on Brill 51-E trucks with 28-in. wheels. All parts were specified to be of American Electric Railway Engineering Association standard as far as possible.

In order to insure freedom from electrical troubles

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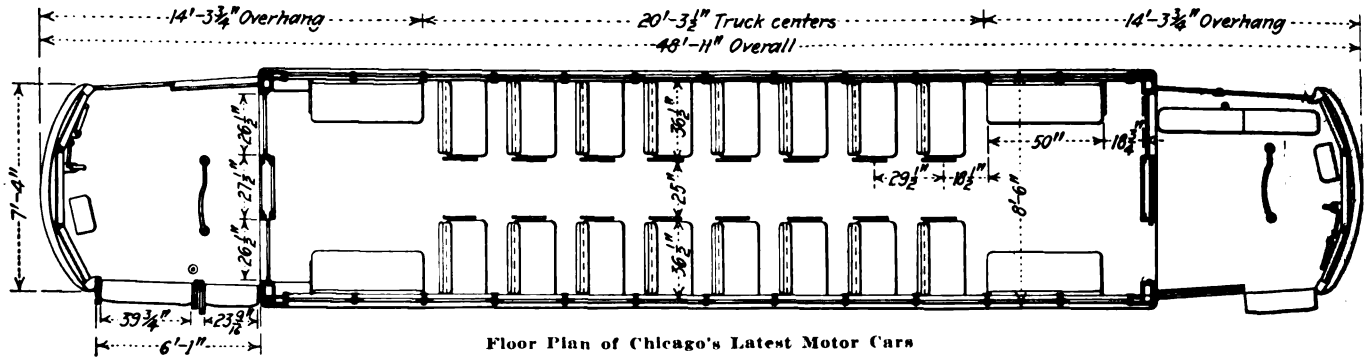
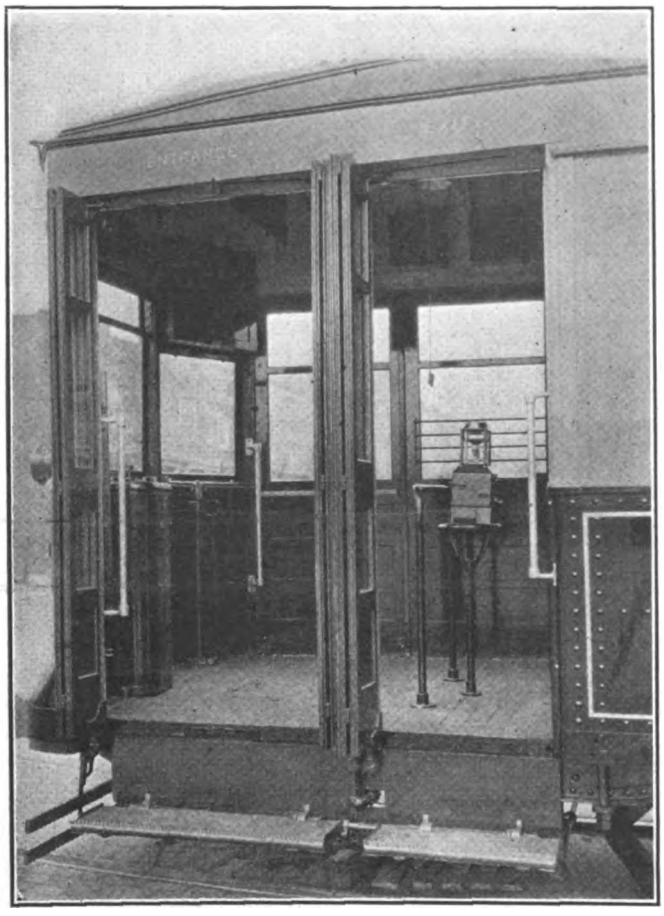


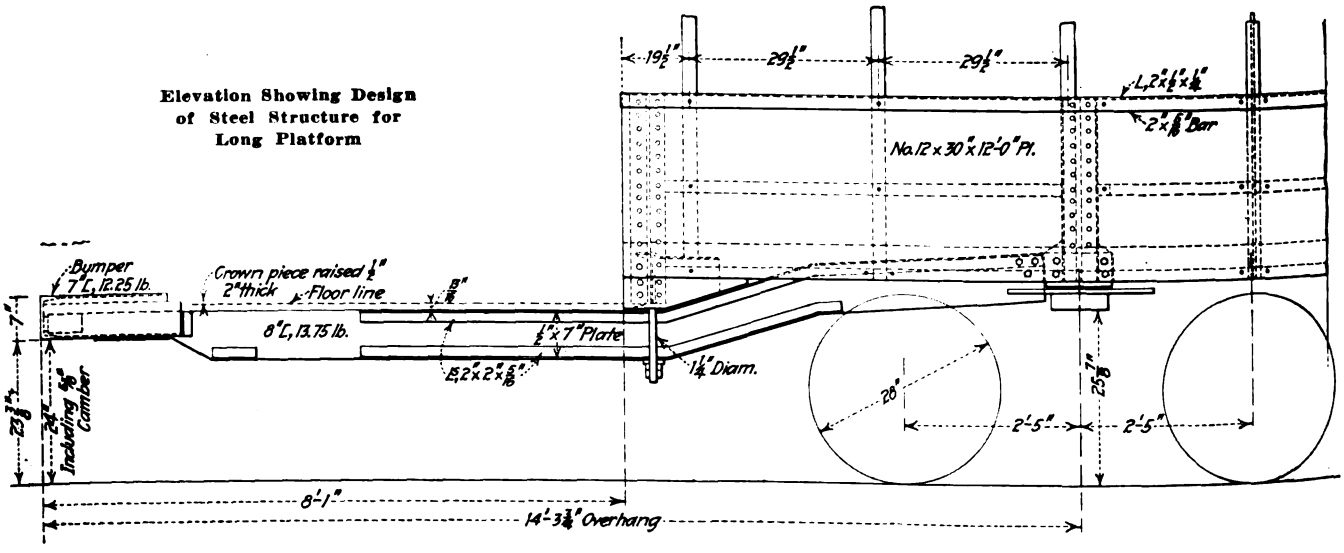
Floor Plan of Chicago's Latest Motor Cars



Platform, Door and Step Arrangement—Aluminum Grab Handles Are Used

Head-On View Shows Fender, Sign, Headlight and Trolley Catcher Equipment

Elevation Showing Design of Steel Structure for Long Platform



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due to creepage around the standard type porcelain insulators which are used for mounting the line switch and control rheostats, a system of double insulation is used; i.e., the apparatus is insulated from its supports by one set of insulators, and the supports in turn are insulated from the car frame either by a second set of porcelain insulators or by hard maple mounting strips. This method of mounting the apparatus is shown in an accompanying illustration.

The rear doors are of the folding type and are equipped with National Pneumatic door engines. They are operated simultaneously by a single engine located above the door header. The conductor's control of the valve is mechanical. The front right-hand door is of the sliding type, being operated manually by the motorman. Curtains are so mounted that they are exposed when rolled up and, therefore, are easy to clean. The Surface Lines' standard system of ventilation, manufactured by the Railway Utility Company, is employed. Automatically regulated intakes are located at the four corners of the car body, with eight exhaust ventilators placed between on the roof. Two ventilators are provided for each platform.

The middle part of the car has sixteen reversible cross-seats manufactured by the J. G. Brill Company, with full spring cushions and thin type backs. They are rattan covered. The width from the inside lining over the aisle plate is 36½ in., and the seat cushions measure 17 in. x 34 in. Longitudinal seats accommodating three persons each are placed in the ends of the body. A folding seat for four persons is provided on the front platform at the left side of the car, making a total seating capacity of forty-eight. The platform layout is of the "pay-as-you-enter" type, which is standard on cars of this company.

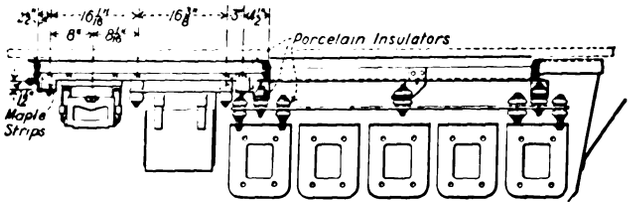
The general dimensions of the car are shown in the accompanying table.

PRINCIPAL DIMENSIONS OF CHICAGO CAR

Length over bumpers	48 ft. 11 in.
Length over corner posts	32 ft. 9 in.
Width over all	8 ft. 6 in.
Seating capacity (body)	44
Seating capacity (platform)	4
Total seats	48
Width of aisle	25 in.
Door opening in clear (rear entrance)	3 ft. 3¾ in.
Door opening in clear (rear exit)	1 ft. 11 1/16 in.
Door opening in clear (front exit)	2 ft. 5⅛ in.
Height, rail to trolley boards	11 ft. 7⅛ in.
Height, rail to floor	3 ft. 1⅛ in.
Height, rail to side sill	2 ft. 7⅛ in.
Height, rail to step	15⅛ in.
Height, step to platform	13 7/16 in.
Height, platform to body floor	9 3/16 in.
Side post centers	29⅛ in.
Wheelbase of truck	4 ft. 10 in.

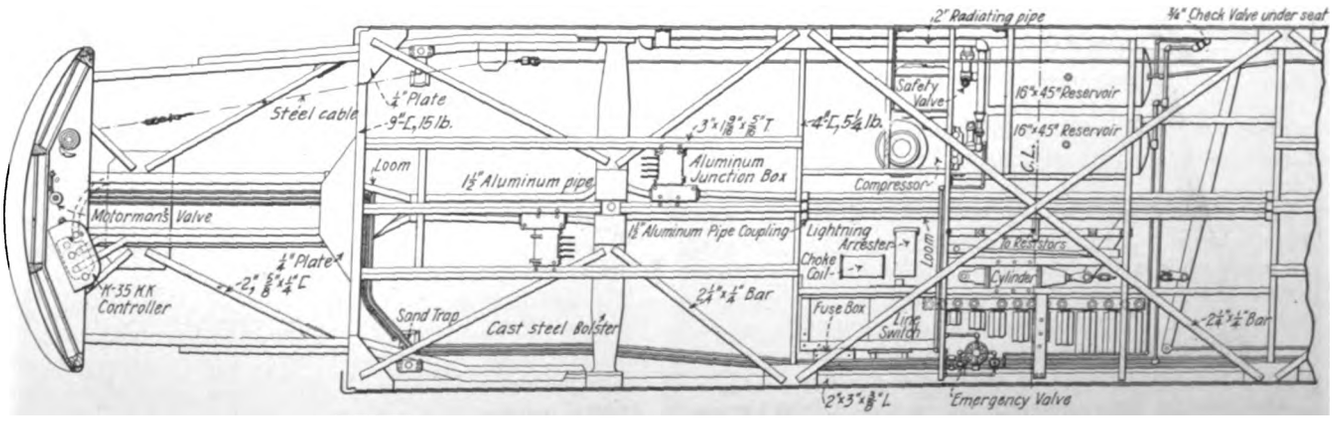
The plate girders forming the sides of the car are of 12-gage steel reinforced at the lower edge with 3-in. x 2-in. x ⅜-in. angles and at the top edge, under the belt rail, with 2-in. x 1½-in. x ¼-in. angles and a 2-in. x 5/16-in. bar. The girder is further strengthened with 1½-in. x 1½-in. x ⅛-in. seat support angles placed longitudinally half way between its bottom and top edges and cut for the side posts, which are strapped and bolted to the plate girder.

The platform knees are 8-in. 13.75-lb. channels, reinforced at the point of greatest stress by web plates and angles. Bumpers are of 7-in. 12¼-lb. channel, with the flanges turned in. The end sills consist of 9-in. 15-lb. channels secured to the side structure with gusset plates. Channels are used for the main body cross sills, being of 4-in. 5¼-lb. section. The frame is braced from bolster to bolster with continuous diagonal braces of 2½-in. x ¼-in. flat bar. Further diagonal bracing is installed between the bolster and the end sills. Bolster struts on the side girder are made of two angles riveted together to form a "Z" section, and are fastened to the bolster by turned bolts with a driving fit. The trapdoor openings are framed with 3-in. x 3-in. x 5/16-in. tees, having the vertical stem cut to 1 3/16-in. and run longitudinally either side of the steel bolster.



Double Sets of Porcelain Insulators for Rheostat Supports

The roof is supported on ⅜-in. x 1½-in. steel carlins set on edge and bolted to 1¼-in. ash carlins over each pair of side posts. Intermediate carlins of 1¼-in. x 1⅜-in. ash are provided between the posts. The roof is ⅜-in. tongued and grooved poplar, covered with No. 8 National prepared roofing. The headlining is ¼-in. Agasote in the center and 3/16-in. Agasote at the sides. Special spring clips for holding the ceiling signs are provided at each end of the car, in the manner standard on the Chicago Surface Lines. Two continuous wood purlins are installed, to which the body lamp sockets are fastened directly by means of special Benjamin mounting plates. The ash side posts are reinforced with ⅜-in. rods, bolted to the lower girder angle, and extending upward through the feet of the steel carlins.



Outline of Steel Frame and Location of Principal Equipment

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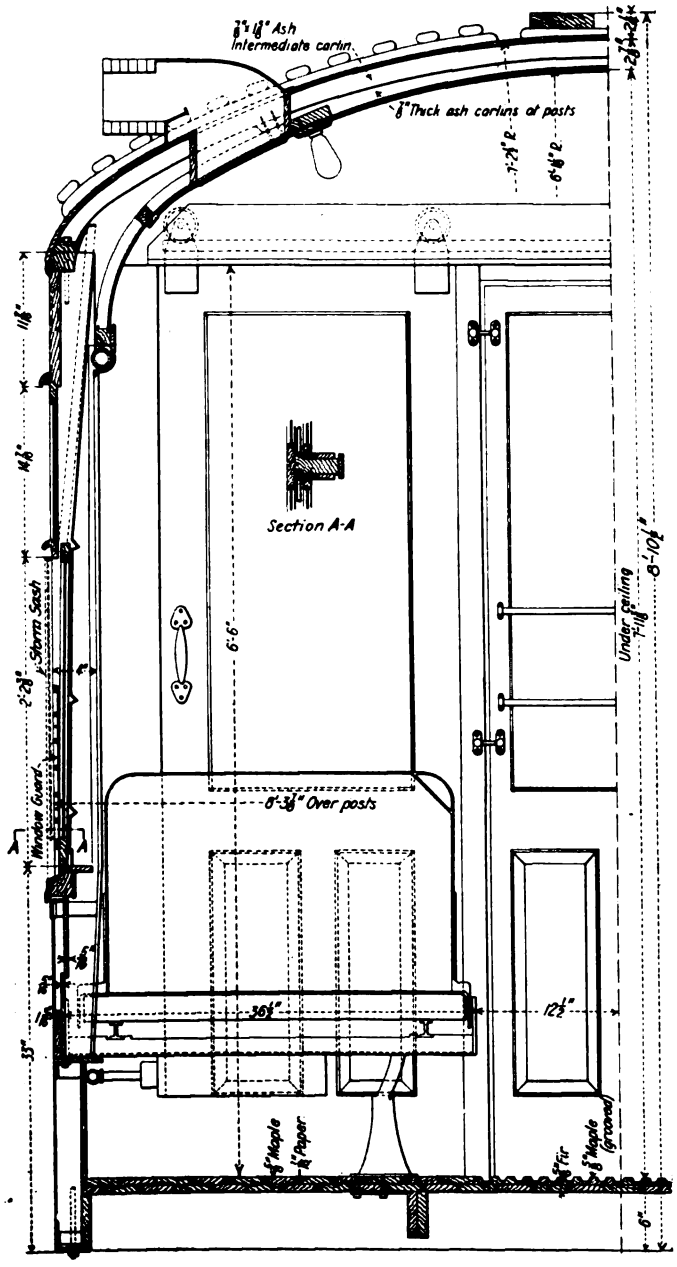
The body side top plate is of yellow pine, and the letterboards are of ⅞-in. poplar.

The top sash is continuous, 1/16 in. thick, and is fastened to the outside of the side posts. The lower rail of the top sash is provided with a lip, to receive the top of the storm sash. These are made up in two-window sections and are of ⅝-in. thick cherry, fastened to the side posts. The lower side sash are also of ⅝-in. cherry, provided with brass wearing channels on the stiles and are arranged to lift. O. M. Edwards sash



Cross-Section Through Car

fixtures are used, with a lock on the right-hand side of each sash and a compression brake on the opposite side.

The window guards are made up of No. 18 gage brass tubing of ⅜ in. inside diameter. These, however, are made up in a single-window section and are fastened permanently between side posts. By this arrangement they form an integral part of the car structure and add materially to the stiffness of the side frame, and the storm sash can be applied without removing them.

The double floor consists of two ⅝-in. thicknesses. The lower is of fir and the upper of maple, separated by tarred felt. In the aisle the top floor is rabbeted, so as to eliminate the use of separate floor strips.

WEIGHTS OF PRINCIPAL DETAILS OF CHICAGO CAR

Body (less electrical equipment)	20,735 lb.
Control and wiring	2,025 lb.
Two trucks complete No. 51-E Brill	14,500 lb.
Motors with pinions, gears, gear cases, axle collars and axle bearings	9,640 lb.
Total light weight	46,900 lb.

In accordance with recent Surface Lines practice, the stationary platform stanchions are of aluminum. In addition to these, the vestibule grab handles are of aluminum pipe, with end castings of special aluminum composition. The use of this material effects not only a saving in weight but also an improvement in the appearance of the vestibule.

Every effort has been made to keep down the weight of the car without weakening its structure. The control wiring has been placed in Duraduct except where it passes under the trapdoor openings, where it is inclosed in aluminum conduit. Aluminum junction boxes are provided for the motor leads. All auxiliary wiring under the body floor is in aluminum conduit, as is also the heater wiring along the truss planks. Auxiliary wiring above the flooring is in Duraduct.

The accompanying table shows the distribution of weight.

Refund Check Avoids Disputes

WHERE fare boxes are used, a passenger occasionally drops more than the required amount of money into the box. While this may be detected while the coins are lying on the table in the fare box, the conductor has no means by which he can extract the coins and give them back to the passenger. Usually, the conductor directs the passenger to apply to the company's offices for a refund.

On the lines of the Beaver Valley Traction Company, New Brighton, Pa., disputes of this character have been eliminated entirely by the use of the refund check illustrated. In case the passenger deposits more than the correct fare, he can receive the difference back at once, upon application to the conductor, provided he signs the refund check. In this way he has no further complaint to make to the company. The signature will deter the passenger from making a fraudulent claim.

REFUND CHECK

Operator .....
Amount Deposited .....
Amount of Fare .....
Amount Refunded .....
Signature of Passenger .....
Date .....

Route	Date	192	
Car Operated		Fare Box No.	Car No.
From	M.		
To	M.		
Badge			
Name			

At Top, Conductor's Receipt for Refund. At Bottom, Credit Slip Dropped in Fare Box

The conductor has the signature of the passenger on the refund check to show that he has paid out money. This check is turned in along with the daily trip sheet.

In order that the cash in the locked fare box will be kept straight with the conductor's record, and that he will get the refund, he fills out another small form, as shown, and drops it in the fare box.

No bookkeeping is involved, as the refund check and the credit slip deposited in the fare box take care of the overpayment automatically. The passengers are much better satisfied with the arrangement than when it was necessary for them to apply at the company's office for refund.

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Securing a Favorable Insurance Rate

On Chattanooga Property Single Broker Acts as Intermediary Between Utility and Underwriters, Thus Simplifying Procedure and Providing for Equitable Distribution of Risk

By W. C. Campbell
Assistant to the Vice-President,
Tennessee Electric Power Company, Chattanooga, Tenn.

THE rate fixed upon a piece of property by an inspection bureau of the fire underwriters is the best index we have of the probability of a fire loss. At the same time no public utility can be fully compensated for the loss occasioned by a severe fire by money collected on its fire insurance policy. The financial houses handling the company's securities not only want to know that the property is insured, but are favorably impressed with a low rate. This, like the clean shop, low lubrication cost, orderly store room and good accident damage record, is commonly considered an indication of general good management.

The insurance premium is relatively small as compared with other items making up the total operating expense of a public utility, and is not especially attractive to the operator who is looking for a place in which to make a showing by reduction in expenses. However, the actual saving in dollars output will often provide a handsome return for the time and effort given the subject. Attention to insurance matters, like safety-first work, should more than pay its way and show a net gain in employee morale, public opinion, etc., as well as render more remote the probability of a fire catastrophe.

How Premium Reductions Were Secured in Tennessee

Some features of our experience in Tennessee may be of interest to those who have never given personal attention to insurance matters. This company has four hydro-electric plants which are now covered with more than two and a quarter millions of insurance on the 80 per cent co-insurance basis. For a long time it was felt that the risk of fire at these plants was so slight that no insurance was necessary. However, in 1920 we called for an inspection and rating with the result that we were quoted rates ranging from 71 cents per hundred to 19 cents on the buildings and 76 cents to 24 cents on the contents, the average being 36.1 cents per hundred, and the premium on a one-year-term basis $8,600.

Obviously either the insurance companies' basis of rating was at fault, or our estimate of the hazard was wrong. Probably both were out of line. However, we called for a reinspection and in January, 1921, were quoted rates on the buildings ranging from 48 cents to 16 cents and contents 54 cents to 21 cents, with an average rate of 33.9 cents, and a premium of $8,075. Effective May 1, 1922, we got the benefit of the work done by the National Electric Light Association insurance committee, when rates were named ranging on the buildings from 38 cents to 6.9 cents and on contents from 40.3 cents to 13 cents, the average rate being 22.7 cents and the premium $5,400, or a saving of 33 per cent over rates previously in effect.

We have recently gone over the property again with the result that we secured further reductions effective June 1, 1923, the rates on the buildings now ranging from 23.8 cents to 6.9 cents and contents from 24.4 cents to 11.8 cents, the average rate being 16.2 cents and the premium on a one-year-term basis $3,850. It will be noted that the saving over the period described

Construction Like That of This New Headquarters Building Will Bring Minimum Insurance Rate

on this part of our property alone was $4,750, while the average rate was reduced from 36.1 cents to 16.2 cents. Of this the N.E.L.A. committee should have credit for $2,675. No changes have been made in plant which would not have been authorized as a matter of good practice regardless of premium savings, and no expense has been involved other than the time required to give close attention to the details.

The Tennessee Electric Power Company was formed last year by the consolidation of the Tennessee Power Company, the Chattanooga & Tennessee River Power Company and the Chattanooga Railway & Light Company, the railway division of which was brought from under receivership at the same time. When all the fire insurance policies were gathered together it was found that there were a great many of them, that they were written for various periods and expired at all sorts of dates. The thing was unwieldy and the need was evident for a rearrangement along lines which would

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make it easier to keep track of it. Our property comprises the four hydro-electric plants previously mentioned and two steam plants, with substations scattered over a wide area, the railway and light and power distribution systems in Chattanooga, offices, stores, distribution systems in smaller towns, employee camps at the power plants, and miscellaneous residences, etc., acquired in times past with power line rights-of-way.

A study was made of the whole situation, involving the rerating of a large number of buildings, and the whole business was thrown into a general form. All outstanding policies were canceled pro rata and the insurance was rewritten through local agents for a three-year term. Our present policy is to distribute fire insurance business rather broadly among the local agents, who in turn place it with the companies they represent, and consequently we still have a considerable number of separate policies and all are involved in the settlement of even a small loss. To assist in handling all matters between agencies and insurance companies we have written our insurance through one agency acting as broker. The broker retains a portion of the regular commission as his compensation. The full premium is paid to the broker and losses are settled for by him, thus relieving us of a lot of detail which is better handled by those in the insurance business, while we retain direct control of all those matters of interest to us.

While it is rather general practice to cover properties of this kind by a general form both for ease in handling and for the purpose of offering the insurance companies a diversified risk, there are certain features in our form which may be of interest. We have approximately a half million dollars of outdoor substation equipment which takes a 7-cent rate, or if written for a three-year term, a rate of less than 6 cents per hundred. The likelihood of fire is not great, but we have considered it worth covering on these terms. Equipment of this type is subject to relocation from time to time and we have therefore blanketed the whole equipment in a lump sum so that any piece is covered while at any one of the locations specified in the policy. We have some $300,000 worth of supplies and spare parts distributed among a number of locations. The values at the various points constantly fluctuate, while the total remains reasonably constant. We have covered these supplies in a lump sum by a provision in the general form protecting us against loss so long as they are in or near any of the buildings owned by the company. This permits us to shift our supplies from point to point as occasion may demand. Supplies on the line wagons or on the job at a distance from our buildings or at a railway station, etc., are covered by a blanket provision protecting us against loss of any of our supplies to the extent of $1,000 while they are anywhere in the state of Tennessee.

In attacking the rate problem we have never been opposed by any insurance interest and have found the rating authorities more than willing to meet us half way whenever we have shown a serious interest. The inspection bureau is ready to furnish data showing just how any rate is arrived at, and it may readily be determined just what saving can be made by correcting the defects which they point out. Many needed improvements can be paid for by savings in the insurance premium.

The Tennessee Electric Power Company

As used in this policy, it is understood and agreed that:

DIVISION A covers on buildings, their additions and extensions, sheds and fences, and including all permanent fixtures not otherwise insured, plumbing, heating apparatus, awnings, attachments and appurtenances, and including with power houses small gate hoist buildings at top of dam, and trestles and tracks alongside and inclines adjoining power house, as described and covered in items below.

DIVISION B covers on all machinery, fixed and movable, including boilers and engines and attachments, shafting, belting, pulleys, hangers, and all electrical equipment (not otherwise insured), including dynamos, generators, boosters, switches, wiring, lamps, and the complete electrical equipment of and in buildings; and office, store, and dwelling furniture, fixtures and equipment and supplies, including maps and drawings, wagons, harness, horses and mules (no one animal to be valued at over $300.00), tools, dies, implements, models, patterns, their own or for which they may be legally liable, and employees' clothing, all while contained in buildings or adjacent thereto, as described and covered in items below.

Item No	Occupancy	Location	Construction of Building	Division A	Division B
		ATHENS			
1	Storehouse	.....	.....	$75	.....
		CLEVELAND			
2	Machine shop	.....	Brick	4,500	$8,000
3	Storehouse	.....	Iron clad	1,500	
4	Substation	.....	.....	1,200	2,000
5	Switching station	.....	.....	3,000	2,500
6	Storeroom and office	No. Side Raht St.	Brick	2,500	1,500
7	Garage and storeroom	No. Side Raht St.	Brick	2,000	.....
8	Store and office	711 31st St.	Brick	.....	400
		CHATTANOOGA			
9	Car house	Third, Market and Broad Sts.	Concrete and brick	96,000	1,920
10	Repair shop	Third, Market and Broad Sts.	Concrete and brick	38,400	22,400

Head of a Sheet Covering All Property to Be Insured, Printed for Convenience in Negotiating Insurance. Complete Table Includes 114 Items

Electric Locomotive for Interurban Freight Service

Field Control Motors with Forced Ventilation Give High Continuous Rating—Locomotive Will Haul 1,180 Tons on Level Tangent Truck

A LOCOMOTIVE designed for transporting short-haul freight has been built for the Interstate Public Service Company, Indianapolis, by the Westinghouse Electric & Manufacturing Company. The conditions existing on this electric line are similar to those to be found on many interurban lines and will show very well the necessity for a locomotive which is particularly adapted for interurban service. It is necessary for this railway to haul freight cars through the city streets at several points, and on account of this fact the width of the locomotive must be limited to 9 ft. Previous to this time, practically all of the locomotives built for use on interurban lines had a cab 10 ft. in width. This severely handicapped freight haulage through city streets.

The trucks are of the rigid bolster equalized type and built with rolled steel end and side frames, located outside of the wheels, which are 36-in. rolled steel.

The brake equipment consists of air and hand brakes operating on all wheels. The rigging is actuated through a radial type brake beam which permits effective braking on short curves. The equipment is an adaptation to electric locomotives of the standard steam locomotive air-brake equipment. It includes an independent straight air brake for handling the locomotive alone, together with a quick-action automatic brake for both locomotive and train. The length of the brake lever and diameter of brake cylinder mounted underneath the cab are proportioned to give a total shoe

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pressure of 75 per cent of the weight of the locomotive with 50 lb. cylinder pressure.

The cab is substantially built. Two windows are provided on each side, with a door and two stationary windows at each end. On the rolled-steel checker-plate platform at one end of the cab is mounted a sand box, an air reservoir and a blower housing. On a similar platform at the other end are a sand box, an air reservoir and a locomotive bell. The underframing is built up of rolled steel channel side and center sills with cast-iron bumpers.

Electrical Equipment

The locomotive is equipped with four 100-hp. 600-volt field control motors arranged for forced ventilation and using a gear ratio of 17:60. The low-speed type of motor used is very well adapted to freight haulage in that it is able to develop large tractive efforts and drawbar pull without drawing excessive current. Forced ventilation is provided by the use of a blower runner mounted directly on the shaft of a 600-volt blower motor. The blower motor is mounted just inside of the cab at the No. 2 end, so that the shaft extends through the cab sheeting for the fan mounting just outside. The fan is inclosed by a housing which is provided with louvers, assuring a supply of dry air for the motors. The space between two of the center sills is closed with a sheet-iron plate, thus forming a duct for carrying the air from the blower to openings adjacent to each motor, from where flexible canvas connections conduct the ventilating air to the motors.

LOCOMOTIVE RATINGS

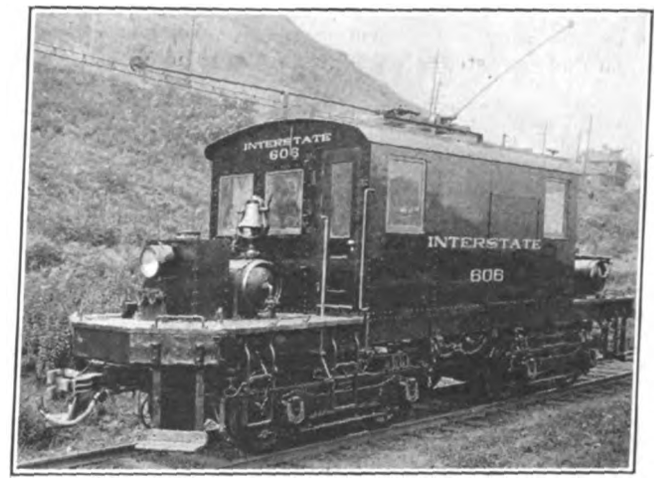
	Tractive Effort Lb.	Volts	Speed M.P.H.	Ventilation
For one hour with motors on short field	13,880	600	11.3	Forced
	13,000	600	11.5	Natural
Continuous with motor on short field	9,000	600	13	Forced
	5,900	600	15.3	Natural
Maximum capacity	25,000			
Normal adhesion for starting duty only	25 per cent of locomotive weight			
Maximum safe speed	35 miles per hour			

The standard Westinghouse electro-pneumatic control is used. Sixteen type UP unit switches are mounted between angle steel equipment supports located inside of the No. 1 end of the cab. The main controller and the reverser are provided with interlocks so that the switches cannot be closed unless the reverser is either in the forward or reverse operating position.

All of the electrical apparatus is mounted in a compartment approximately 4 ft. long and 6 ft. wide, extending from the floor to the roof of the cab. The accelerating resistors are mounted near the top of this compartment.

Ventilation is obtained through the roof by means of two ventilators. The unit switches are mounted directly beneath the grid resistors, while the reverser, overload relay, motor cutout switch and other apparatus are mounted so as to be accessible from both the front and rear compartments, which simplifies the maintenance and inspection. The equipment compartment is inclosed by removable doors or covers to prevent accidental contact of the operator with any of the electrical apparatus. A sixteen-notch master controller gives a large number of accelerating steps, so that a very heavy trailing load may be started without abuse to the equipment and with a minimum of wheel slippage.

The air compressors are mounted in the space adjacent to the equipment compartment and the installation or removal is facilitated by a removable section of each side of the cab. They supply air at 85 to 100 lb. pressure to the reservoirs mounted on the platforms at each end of the cab. Cooling pipes are inserted between each compressor and the air reservoir and also between the two reservoirs. A reducing valve provides 70 lb. pressure for the control reservoir for supplying air for the control apparatus, sanders, whistles and bell.

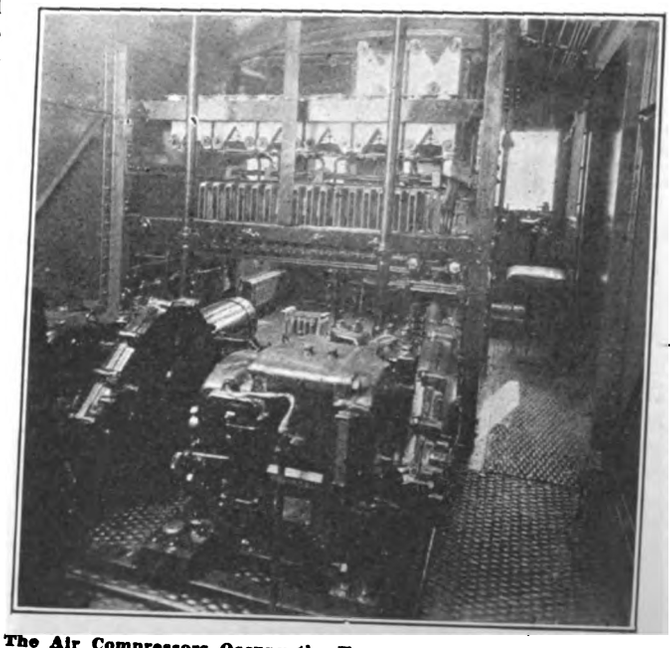


Locomotive for Interurban Freight Service on the Interstate Public Service Company's Lines

The locomotive for the Interstate Public Service Company is arranged for double-end operation and has two air compressors and a blower equipment. The accompanying table gives the ratings of the locomotive.

At the continuous rating, with motors operating on short field and with forced ventilation, this locomotive is capable of hauling a trailing load of approximately 1,180 tons on level tangent track.

The general design of this locomotive is standard, so that similar machines may be built for single- or double-end operation, and may have one 50-ft. compressor or two 35-ft. compressors, with or without forced ventilation and may be provided with or without multiple-unit control.



The Air Compressors Occupy the Foreground with Unit Switches and Grid Resistors in the Rear. Directly Behind the Compressor on the Left Is the Reverser

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Akron People Respond to Appeal for Higher Fare

Railway Advertises that "The Actual Cost of Your Car Ride Is 5.7 Cents; Please Help Meet It by Dropping 6 Cents in Fare Box"—Twenty per Cent of the Riders Pay the Extra Cent Voluntarily

By E. B. Atchley
Northern Ohio Traction & Light Company, Akron, Ohio

FOR three weeks this appeal has been made to the car riders of Akron by the Northern Ohio Traction & Light Company, and is still being made through newspapers, car cards and in the company's publication—the *N. O. T. & L. News*. For two weeks prior to the date fixed for the payment of the "Voluntary 6-cent fare" advertising explaining the cost of the ride was presented the public.

The result has exceeded the expectations of the company, an average in excess of $200 daily coming in at this time in pennies from approximately 100,000 passengers carried.

Day by day the number of pennies that fall into the fare box is increasing. It is almost impossible to make an accurate check for the reason that the Cleveland fare box is used and there is no registration.

On Sept. 1, however, the company placed "voluntary 6-cent tickets" on sale. Many business firms bought tickets, sending in their checks, and nearly 1,000 car riders bought strips the first day. The tickets were put in strips of 5 and sold for 30 cents a strip. Since the first day there have been additional purchases.

The action of the company in appealing to the people of Akron for relief follows negotiations for a new franchise which have been in progress for years without results. Time after time the company has been on the point of getting a new franchise-contract through the Council for submission to the people, the city charter requiring submission, but at the last moment something has arisen to block progress.

The last proposal of the company was for a 6-cent cash fare, nine tickets for 50 cents with city control of service and a twenty-five-year agreement. This was finally rejected by the city and with it came the demand for a short-term franchise and a straight 5-cent fare with free universal transfers. The company could not accept this.

Figures were submitted by the company showing that the total cost of carrying passengers in the city, including a fair return on the investment, and allowing for depreciation, was 7.2 cents. Figures were also submitted to the public utilities committee of the City Council showing that the *actual cost* of the ride, excluding depreciation charges and interest on the investment, was 5.7 cents, divided as follows:

	Cost per Passenger, Cents
Wages	2.3384
Equipment	.8835
Power	.7818
Track	.7299
General and miscellaneous	.7073
Taxes	.2558
Traffic	.0113
Total	5.7080

At that time many persons said that the company was entitled to its demand of 6 cents cash, or nine tickets for 50 cents. Others believed there should be a transfer charge.

In the recent municipal primary campaign, one of the candidates stood boldly for a flat 5-cent fare and a short-time contract. This candidate was defeated. Another candidate, who has always opposed the company although he said nothing in the campaign, was defeated for nomination.

The company made it plain, however, when it began advertising, that the 6 cents was necessary to continue the *present service* and the action had no political significance. It pointed out that the present service far exceeds the service provided for under the terms of the old franchise, which expires on Feb. 1, 1924.

The action of the company in putting tickets on sale caused an uproar among the politicians and some city officials, including the Mayor. The Mayor sought to invoke the aid of the city's law department to prevent the sale of five tickets for 30 cents, and one or two councilmen asked the same department if something couldn't be done to stop the advertising.

"The city is getting a black eye in this advertising," declared Councilman Rose. "We are being made the laughing stock of visitors. Something must be done."

The legal department is reported to have expressed an opinion that gave little satisfaction to the protestors. "There's no law against honest advertising, and the people can pay what they want to pay in excess of the franchise fare," is the substance of what the law director said to the Mayor.

And that settled that!

Now it is said a committee of citizens has again taken up the question of a new franchise in the hope of ending the controversy. What has been done along this line, if anything, no one seems to know.

The advertising used has been carried in the company's magazine, the *N. O. T. & L. News;* in sectional strips on the upper ends of the cars, posters inside the cars, in newspapers and local magazines.

The figures which were submitted included nothing for depreciation and no interest on the investment. These facts were clearly pointed out in all advertising.

The company also showed the old franchise service provisions in comparison with the service now being supplied. It pointed out that 120 new city cars and twenty-four buses had been placed in service in the last few years; that lines had been extended, rebuilt and double tracked; that a new line had been constructed across the $2,000,000 viaduct which bridges the Cuyahoga Valley, and in many other ways the

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system had been improved to enable the company to provide a betterment of service. At the same time the company declared:

"We have lost money on the Akron City system for years. Steadily adding to the investment may have seemed to some not good business, but—

"We have never lost faith in the people of Akron. We firmly believe the people of this city do not want this company, or any other company, to operate for less than cost."

Before the appeal was made to car riders to voluntarily pay the additional penny, talks were made to the company's trainmen. They were urged to express the thanks of the company to patrons paying 6 cents. This co-operation has undoubtedly been beneficial.

When Detroit went to a 6-cent cash fare and the Cleveland ticket fare was abolished the company took the opportunity to point out rising labor, material and fuel costs.

Here is additional evidence of how no opportunity was overlooked. A newspaper man called the advertising department of the company and said: "You certainly have more confidence in the public than I have. I don't think it will respond to your appeal. You might as well save your money."

The next day the following advertisement appeared in all the papers:

One of Our Friends Said to Us Yesterday:

"You certainly have more confidence in the people than I have."

Confidence in the people—in the people who ride our cars!

Certainly we have confidence in them, and why not?

We have found the men and women who ride our cars disposed to give us a square deal. They are the *kind of people who believe in dealing fairly by everybody.*

They do not want something for nothing!

Faith in them? Every day in the week we will pin our faith to them.

Believe they will answer our appeal and in fairness drop 6 cents into the fare box?

Certainly we believe they will!

We have confidence in the car riders—and we firmly believe the car riders are going to assist us in maintaining the service we are supplying—a service far in excess of the old franchise requirements.

Thank you!

Still another piece of effective advertising was the following placard used in the cars:

Do You Know?

154 cities have a 10-cent fare;
4 cities have a 9-cent fare;
109 cities have an 8-cent fare;
186 cities have a 7-cent fare;
99 cities have a 6-cent fare;

In only *two* cities have fares been increased by court order.

Car riders of Akron are *voluntarily paying 6 cents.*

The *actual cost* of the car ride is 5.7 cents!

In the advertising there has been no let-up in the campaign from the day it was inaugurated and there will not be. As stated, the old franchise expires on Feb. 1, 1924, and the company believes that by that time the people will have become so thoroughly conversant with the situation that there will be no objection from those who ride the cars to paying the cost of their ride.

Is the campaign proving a success? Here is the answer:

Sunday, Aug. 19, the first day, nearly 10,000 pennies fell into the fare box. On Monday, the next day, the number increased to 19,000. It fell to 17,000 on Tuesday; went to 22,000 on Wednesday; decreased Thursday and Friday, and exceeded the 22,000 mark on Saturday.

Since the first week between 19,000 and 20,000 pennies—the number increasing somewhat day by day—have been placed in the fare box daily.

The average number of passengers carried slightly exceeds 100,000 in the city, so that nearly 20 per cent of the riders appear to be paying the 6-cent fare.

Now that the tickets have been placed on sale there is reason to believe that the percentage of those paying the 6-cent fare will be still further increased.

Observations in Three Tennessee Cities

Accident Prevention, Systematizing of Insurance Policies, Pull-In Records and the Railroad and Public Utilities Commission Were of Special Interest

BY "SPECTATOR"

CHATTANOOGA, Nashville and Knoxville, Tenn., are cities in which railway conditions are similar in many ways. The railways in these cities, as well as the other industries, are supplied with power by the Tennessee Electric Power Company, a virile, composite organization, made up of several railway and power companies now thoroughly merged. The railways in these three cities are fortunate in being affiliated with the prosperous power business.

One element of uncertainty which I found among the railways in Tennessee is the future status of the Public Utilities Commission, which is under vigorous political fire. The commission is elective and hence is necessarily "in politics." As far as can be learned, it is endeavoring to give the utilities a square deal, but it occupies a difficult position. The Governor appears to favor a commission of a different character, with commissioners appointed, but with provision for changing only a portion of the commission in any one year. It appears to me that the principle of regulation by commission is on trial in Tennessee and the outcome of the present agitation will be of general interest throughout the country.

In Chattanooga the intimate relation of the railway and power departments of the company is illustrated by the large use made of display spaces on the cars for the advertising of power service. Legends for this purpose are mounted in the car windows, so that from the street side they read continuously from end to end of the car. On its inside space each card bears a separate legend.

The shops at Chattanooga are particularly commendable, being roomy and cheerful and bountifully supplied

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with labor-saving devices. Traveling air hoists are particularly in evidence.

Since the formation of the Tennessee Electric Power Company was brought about the company has been making a comprehensive study of fire insurance, which is now on a systematic basis, one blanket policy participated in by several insurance companies covering the whole property. This is the subject of a special article on another page of this issue.

Signal Mountain and Its Railway

In Chattanooga there is an interesting mountain railway serving a thriving group of industries centering in Signal Mountain, namely, the Chattanooga Traction Company. Just ten years ago two land companies were formed to develop the territory adjacent to the city below and on Signal Mountain, 12,000 acres in all. Coal mines were opened up, an attractive hotel and cottages were built on the mountain, 1,500 ft. above the city, and manufacturing industries were encouraged to locate on the tract. The railway, of course, formed an essential feature of this development, as it was to supply all the local transportation. The railway was built according to the best practice, and its construction involved unusual difficult operating conditions of grade and curvature. A maximum grade of 5¾ per cent was encountered, and the curvature in places seems almost too great for operation. These curves are, however, "negotiated" safely and without excessive wear on the equipment. There are three "horseshoe curves" on the mountain side. Of course it takes power to operate this line, each 26-ton car being equipped with four 70-hp. motors, geared to 33-in. wheels with a ratio of 20:66. The power comes from the Tennessee Electric Power Company, with which it has no financial connection, but whose tracks are also used for entrance to the city.

The passenger cars on Signal Mountain seat sixty-two passengers and the combination cars fifty, there being a roomy baggage compartment in each of the latter. Hourly service is given, and the fare for the 12 miles up the mountain is 25 cents. To Red Bank, 8 miles, the fare is only 10 cents, and that to Glendale, in the first zone, is but 5 cents for 6 miles. For the service given these fares are very low, but the company does a large freight business, which is much more profitable. In this service two electric locomotives are employed, and more than 500 carloads per month are handled. When enormous cement works now under construction are completed the freight business will be greatly increased.

Safety Campaign Active in Nashville

The Nashville Railway & Light Company, also a subsidiary of the Tennessee Electric Power Company, has been under fire, to show why the local carfare should not be reduced from 7 cents. Considerable stress was laid by the complainant on the fact that the company pays to one of the nationally known management and engineering companies certain fees for advice and engineering design and supervision. The company clearly brought out by expert opinion that it obtains full value for these fees and that a 7-cent fare is no bonanza in Nashville.

The Nashville Railway & Light Company is taking a leading part in the campaign recently organized to bring about accident reduction. J. P. W. Brown, general superintendent of the company, heads a newly formed local Safety Council. Headquarters of the council have been established in the Chamber of Commerce Building, with a former employee of the company in charge. Data which the council has promised for early publication in this paper will show remarkable results from these efforts.

There is a fine spirit on this property in the welfare work for employees and their families. The quarters of the Employees' Mutual Benefit Association and its program are like those of an enterprising club. The vocational educational plans of the company are also well advanced. As was illustrated in a recent article in this paper, the reclamation work going on in the shops is highly profitable. This work is supplemented by care in the purchase of supplies, as is illustrated in the case of lumber, of which a large quantity is kept in storage. Lumber is purchased in lots at advantageous times and stored under cover. The lumber storage contains a wealth of valuable wood, some specimens of which have been seasoning under natural conditions for several years.

Fine Pull-In Record at Knoxville

In Knoxville I found the railway officials highly gratified with their pull-in record for the preceding month (May), which was 17,963 miles per pull-in. This record can be understood in view of the company's excellent shop facilities. The machine shop, in particular, is one of the best that I have seen recently. The mechanical department has adopted a motto: "Careful fitting is the secret of success." It seems to work out well here with regard to maintenance.

Knoxville is the center of vigorous bus activity. Thirty-seven bus lines terminate in the city, at several centers. An association of bus owners has been formed, and there is talk of a union bus terminal. This traffic appears to be largely of non-competitive character with the railway.

The Knoxville company is increasing its demand upon the power company and is installing 10,000 kva. in transformers to supply additional power which is to be purchased. The transformers will step the voltage down from 120,000 to 2,300 for the railway and to 13,200 for large power customers. The power company is putting in a duplicate transmission line to care for this rapidly increasing business.

Knoxville is one of the cities which has found ballasted track construction to be the most permanent for the local conditions. This permanence is only secured, however, by careful tamping and draining. The ballast is compacted by as many as four tampings under traffic. The railway is co-operating with the city in regard to paving, so as to prevent breakage where the municipal and utility pavings join.

Municipal Operation of Tramways Predominates in Great Britain

INTERESTING statistics of British tramways have been issued by the Ministry of Transport. The data, which cover both tramways and light railways on public roads, show the following for the fiscal year ended Dec. 31, 1921, for companies and March 31, 1922, for local authorities. Total route-mileage in operation 2,579 (4,275 track-miles), of which 1,756 miles was operated by local authorities and 823 miles by companies. The total gross receipts for 1921-22 were £32,523,339 and the total operating expenses were £26,835,292, leaving

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net receipts of £5,688,047, roughly an improvement of 30 per cent over the preceding year.

Passengers carried numbered slightly over four and a quarter billions, a decrease of nearly 9 per cent from the preceding year, while the car-mileage decreased slightly under 4 per cent. The operating ratio fell to 82½ per cent from 86.44 per cent, as it was during the preceding year, as compared with 64½ per cent in 1913 and 1914.

Of the 250 tramways in Great Britain 170 are owned by local authorities and eighty by companies. Of five track gages in use, ranging from 3 ft. 6 in. to 4 ft. 8½ in., 60 per cent of the track is of the last-named gage. More than 23 per cent is of the 3-ft. 6-in. gage. The average energy consumption during the year was 1.82 kw.-hr. per car-mile.

Combination Road and Drainage Ditch Crossing

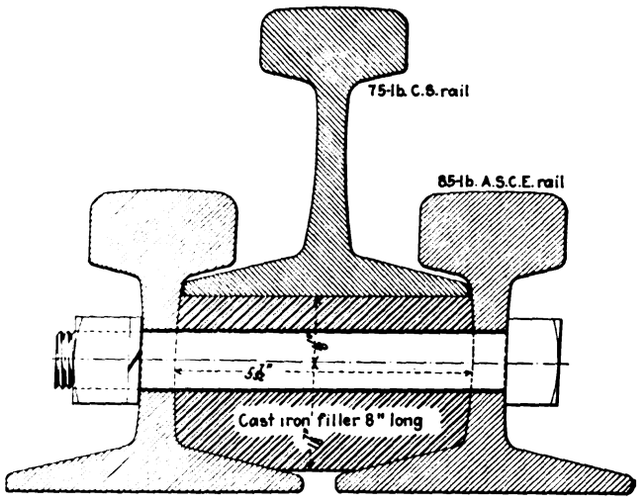
Unique Construction on Interurban Line of Pacific Electric Railway Made Necessary by Locating of Drainage Ditch Across Right-of-Way

By Clifford A. Elliott
Cost Engineer, Engineering Department, Pacific Electric Railway, Los Angeles, Cal.

THE Los Angeles County Flood Control District is carrying out plans for handling the large volume of storm waters that collect each rainy season in southern California in a locality north of the Pacific Electric Railway's Del Rey-Redondo Beach interurban line near Rentchler station. In order adequately to drain this particular district, the county has constructed a concrete drainage ditch 40 ft. wide. The height of the retaining walls is 4 ft. from the base of the ditch to the top of the wall, which is 6 in. thick.

The drainage ditch follows the route of a highway and it was, therefore, constructed so that the floor of the ditch, which is suitably crowned, could also serve as a roadway, being built of concrete similar to a highway.

At the point of intersection with the interurban railway's tracks the ditch was spread to a width of 60 ft., running back 150 ft. at this width in each direction from the center line of the railway tracks. The highway was raised to the track level with a runoff of 250 ft. on one side and 350 ft. on the other. Wooden post barriers were placed along each side of the 20-ft. roadway on the raised section, and valley gutters, 4 ft. wide from the toe of the crowned highway to the face of the retaining wall, were provided. For the passage of the flood waters the railway installed under its double-track line two reinforced-concrete culverts which act as a water course for a section of the drainage ditch. One is located on each side of the 20-ft. concrete elevated highway.



Details of Method of Supporting Rail Over Culverts

These culverts are of the compartment type. The width of the opening in each is 6 ft. and its height is 3 ft. 3 in. The section of the railway right-of-way occupied by the culverts and not paved in was planked over, but where the 20-ft. highway crosses the railway tracks 6-in. concrete pavement was laid.

The tracks over the concrete culverts are of T-rail girder construction, two 85-lb. rails set longitudinally, forming with the rail a girder support for each rail of the tracks. This rests on inverted pieces of T-rail set in the concrete. Details of this plan for supporting the track rail over the 6-ft. opening are shown in one of the accompanying illustrations.

Where the concrete paving crosses the tracks, a 20-ft. length of 75-lb. C. S. revised section guard rail was mounted inside of each track rail, providing a flangeway in which the car wheel flanges can run without damage to the roadway.

At Top, Crossing of Pacific Electric Tracks with Combined Drainage Ditch and Highway Furnishes Interesting Construction Problem. At Left, Crossing of Tracks and Highway at Grade. At Right, Guard Rail Edges Concrete Paving and Provides Flangeway at Crossing.

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The Readers' Forum

Factors in Rail Head Wear

THIRD AVENUE RAILWAY

NEW YORK, N. Y., Sept. 4, 1923.

To the Editors:

The article by Charles H. Clark in your issue of July 14, entitled, "Wear on Rail Head May Determine Life of Track," includes an interesting tabulation showing rail wear and corresponding car traffic at various locations in Cleveland. Mr. Clark's article gives the impression that in Cleveland, owing to the use of the "best modern construction," "the life of the track is practically the life of the head of the rail and the construction combined" instead of being controlled by "the life of the joints," which has been pretty generally the experience in other cities. Elsewhere in the article, the best modern construction is indicated to be, at the present time, "the solid concrete steel tie construction."

A summary of the tabulation given, obtained by adding up the items for the two classes of construction shown, is as follows:

Years in Service	Number Cars in Millions	Type of Ballast	Vertical Rail Wear in Inches per Million Cars Between At Stop	Stops	Average	Wear per Year
209	67.2	Crushed stone	0.088	0.066	0.077	0.025
466	156.3	Concrete	0.099	0.059	0.079	0.026
675	223.5	Total	0.095	0.061	0.078	0.026

The rail wear as shown by this summary is substantially the same with concrete and with crushed stone construction. With the exception of the first item, which is track that has been in service eighteen years, none of the rail given in the tabulation has worn more than ⅜ in. vertically. As this includes only part of the Cleveland tracks, it is impossible to tell from it what the average wear on Cleveland rail has been at the time of its renewal.

The sketch given on page 47 of worn rail section 95-400 indicates wear of about 13/16 in. if measured on the edge of the head next to the gage line fillet. In referring to it Mr. Clark comments that it was removed on account of cracking of the web below the head. He gives a movement of 21,000,000 wheels over this rail. Assuming these to be under double-truck cars similar to those at present in use in Cleveland would give a movement of 5,250,000 cars, which, at the average rate of wear in the table, would give a total vertical wear of 0.41, or 13/32 in., which is about half the amount of wear shown on the sketch. This figure of 13/32 in. also agrees fairly well with the figures given in the paragraph at the bottom of the first column on the first page of the article.

In actual practice rails are often removed for reasons not by any means controlled by the amount of wear on the rails. Pavement renewals and political considerations all tend to make the life of the rails much shorter than the maximum which could be obtained if the joints permitted the rail to be worn down to a minimum thickness between joints, and if nothing else interfered arbitrarily to shorten the life of the track.

The article contains a diagram showing the average cars per mile per year. The variations above and below the mean since 1914 are practically equal in amount, averaging 126,000 cars per mile per year. A second diagram shows the average age of track removed each year. In 1916 this was only about 11¾ years, which was extraordinarily low for an average figure, and probably much below the average of the country generally, showing that track renewals in Cleveland had been made on an exceedingly liberal basis. This seems readily to account for the increased average life of track removed since that date, the present average of about 17½ years being considerably nearer the normal of other companies. It is also to be noted that this increase in age coincides with the war period from 1916 to 1919.

In the last paragraph of Mr. Clark's article he refers to tilting the rails at an angle of 1:25, which, he concludes, "means at least 15 per cent more life." It should be noted that the redesigned Cleveland rail referred to in the next sentence is not intended to be used tilted, and the additional life which may be expected of it is due to the fact that the head of the rail is a quarter of an inch thicker than in the old section, making the total height of the rail 7½ in.

The main conclusions the writer wishes to draw are, first, that there is nothing in the figures given to show any superiority of solid concrete construction over construction using crushed stone ballast; and second, that the increased average life of track removed dating from the beginning of war-time conditions in 1916 seems to be due to other causes than the rate of rail wear.

E. M. T. RYDER, Way Engineer.

Reproduction Method of Valuation More Convenient to Apply

NEW YORK, Aug. 28, 1923.

To the Editors:

I was much interested in your comment last week on the reproduction and investment methods of valuation from the standpoints of public relations and the reward of good judgment. Fortunately, it is not necessary longer to discuss which method is the more just to utility and public. That is up to the courts and commissions, and they are settling it rapidly.

There is a phase of the subject, however, to which attention might also well be directed, and that is the relative convenience in application of the two methods. In this, the reproduction method is far superior to the investment method for any properties except the very modern ones. With cost of reproduction as a basis, the facts are always available if one seeks them, but the investment method means dependence on historical records, which, if they exist at all, are nearly always apt to be incomplete. And incompleteness in this case practically means that many important items of expense must be omitted because they are unknown or cannot be proved. Some knowledge of the historical conditions surrounding the installation must be available, even with the reproduction method, but nowhere nearly as much as with the investment method. In consequence, reproduction valuations of several properties recently show practically no difference in the inventories, as determined by the engineers of the opposing sides. Such is more apt to be the case, of course, when the inventories are made at the same time and the engineers can compare notes. The differences that exist in the valuations usually occur in the intangible items to be included and the price data.

ENGINEER.

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Association News & Discussions

Pacific Claim Agents Hold Successful Meeting

THE most successful convention ever held, was the general verdict after the meeting of the Pacific Claim Agents' Association at Portland, Aug. 22 to 24. The good results obtained in that city along safety education and accident prevention lines were of particular interest to the claim agents. It was the opinion that this had been brought about principally through the hearty co-operation between municipal officials and the railway.

Safety and Its Relation to the Public

In a paper read by B. F. Boynton, Portland Railway Light & Power Company, the problem of interesting the public along safety lines was discussed. "You must first thoroughly demonstrate that you are sincere," said Mr. Boynton, "that you understand what you are doing, and that you are perfectly willing to work hard, not for private gain, but for the general welfare. Beneficial results can be obtained by talking to school children about accident prevention. The organization of safety officers at each school, who report to their principals any infraction of traffic regulations, has been found a helpful scheme. Whenever an accident occurs, and one of these safety officers is near, he immediately gets all the data possible and turns them over to the chief of safety officers.

"One of the best ways to get the confidence of the people is for the claim agent who is a good mixer to affiliate with all the different civic bodies in the city, attend the meetings regularly, be willing to work hard along any helpful lines of civic work, to show himself willing at all times to help the other fellow when he needs assistance. The latter will then be more ready to come to your aid when you need him."

Discouraging Litigation in Damage Claims

J. H. Handlon, Market Street Railway, San Francisco, spoke on methods by which litigation can be discouraged. "What can we do toward prevailing upon claimants to abandon all thoughts of litigation?" said Mr. Handlon. "We must by our conduct, by our own behavior, instill confidence so that the 'other fellow' has faith in us. We must establish, if possible, in the minds of claimants, the thought that we are striving to deal justly by them. Let us endeavor to convince them that we are trying to obtain a proper perspective of the merits of their claims. We must try to eradicate any impression which they may have that we are advocates paid solely to champion the interests of the company.

"We must give claimants to understand that the lawyer representing the company is hired to plead, support, vindicate and defend the company, therefore the lawyer is right in assuming a fighting attitude when combating litigation; but as claim agents we aim to be just as impartial as a judge or jury weighing the merits of the case.

"The publicity given to the methods employed by the company in striving to prevent accidents is a factor establishing a friendly feeling toward the company. Claimants then are more disposed to look kindly upon offers of settlement, for they are not so vindictive and not so likely to ask punitive damages.

"The good will of lawyers and doctors should be cultivated. Lawyers are encouraged to deal directly with the claim agent. A lawyer ordinarily wants to facilitate the handling of the claim without burdening himself with too much effort. We should pave the way to a final disposition of the claim by putting him to as little inconvenience as possible. We are always trying to develop the good will of physicians in numerous ways, particularly by making an effort to protect their bills and by allowing them liberal fees.

"The general public's letters are acknowledged in prompt, respectful and business-like fashion. Persons are treated courteously on their arrival at the office. Our reception room is supplied with newspapers and magazines for their convenience. Our walls are covered with accident prevention placards and similar exhibits, planned to interest them if they are compelled to wait before being interviewed. Telephones and drinking water are at their service. They are not only pleasantly greeted but given to understand that we do not look upon them with suspicion; that it is our wish to pay what we owe and we do not have any intention of evading our just obligations; that we merely ask their co-operation in gathering the facts; that everybody, whether rich or poor, influential or forsaken, is treated alike."

Liability of the Auto Driver to His Guests

In a paper A. L. Levinsky, Stockton Electric Railway, said that at the San Diego convention, after a discussion upon this subject, it was suggested that action should be taken at the next session of the Legislature to have the statutes upon negligence amended so that railways might escape the burden cast upon them by the decisions on the liability of the automobile driver to his guests. He therefore wrote to the law departments of various transportation companies, and two bills were finally agreed upon, which were presented to the Legislature, but unfortunately did not obtain favorable action. After giving the proposed amendment very careful consideration, it was felt that it was an intricate matter to prepare an amendment which would be constitutional.

Mr. Levinsky stated that in line with recent decisions, it has been held that if the driver and guest were engaged in a joint enterprise, then the negligence of the driver could be imputed to the guest.

But in order that there be such a joint undertaking it is not sufficient, according to court decisions, that the passenger or occupant of the machine indicate to the driver or chauffeur the route he may wish to travel, or the places to which he wishes to go, even though in this respect there exists between them a common enterprise of riding together. The circumstances must be such as show that the occupant and the driver together had such control and direction over the automobile as to be practically in the joint or common possession of it.

Education of Employees

H. G. Winsor, Tacoma Railway & Power Company, in a paper on education of employees, said that some companies have attempted education in various ways, but the results have been in most cases unsatisfactory, principally because the objective has been clouded, or the means of accomplishment lacking. "As claims men," continued Mr. Winsor, "we have for a number of years persistently followed a plan to educate our employees in accident prevention. The results have been beneficial from the humanitarian and financial view points.

"I have been very much interested in a report by Mr. Handlon which contains the record of proceedings of a research committee appointed in November, 1920, by President Von Phul of the Market Street Railway and working in co-operation with the Pacific Coast Bureau of Employment Research. The principal application to education of the work reported by this committee is found in the mental tests in which employees, principally motormen, were examined in various ways to determine their mental ability

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properly to perform their duties. The results agreed with those secured in other industries and in the United States Army. Many men were found to have the mentality of a person ten to fifteen years of age. This condition, which is reported to exist in all industrial groups, emphasizes the need of education.

"As claims men we have only a limited opportunity in the education of employees. Such work of this nature as we have undertaken in the past has, we believe, proved successful. Our experience must, therefore, be of some value in any development which our employees may undertake."

Officers Elected

The officers elected for the following year are: President, P. O. Solon, San Francisco-Oakland Terminal Railway; first vice-president, S. A. Bishop, Pacific Electric Railway; second vice-president, V. F. Bennett, San Diego Electric Railway; third vice-president, C. R. Peck, Portland Railway, Light & Power Company, and secretary-treasurer, B. F. Boynton, Portland Railway, Light & Power Company. The new executive committee will consist of J. H. Handlon, chairman; T. G. Aston, H. G. Winsor, W. H. Moore, C. A. Blackburn, F. E. Oakley, H. K. Relf, A. M. Lee, A. L. Levinsky, and C. N. McRoberts.

Track Building with Steel Ties*

By Clyde L. Hedges
Wisconsin Railway, Light & Power Company, La Crosse, Wis.

OUR track program this year for city track construction in La Crosse calls for the relaying of 2.7 miles of track, all in paving. Of this track 1.2 miles is in bituminous concrete paving, and the balance in brick. All was laid with 6-in. 72-lb. T-rail except 0.1 mile, which we laid with 70-lb A.S.C.E. section, in bituminous concrete paving.

For foundation to be placed under wood tie construction 5 in. of No. 1 and No. 2 limestone is used. It is rolled with a 10-ton roller, sufficient No. 3 crushed limestone being used for tamping before rolling, thus making a total of 6 in. of rock under the ties. Dayton mechanical ties will be used for 0.8 mile and on the balance 7-ft. cedar ties. Concrete to the depth of 5 in. is placed between the ties and under the rail in wood tie construction, for support of paving. Standard spikes 5½ in. x $\frac{9}{16}$ in. are used. Experience has shown tie rods are not necessary.

For joint welding we use an Indianapolis welder. All of our track this year will be welded with Apex joints, which are preferred to the Simplex joint on account of the better head support. Four pounds of Grade "B" and 1 lb. of Grade "C" welding material are used on each joint. Our joints cost about $6.55 each, divided as follows:

Labor	$0.75
Current	.60
Welding material	.50
Welding plates	4.70
Total	$6.55

Under the ball of the rail and adjoining the web, cement mortar is placed, against which the outer paving block is laid. Along the gage side of the rail a special mold block of Nelsonville pattern is placed of size to fit the rail. A special Nelsonville stretcher brick is laid inside of the rail. Three rows of regular paving block are placed lengthwise adjoining the outside of the rail.

We have purchased new double curves wherever necessary, arranged for car clearance. Wherever we have replaced any switches, iron-bound manganese hard center construction is used. All our switch points are arranged with reversible automatic spring switch boxes.

Our plan for the installation of the Dayton resilient tie is as follows: We establish a grade for street paving, and roll with a 10-ton roller. Then the track is located and under each rail a trench is excavated 15 in. wide and of sufficient depth to allow 6 in. of concrete between the bottom of trench and bottom of ties after the rail has been brought to grade. We then place wood ties across the trench about every 20 or 30 ft., the distance being governed by the weight and flexibility of the rail installed. The rails are set in position on the ties above the trench grade. We then hang the ties to the rail by means of the fasteners which are provided with them. At first only every fourth or fifth tie is hung in order that the track gage may be verified at points where these ties are installed. The intermediate ties may then be hung and fastened permanently. In spacing the ties 3-ft. centers are allowed, and the space is closed to 2-ft. centers next to the joint tie. After all ties are properly spaced and fastened, track is lowered on 12-in. blocks spaced every 20 ft. in the trench. Old ties may be used for blocks. The track is ready for final line and grade after it is lowered on the blocks. Wood shims are used between wood blocks and rail wherever necessary. In tightening the tie fasteners, a short wrench not more than 10 or 12 in. long should be used, and care should be taken not to screw the nut tighter than is necessary to seat the rail firmly upon the tie block. The Dayton tie has a cushion of asphalt ½ in. thick under each of the wood blocks, and if the nuts are run down too far the asphalt will squeeze out between the two blocks.

The following concrete mix is used: One part portland cement, three parts sand, six parts coarse aggregate. If pit run gravel is used it should be free from soil, and the mix used is one part cement to six parts gravel. In pouring the concrete a man should be present constantly with tamping bat to see that no voids are left under or about the tie blocks.

In welding the joints it is good practice to weld the base of the rail to the top plate of the joint tie.

A rail grinder supplements the work of the track welder. With the welder and grinder we have been able to save a great deal of special trackwork such as frogs, switches, mates and crossings. The worn-out frog or switch is built up by depositing new metal, which is then ground down without disturbing paving or traffic. Cupped joints and deep depressions are filled in and then ground to the original surface.

It is our intention to go over all joints on our new work and grind off any slight high spots the rail may have, and we will then have a perfect joint. Our welder has been used to fill bolt-holes in car trucks which have become oblong through wear. These holes have been filled in solid with new metal and then rebored. This is much more satisfactory than the old method of plugging and redrilling. We have been able to weld many new ears on gear cases.

On one of our streets a number of years ago the operators of the property at that time installed 70-lb. A.S.C.E. rail in brick pavement. To bring the rail to proper height for 4-in. paving brick the 70-lb. rail was laid on wood shims on wood ties. The shims have since rotted out and the track has become depressed in the pavement. We have found it necessary to relay the 70-lb. rail with 72-lb. 6-in. T and repave between the rails. We have been able to save most of the brick for repaving by laying them with the worn side down and asphalting in. For the above reason we are laying all new track with 6-in. rail.

*Abstract of a paper presented before the Electric Railway Section of the Wisconsin Utilities Association, Oshkosh, Wis., Aug. 17, 1923.

International Conference on Standardization

A CONFERENCE of the secretaries of national industrial standardizing bodies was held in Zurich and Baden, Switzerland, July 3 to 7. Thirteen countries were represented, including all of the more important industrial nations of Europe and America. The United States was represented by P. G. Agnew of the American Engineering Standards Committee.

A leading topic discussed by the conference was the interchange of information between the various national bodies during the development of the work in the different countries. While it was not possible to overcome all the difficulties existing, substantial progress was made. It is believed that the steps taken will lead immediately to a substantially increased amount of interchange of information during the earlier stages of standardization work, and that the way has been paved for a much more extensive interchange in the future.

Provision was made for continuing the work of the conference on the many administrative problems of common interest, through a loosely-knit continuing organization. An example of such work

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planned by the conference is the translation of technical terms of special importance or difficulty in standardization work. There will gradually be built up such a vocabulary of technical terms, mainly in English, French and German, but supplemented as far as may be feasible and necessary by the corresponding terms in other languages. Another example is the work undertaken by the conference on the classification and nomenclature of standards.

Birmingham's Experiment with Trackless Trolley*

AT THE annual conference of Municipal Tramway Association, Portsmouth, England, Aug. 22-24, Alfred Baker, general manager Birmingham Corporation Tramways, presented a paper giving an interesting account of the reasons why the City Council determined to try trackless trolley cars and of the satisfactory traffic and financial results so far obtained on a route which was formerly occupied by a tramway.

Mr. Baker, in opening, said that the opponents of tramways had been delighted when it was announced some time ago that Birmingham had decided to abandon one of its tramway routes and to substitute some other system of traction. But the fact was that there was no system of traction that could cope with rush-hour traffic with the same ease and facility as the tramway. Tramways were as alive today as they ever had been and would hold the field for many years in dealing with large volumes of traffic.

In 1921 Birmingham Corporation was faced with the reconstruction of a very large amount of permanent way, a matter at that time of grave concern owing to the high cost of wages and material. At prices then obtaining, it was only on routes of enormous traffic that reconstruction could be faced without anxiety. The corporation was then reconstructing certain heavy traffic routes.

On the other hand, he said, there were certain other routes requiring reconstruction where the traffic was comparatively light. The Nechells route was one of the latter. It was only single track and ran through narrow streets. The alternatives to reconstruction were the petrol omnibus and the trolley omnibus. The former the corporation knew all about, having a large fleet already in operation, so it directed its inquiries to the subject of the trackless car system. After exhaustive inquiries it was decided to adopt the trolley bus as being the most suitable for this route.

In considering relative merits, the question of carrying capacity was very important. The tramcars running over the route were double-deck top covered vehicles seating fifty-four passengers each. It seemed to the corporation that any new vehicle adopted must be able to seat passengers approximating in number those carried on the tramcar. This seemed to point to the double-deck petrol bus, as the majority of the trolley buses running in England were single-deck vehicles carrying only from twenty to thirty passengers. It was known, however, that R. H. Wilkinson of Bradford was experimenting with a double-deck trolley vehicle carrying about fifty passengers, and this was investigated.

Operating Costs

The most important question was that of operating costs. The cost of running double-deck trolley vehicles of large seating capacity was unknown, as no vehicles of this type were in regular service in other towns. Such knowledge as they did possess, however, led the tramways committee to believe that operating costs would be less than petrol bus costs and that the working expenses would be similar to those of tramway operation. In coming to the decision to adopt the trolley bus, estimates were put forward to the effect that to reconstruct the tramway route would cost £90,000, while to install trolley buses would cost only £36,000. The gross total for the trolley system was £54,000, but £18,000 was deducted as the value of twelve tramcars transferred to other routes. The items of the £54,000 were: Twelve trolley buses, £36,000; alteration to overhead lines, £3,000; taking up tramways and making good the street for ordinary traffic, £15,000.

In regard to receipts, those of the tramway, based on previous years, were £28,300, while the expenses were £22,640, giving a gross profit of £5,660. If the amount required for reconstruction was made the subject of a loan, the interest and sinking fund charges would amount to £9,000, thus bringing out an annual loss of £3,340. For the trolley buses the receipts and expenses were put at the same figure as for the tramway, less a saving of 1.25d. per car-mile on permanent way repairs (£1,562). There was thus a gross profit of £7,222, and as interest and sinking fund charges would be only £4,100, there was a net profit of £3,122.

The trolley buses which were ordered provided seating accommodation for fifty-one passengers each—twenty-six in the lower saloon and twenty-five on the upper deck. The weight was 7 tons 6 cwt. (16,352 lb.) empty. After the tramway was pulled up and the road surface restored, the trackless cars began running on Nov. 27, 1922.

Comfortable Riding

The new system immediately took with the public. The trolley bus gave the passengers a most comfortable ride with an entire absence of jerks. They ran with extreme smoothness and were practically noiseless. There was no vehicle in transport service that for ease and comfort could compare with a properly constructed trolley bus. The route, which it had been thought had reached the limit of its capacity, immediately began to improve its returns. The trolley buses attracted more passengers than had ever ridden on the tramcars. The mileage run had been increased without increasing the number of cars in service.

Tables submitted showed increases of passengers per week, compared with the tramcars, ranging up to about 50 per cent. Receipts were also up, but per car-mile they were down, owing to the increased mileage run. Accounts drawn up for the period from Nov. 27, 1922, to March 31, 1923, showed that the traffic receipts of the trolley buses were £8,812, or 19.234d. per mile run. The total working expenses (excluding income tax and capital charges) were £5,789, or 12.648d. per mile run. The costs per car-mile under the various main headings were: Power, 2.131d.; traffic, 6.843d.; general, 2.351d.; repairs and maintenance, 1.209d.; contributions for health insurance and national insurance, 0.114d.

The figure of 12.648d. per car-mile compared with 15.407d. for petrol buses and 14.824d. for tramcars in Birmingham. While it was true that the full burden of repairs for the trolley buses had not yet been reached, still figures confirmed the view that operating costs of trolley buses need not exceed the costs of tramcar operation.

Spheres for Trolley Bus and Petrol Bus

Each system had its own sphere of usefulness, but for large volumes of traffic tramways held the field. If he was asked as to how he would employ petrol buses and trolley buses in conjunction with tramways, he would be inclined to suggest—though in every case local conditions would have to be the deciding factors—as follows:

1. In anticipation of an extension of an existing tramway, where it was reasonably probable that tramways would be required at some future date, he would use the trolley bus.
2. He would use the trolley bus in substitution for a single line of tramway where the traffic was light, or where it was not possible to double the track.
3. On routes in suburban districts where some sort of transport was necessary and where there was no likelihood of tramways being required, he would certainly use the petrol bus.
4. He would use the petrol bus in running cross-country routes and in connecting up the outer termini of tramways. Petrol buses could be made to serve a most useful purpose in linking together the country ends of the tramways.

Wrought Iron Bars and Plates Standardized by A.E.S.C.

THE American Engineering Standards Committee has adopted as tentative American standards the specifications submitted by the American Society for Testing Materials, one covering staybolt iron, engine-bolt iron and extra-refined wrought-iron bars; second for refined wrought-iron bars,

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and a third for wrought-iron plates. The special committee in charge of these specifications was headed by E. C. Peck, representing the American Society of Mechanical Engineers. The committee further recommended that the American Society for Testing Materials should be designated sponsor, under A.E.S.C. procedure, for the future development and revision of these specifications.

C.E.T.A. September Meeting Announced

THE next regular meeting of the Central Electric Traffic Association will be held at Yellow Banks Hotel, Webster Lake, Ind., on Friday and Saturday, Sept. 14 and 15.

The morning session of Friday will be called to order at 9 o'clock and will be in the nature of a round-table discussion. All matters of importance should be brought before the association at this time.

The afternoon session will be in charge of J. S. Bleecker, general manager Indiana, Columbus & Eastern Traction Company. Mr. Bleecker is chairman of the committee on publicity of the Central Electric Railway Association and is taking this opportunity of bringing before the traffic representatives the value of publicity on the part of electric railways. Mr. Bleecker has arranged to have present representatives of the various committees on public utility information in the association territory.

American Association News

Transportation Plans for the Atlantic City Convention

ALL of the trunk line passenger associations of the country have authorized the sale of round-trip tickets to the convention in Atlantic City at the rate of one and one-half the single way fare. This will be done on presentation of a special certificate on purchase of ticket at the local ticket office. Certificates are being mailed to members by Executive Secretary J. W. Welsh.

One certificate is good for any member of the association, including dependent members of his family. Tickets may be purchased for the going trip beginning Oct. 4 to 10 inclusive, and the return trip may be made leaving Atlantic City up to Oct. 18, but must be by the same route as the going trip. Tickets will be validated at Atlantic City, N. J., by agents at the regular ticket offices.

Detailed arrangements have been placed in the hands of a special committee on transportation, one company member and one manufacturer member in general having been designated for each state.

The complete personnel of the committee follows:

H. J. Kenfield, chairman and representative for Illinois, *Electric Traction*, 431 South Dearborn Street, Chicago.

RAILWAY MEMBERS

Alabama, F. V. Underwood, Birmingham Railway, Light & Power Company; Arkansas, C. J. Griffith, Arkansas Central Power Company, Little Rock; California, W. V. Hill, California Electric Railway Association, San Francisco; Colorado, Ernest Stenger, Denver Tramway Company; Connecticut, J. K. Punderford, Connecticut Company, New Haven; Delaware, T. W. Wilson, Wilmington & Philadelphia Traction Company, Wilmington; District of Columbia, J. H. Hanna, Capital Traction Company, Washington; Florida, J. P. Ingle, Jacksonville Traction Company.

Georgia, F. L. Butler, Georgia Railway & Power Company, Atlanta; Indiana G. K. Jeffries, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis; Iowa, C. D. Cass, Waterloo, Cedar Falls & Northern Railway, Waterloo; Kansas, George Theis, Jr., Arkansas Valley Interurban Railway Wichita; Kentucky, Samuel Riddle, Louisville Railway; Louisiana, H. B. Flowers, New Orleans Public Service, Inc.; Maine, Alfred Sweeney, Androscoggin & Kennebec Railway, Lewiston; Maryland, L. H. Palmer, United Railways & Electric Company, Baltimore.

Massachusetts, Edward Dana, Boston Elevated Railway; Michigan, E. J. Burdick, Detroit United Lines; Minnesota, Vincento Law, Twin City Rapid Transit Company, Minneapolis; Mississippi, W. R. Phipps, Meridian Light & Railway; Missouri, B. W. Frauenthal, United Railways Company of St. Louis; Montana, E. J. Nash, Butte Electric Railway; Nebraska, R. A. Leussler, Omaha & Council Bluffs Street Railway, Omaha; New Hampshire, E. C. Foster, Manchester Street Railway.

New Jersey, H. C. Donecker, Public Service Railway, Newark; New York City, George Keegan, Interborough Rapid Transit Company; New York, W. H. Collins, Fonda, Johnstown & Gloversville Railway, Gloversville; North and South Carolina, Raymond Hust, Tidewater Power Company, Wilmington, N. C.; North Dakota, C. P. Brown, Northern States Power Company, Fargo; Ohio, J. H. Alexander, Cleveland Railway; Oklahoma, J. W. Shartel, Oklahoma Railway, Oklahoma City; Oregon, F. T. Griffith, the Portland Railway, Light & Power Company.

Pennsylvania, F. R. Phillips, Pittsburgh Railways; Rhode Island, R. R. Anderson, United Electric Railways, Providence; South Dakota, R. C. Mills, Sioux Falls Traction System; Tennessee, E. D. Reed, Tennessee Electric Power Company, Chattanooga; Texas, G. H. Clifford, Northern Texas Traction Company, Fort Worth; Utah, H. F. Dicke, Utah Light & Traction Company, Salt Lake City; Virginia, J. E. Harvell, Virginia Railway & Power Company, Richmond; Washington, R. A. Willson, Spokane United Railways; West Virginia, E. B. Moore, Monongahela West Penn Public Service Company, Fairmont; Wisconsin, S. B. Way, Milwaukee Electric Railway & Light Company.

MANUFACTURER MEMBERS

California, F. R. Fageol, Fageol Motors Company, Oakland; Connecticut, C. L. Hancock, Bridgeport Brass Company, Bridgeport; Georgia, P. M. Potter, Mutual Foundry & Machine Company, Atlanta; Kentucky, Carl P. Nachod, Nachod Signal Company, Louisville; Maine, N. E. Hodgkins, J. F. Hodgkins Company, Gardiner; Massachusetts, W. P. Underhill, L. C. Chase & Company, 89 Franklin Street, Boston; Michigan, M. J. Phelan, Peter Smith Heater Company, Detroit; Missouri, J. B. Spencer, Southern Wheel Company, St. Louis.

New Jersey, Joseph Kempf, Wilson Imperial Company, Newark; New York City, C. D. Eaton, American Car & Foundry Company; New York, E. P. Waller, General Electric Company, Schenectady; Ohio, W. P. Day, International Steel Tie Company, Cleveland; Pennsylvania, M. B. Lambert, Westinghouse Electric & Manufacturing Company, East Pittsburgh; Rhode Island, A. J. Thornley, Consolidated Car Fender Company, Providence; Wisconsin, J. R. Jeffrey, Allis-Chalmers Manufacturing Company, Milwaukee; Canada, W. W. Horwood, Canadian Steel Foundries, Ltd., Montreal, Que.

Experience with Buses

AT THE last American Association executive committee meeting, reported in last week's issue, some discussion came up about competition of buses. Britton I. Budd, president Chicago, North Shore & Milwaukee Railroad, said that the electric railways ought to go into the bus business if for no other reason than to meet fire with fire. He said that the worst thing about competitive bus lines is their effect on the ability of the railway to sell securities. He considered that the best protection is for the railways to operate buses and thereby prevent others from getting into the territory. Furthermore, if there is any need for this character of transportation let the railways provide it.

Mr. Budd said that the Chicago, North Shore & Milwaukee Railroad now has nearly half a million dollars invested in buses, though practically none of this business is profitable. But the interests of the North Shore road have been protected as most of the routes out of Chicago to the north have been supplied with bus service.

To determine whether there was any demand for a bus service paralleling the North Shore line between Chicago and Milwaukee, Mr. Budd bought five Fageol buses and advertised that three trips a week each way would be made. The traffic department devoted nearly its entire time for three weeks to solicitation of business for this service and at the end of that time had succeeded in securing seven passengers, the general comment being, "Why should we ride buses when there is good railway service?" These buses are now being used in special tours to Delavan Lake, Wis., and other resorts. There has been a call for this service such that about three buses a day have been dispatched on special tours. Mr. Budd reiterated that he doubted whether his bus business would be profitable, but it would at least protect the railway from others getting in.

Engineering Executive Committee Meets

A MEETING of the executive committee of the Engineering Association was held in New York on Aug. 23. Plans for the October convention were taken up in considerable detail. On account of the large number of committee reports to be considered, and the limited time available for discussion, it was decided that each speaker would be limited to five minutes. The committee expects to get considerable written discussion, and in order to save time it is requested that an abstract be furnished with each contribution which will give the principal points.

The committee on revision of the engineering manual made a progress report. It was recommended that a permanent bound volume be published within a reasonable time after the convention. It was also recommended that the committee on standards be relieved from direct responsibility for the

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manual, and that the committee on manual should be made a standing committee composed of members of the executive committee, with authority to edit for publication the material submitted and prepare the makeup of the manual.

The program for the convention was next discussed. It was agreed that the subjects committee should not make a report after each session, but should prepare a complete report immediately following the convention. The various reports of the committees of the Engineering Association were discussed, and they were approved for publication upon recommendation of the sponsors for each committee.

H. A. Johnson was appointed a subcommittee to report on the policies of the heavy traction committee; E. H. Scofield to consider the work of the power generation committee; and C. R. Harte to decide on the question whether signals should be retained as a subject for the power distribution committee, or should be handled otherwise.

The secretary explained briefly the results of a conference called by Secretary of Commerce Hoover for the purpose of forming an advisory council consisting of representatives of the technical societies and trade associations in conforming specifications for governmental purchases of supplies.

A special committee was appointed to co-operate with the Bureau of Standards in work affecting electric railways, consisting of R. H. Dalgleish, C. S. Kimball and W. W. Wysor.

The activities of the American Engineering Standards Committee were reported on by Mr. Cram, who presented a memorandum on the relations of the Engineering Association to the A.E.S.C. The status of the work of the various sub-committees of the latter association, on which the Engineering Association is presented, was discussed. The entire proposal was submitted to a committee composed of Messrs. Cram, Harte and Hecker.

A committee on subjects to select suitable topics for next year's standing committees was appointed consisting of C. H. Clark, R. C. Cram, C. R. Harte, H. H. Norris and L. C. Datz.

It was reported that practically all the money has been contributed for the rail joint investigation. The committee is now awaiting bids from manufacturers to provide the equipment. Co-operation with the Central Electric Railway Association in its recent car braking tests was taken up, and it was decided to analyze and work up the results of these tests.

Requests for an alternate for the president of the Engineering Association at meetings of the executive committee of the American Association was taken up. President Datz announced that hereafter the alternates will be the vice-presidents of the Engineering Association in order of seniority.

Those present at the meeting were L. C. Datz, chairman; R. C. Cram, R. H Dalgliesh, D. Durie, C. R. Harte. C. H. Clark, H. A. Johnson and G. C. Hecker, who acted as secretary.

New Members of A.E.R.A.

THE last meeting of the executive committee approved the applications for membership in the American Electric Railway Association of the following companies—two railways and nineteen manufacturers:

Lake Superior District Power Company, Ashland, Wis.

Toledo, Ottawa Beach & Northern Railway, Toledo, Ohio.

Jerome Detective Service Company, San Francisco, Cal.

Portland Cement Association, Chicago, Ill.

Elliot Frog & Switch Company, East St. Louis, Ill.

Macbeth-Evans Glass Company, Pittsburgh, Pa.

Hoover Body Company, York, Pa. (bus and truck bodies).

Johns-Pratt Company, Hartford, Conn. (fuses and electrical protective devices).

Rubberset Company, Newark, N. J. (paint brushes).

W. S. Godwin Company, Inc., Baltimore, Md. (steel paving guards).

Southern Signal Company, Louisville, Ky. (track instruments and other railway signal appliances).

Federal Motor Truck Company, Detroit, Mich.

Graham Brothers, Detroit, Mich. (motor trucks).

Powers Accounting Machine Corporation, New York City.

N. A. Petry Company, Inc., Philadelphia, Pa. (automobile specialties).

Clark-Williams Engineering Company, Inc., Bridgeport, Conn. (pole supports).

Budd Wheel Company, Philadelphia, Pa.

National Malleable Castings Company, Cleveland, Ohio.

Wales Adding Machine Company, Wilkes-Barre, Pa.

New York Transportation Company, New York City (motor buses).

E. B. Badger & Sons Company, Boston, Mass. (Badger ball cushions).

Meeting of Purchasing Agents and Storekeepers

THE purchases and stores committee has been handicapped heretofore by the lack of a definite place at the convention, therefore the executives of the American and Engineering Associations have approved its request for a session at this year's convention to be devoted entirely to subjects of interest to purchasing agents and storekeepers. The program follows:

SESSION OF PURCHASING AGENTS AND STOREKEEPERS AT YOUNG'S MILLION DOLLAR PIER, ATLANTIC CITY, WEDNESDAY, OCT. 10, 1923
2 P.M.

Address of Welcome — President L. C. Datz, chief engineer Memphis Power & Light Company, Memphis, Tenn.

Report of Purchases and Stores Committee —B. J. Yungbluth, supervisor purchasing and supplies Philadelphia Rapid Transit Company, chairman.

Outline of Purpose and Constructive Work Planned by the Committee on Purchases and Stores—W. H. Staub, purchasing agent United Railways & Electric Company of Baltimore.

Proper Control and Handling of Materials and Supplies—P. F. McCall, superintendent of materials and supplies Chicago, North Shore & Milwaukee Railroad.

Convention Information

A CIRCULAR letter has been sent to all members of the American Electric Railway Association and affiliated associations by Secretary J. W. Welsh regarding plans made for the October convention at Atlantic City. With it are inclosed advance registration cards, indentification certificate for securing reduced railroad fares, copies of the proposed changes in the constitution to provide for the establishment of community section membership and for covering "no quorum" meetings of the executive committee, and an attractive leaflet entitled "All About the Forty-second Annual Convention." This folder gives a brief description of the various convention activities.

Special Reports Available

THE bureau of information and service, American Electric Railway Association, has prepared the following special reports, which are available to member companies in good standing upon request:

Cost of Living Studies.—A summary of reports of the National Industrial Conference Board, Bureau of Labor Statistics, Annalist Food Index, Gibson's Food Index, Dun's Wholesale Index and Bradstreet's Wholesale Index, showing present compared with prewar prices.

Protection of Railroad Crossings.—Part 1, laws of various states regarding elimination and protection of grade crossings; Part 2, court and commission decisions in cases involving apportionment of expense for the protection or elimination of grade crossings; local ordinances passed by cities regulating traffic over railroad and railway crossings; extracts from committee reports of the National Association of Railway and Utilities Commissioners.

Electric Railways Operating Motor Bus Lines—A list of 107 electric railways that have adopted or propose to adopt motor buses or trackless trolleys either as auxiliaries or to supersede railway service in whole or in part.

Independent Motor Bus Routes.—A list of motor bus routes grouped according to geographical distribution, showing length of route, fare charged, number of buses operated and the type of bus.

Cost of Handling Materials and Supplies.—Gives the ratio of the value of materials and supplies on hand to gross revenues for a number of companies classified into three groups according to their size and their comparative stores department expenses (I. C. C. Account No. 95) per $1,000 of materials disbursed.

The Attitude of State Regulatory Commissions Toward Motor Bus Competition with Railways.—A study of the development of the policies of the various state commissions in regard to issuance of certificates of public convenience and necessity to motor bus operators.

Trend of Electric Railway Operations.—A month-by-month statement of the revenues, expenses, taxes, car mileage, passengers carried, operating ratio and average rate of fare of eighty companies since January, 1921, with charts showing the trend of the daily average number of passengers carried by these eighty companies since January, 1920, and the percentage variation.

Investment as the Basis of Rate Making.—A summary of court and commission decisions discussing the use of original investment as a measure of value for rate-making purposes.

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Maintenance of Equipment

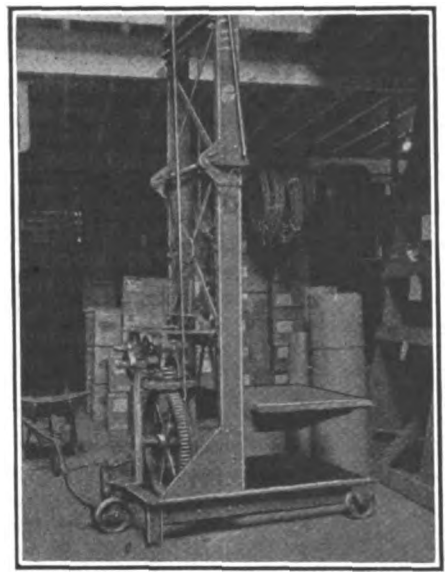
Painting Shop Interiors

THE maintenance shops of the Ohio Valley Electric Railway, Huntington, W. Va., are far from gloomy, but the management believes that liberality in the use of good paint on walls, under sides of roofs, and even machines will have good effect in increasing illumination and adding cheerfulness to its shops. Experiments have been going on recently to determine a satisfactory method of coating brick walls, roof trusses, etc., with white paint in such a way that the whiteness will be retained. It was found that paint of the ordinary type soon stains and takes on the appearance of antiquated whitewash.

At present, two coats of a special white paint made by the Detroit Graphite Company are being applied on rough brick and steel, with apparently permanently satisfactory results. On woodwork an "outside white" made by the same company is used. This paint is put on by the spraying method, with apparatus furnished by the Paasche Air Brush Company of Chicago, Ill.

An unusual and very attractive effect is secured in the machine shop by painting all of the machine tools red. A brightly colored machine in the white walled and roofed room produces a pleasing effect which is undoubtedly reflected in the quality of the work done. Whether the general neatness of the shop has anything to do with the good painting or not is a question, but there may be some connection.

Minimizing Lifting in the Storeroom



Convenient Device for Lifting Heavy Stock

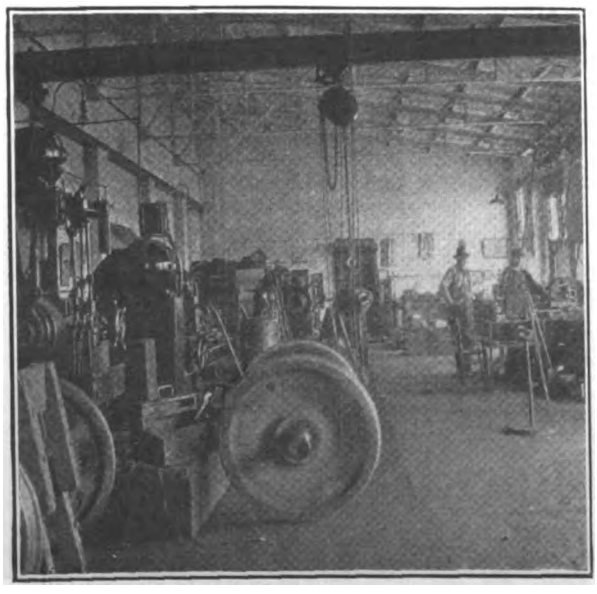
THE Virginia Railway & Power Company is making improvements in its storeroom in Richmond, with a view to facilitating the taking of inventory and to handling materials more conveniently.

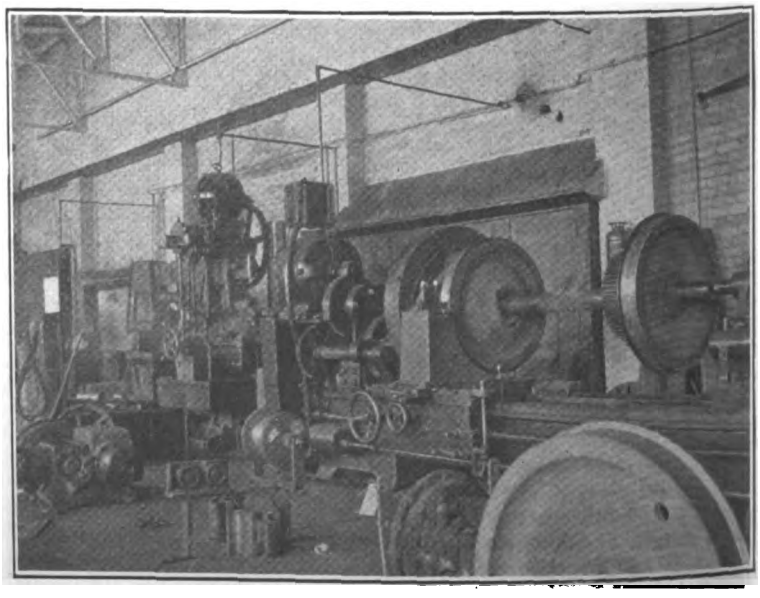
Among the materials-handling devices that have been found useful is the portable lift shown in the accompanying illustration. This is invaluable for raising materials to high bins or to a gallery. It consists of a platform sliding in guides and elevated by means of a steel cable passing over a sheave at the top and down to a drum, which is revolved by means of a crank through gearing. The lift is mounted on wheels and provided with a handle for pulling and steering. It is made by the Economy Engineering Company, Chicago, Ill.

Gear Cases Modified to Get Better Lubrication

LUBRICATION of railway motor gears and pinions is done ordinarily by placing grease or heavy oil in the bottom of the gear case. Sometimes sufficient grease is not placed in the gear case to insure good lubrication, and frequently some of the grease works out through the joints until the gear does not pick up enough to cover the teeth, leaving them dry. The result of the dry gears is excess noise and chattering, with resultant rapid wear.

A simple remedy has been provided by the West Penn Railways, Connellsville, Pa. This consists of cutting off the lower portion of the standard malleable iron gear case,





In the Shops at Huntington, W. Va., Unusual Care Is Being Given to the Painting of Walls and Other Reflecting Surfaces

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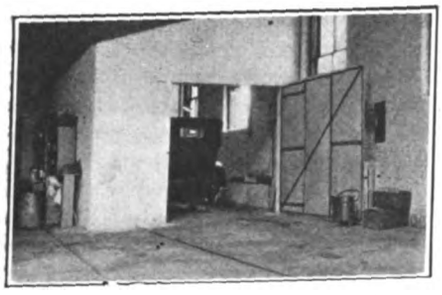
and welding on a new bottom having a clearance of only about ¼ in. below the gear. This clearance has been found sufficient in practice, since there is no danger of loose parts falling into the case.

The result of this modification of the gear case is that the gear is lubricated so long as any grease at all remains in the case, and dry gears are unknown on the property. An incidental advantage is that the clearance between the track and the bottom of the gear case is increased several inches. As redesigned, the bottom of the gear case is above the bottom of the motor case, whereas in the standard design the gear case is the lower. This prevents damage to the gear cases, especially during the winter season, or when the paving has become broken and portions of it project above the general level.

A Dustproof Annex to the Paint Shop

IN ONE corner of its paint shop, the Chattanooga Railway & Light Company has built a dustproof brick and iron compartment or room for the painting of automobile bodies.



Fine Varnish Work Is Facilitated by Means of This Dustproof Room

Its appearance is shown in the accompanying illustration.

The brick part was built so as to include the two outside windows of the building, thus providing ample daylight illumination. For artificial lighting, powerful electric lights with reflectors were placed in such positions and at such angles as to give direct light on all parts of a job in process.

The roof was sloped so as to include the whole height of the windows without unnecessary height of the walls. It is of sheet iron, mounted on angle-iron rafters. The door is also of sheet iron, with a strong light framework of flat steel.

The room is wired in iron conduit. Steam radiation is provided sufficient to raise the temperature of the room above that of the shop.

New Equipment Available

Portable Bar for Boring Operations

A RECENT development in portable tools for railway shop use is the portable boring bar equipment just brought out by H. B. Underwood & Company, Philadelphia, Pa. Due to its light weight, compactness and the fact that it can be used in close quarters, this equipment is particularly useful for reboring motor housings and air compressor cylinders.

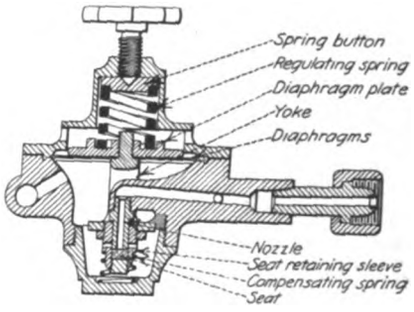
The boring bar equipment is of rugged construction and simple design involving few parts. The bearing plate carries a boring bar driving spindle and feed screw, mounted on a clamping ring, and a cutterhead. The pilot guide is screwed to the stuffing box and the bar placed in the cylinder. A clamping ring is securely fastened to the top flange of the cylinder by studs and nuts. Any inaccuracy in the position of the studs in the cylinder flange can be overcome by means of four thumb screws used for aligning the bar. The tool is adjusted and rigidly held in the cutterhead by tightening the collar screw which clamps the tool to the cutterhead by means of a simple clamp. The tool may be readily released when the cutterhead is at the lower end of the cylinder, if desired.

In boring cylinders the use of calipers is rendered unnecessary by use of a gage furnished with each bar. This provides a simple and practical method of setting the tool to the required position. In this manner a number of cylinders can be bored to accurate dimensions without loss of time.

The driving spindle is provided with a Morse taper shank to fit the air motor and drives a pinion which meshes with a gear keyed to the boring bar. A feed gear is keyed to the feed screw and meshes with a reverse gear journaled on a pin centered in the boring bar. The reverse gear turns freely on this pin, unless prevented by the feed pawl which holds the reverse gear stationary relative to the bar, and causes the feed gear to revolve the feed screw and advance the cutterhead into the work. To return the cutterhead to the top of the cylinder the air motor is placed on the shank of the reverse gear, which rapidly returns the cutterhead. The weight of an equipment for boring from 8½ in. to 11 in. diameters, without air motor, is approximately 140 lb.

New Line of Gas Welding Regulators

THE Torchweld Equipment Company, Chicago, Ill., announces a new line of welding and cutting regulators. One type, 2 in. in diameter, is fitted with a working pressure gage and with connections for cylinders or pipe lines. A second type, 2⅝ in. in diameter, is fitted with one working pressure gage and one gage for indicating cylinder pressure. This regulator is for use in oxy-acetylene cutting where the gases are delivered at their higher pressures. A third type, 3 in. in diameter, is fitted with either one working pressure gage or with two gages to show the cylinder pressure and



The Yoke Preserves the Alignment

gas delivery. This type is also fitted with connections for cylinders or pipe lines. A duplex regulator is also included in this new line. It is equipped with three gages, one for showing the oxygen cutting pressure, one the oxygen welding pressure, the third the cylinder pressure.

Regulators of this new line are fitted with three diaphragms of graduated sizes. These diaphragms are clamped into position between the regulator body and bonnet, and are held tight when the bonnet screws are tightened. The accompanying illustration of regulator details shows how the yoke holding the regulator seat is guided by the nozzle to preserve the alignment of these two parts. This construction is of advantage on account of the number of times that the regulator nozzle and seat are brought together.

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New Model Truck Mounted Air Cleaner

A NEW model, truck mounted, electrically operated vacuum cleaner has been announced by the United Electric Company of Canton, Ohio. The entire equipment is mounted upon rubber tired steel disk wheels, and is marketed under the trade name of Tuec. In the construction of this new model particular attention has been given to lightness and ease of handling. It has a small wheelbase, which permits ready operation through restricted aisles and narrow doorways. Where it is necessary to transport it from floor to floor it can readily be carried or placed in a small elevator. The regular set of tools furnished consists of flexible hose, aluminum tools and extension handles which afford easy access to bins, shelving, ceilings, walls, etc., which are ordinarily beyond the reach of the cleaner without the use of a stepladder. The portability of the outfit makes it suitable for cleaning car interiors, including seats and fittings.

New Model Truck Mounted Air Cleaner

The equipment is driven by a universal motor of 3-hp. capacity at 5,000 r.p.m. Motors are furnished for use either with 110 or 220 volts. A fan is attached to the lower end of the motor shaft, which has wide clearances and handles a large volume of air at high velocity with low power consumption. One dry separator is used. There are no water sprays, fine screens, by-passes, or appliances to reduce efficiency in construction, gravity alone being used in the separating medium.

One metal screen of coarse mesh is placed in a separating tank, which deflects the dirt from the fan. Two leakproof dust bags are mounted in the rear for air separation of finer dust which drops into the lower dust bag for ready removal.

A removable dust pan of ample capacity is provided in the bottom of the separating tank to catch the heavier dust and dirt deflected by the screen. A large door at the bottom of the tank gives easy access to this tank. There are but two bearings and these are of a high-grade, self-aligning ball-bearing type. The net weight of the new Tuec model is 280 lb., and it has an over-all height of 48 in., a width of 30 in., and a length of 36 in. The wheels are 30 in. in diameter.

Bringing Electrical Repairs to the Job

THE increased use of electric power for driving shop machinery has required a supply of fuses, motor brushes, wires, switches, etc., for maintenance repairs. Trouble at any point frequently requires several trips back and forth between the point and the electrical repair department, and sometimes the transporting of heavy motor parts.

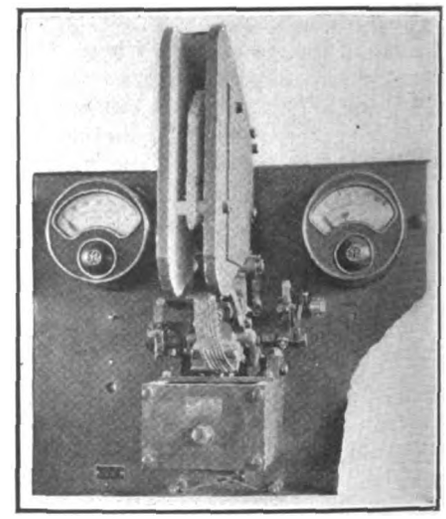
The Elwell-Parker Electric Company, Cleveland, Ohio, has taken a cue from these conditions to provide an electric industrial truck suitable for carrying necessary repair parts and provision for making repairs. As will be seen from the illustration, a steel and wood case occupies about two-thirds of the platform, while the balance is reserved for a motor and tool kit, with room for one or two repair men to ride. A pipe vise is mounted on a partitioned rack to enable the making of repairs.

The truck is driven by a battery carried in a compartment over the large rubber-tired drive wheels. The operator can drive the truck and usually deliver necessary material right at the job, since it steers on all four wheels.

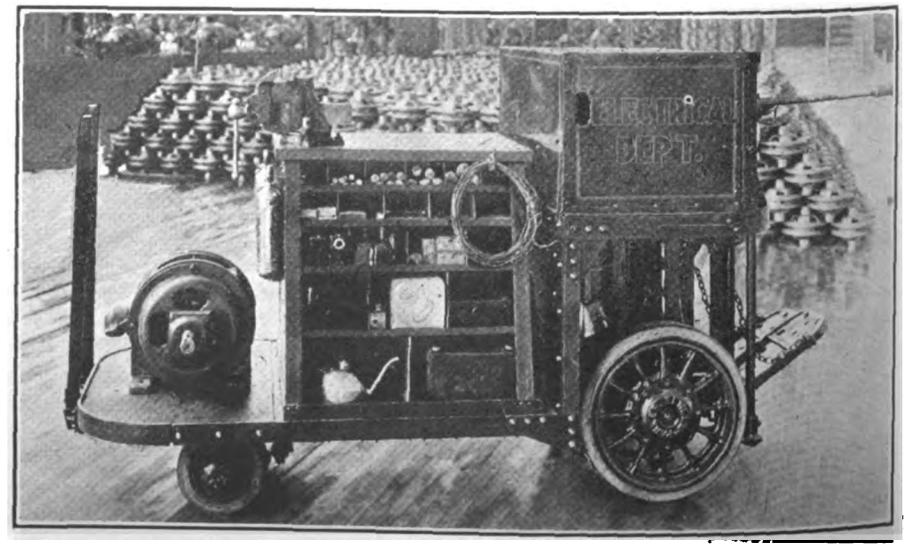
The truck cannot be started unless the operator is on the pedals, and the truck will stop within its own length if he steps off. The outfit is a valuable adjunct to the maintenance of electrical equipment in shops of sufficient size to warrant its use.

Counting Breaker Operations

THE number of operations performed by the various opening and closing devices on automatic switching equipment is being recorded in an interesting manner by means of a standard Veeder counter on installations which have been made recently by the General Electric Company. The illustration shows one of these counters connected to the circuit breaker mechanism of an automatic reclosing equipment. It will give an accurate record of the number of times this breaker opens or closes. By installing counters in connection with relay, contactors, etc., a complete check of operation may be shown which will lead to locating any faults.



Device for Recording Breaker Operations



Tractor Used for Carrying Maintenance Repair Parts

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The News of the Industry

$1,000,000 for New Work

Railway at Fort Wayne Forging Ahead —Story of Improvements to Be Told to Public

Fifteen new double-truck front-entrance and rear-exit cars, being manufactured in St. Louis at a cost of $12,000 each, will be placed in service on Oct. 1 by the Indiana Service Corporation on its lines in Fort Wayne. These will be the first new front-entrance and rear-exit cars purchased for the Fort Wayne city lines for some time, as 80 per cent of all the cars operated on the Fort Wayne city lines are of the one-man type with both entrance and exit at the front.

The addition of the fifteen new cars to the Fort Wayne city lines will complete an expenditure of nearly $300,000 for new car equipment for the city of Fort Wayne as the Indiana Service Corporation last spring purchased for Fort Wayne fifteen one-man cars at a cost of $7,800 each.

The city is growing fast and its rates of four tickets for a quarter and the sale of weekly passes for $1 each account very largely for the need for the new equipment. At the present time the company is selling about 5,500 passes a week. This summer-time sale of passes compares very favorably with the peak sale of 7,600 passes a week which occurred in one week in March last.

$500,000 for Power Improvements

In addition to spending nearly $300,000 for new cars the Indiana Service Corporation is completing improvements at its power plant and carhouses totaling more than $500,000. At the power plant a 12,000-hp. turbine is now being installed. In recent years two 6,000-hp. turbines have been put into the plant. Ten years ago there were only two turbines of 1,500 hp. each. The new carhouse next to the power plant is going up at a rapid rate. It will cost more than $200,000.

The company has just completed the double tracking of South Calhoun Street at a cost of $77,000 and is preparing to begin double tracking Pontiac Street and extending the line to the International Harvester Company's plant at a cost of about $150,000. In addition to this a franchise has just been granted by the Board of Public Works at Fort Wayne for a double-track line on Lafayette Street. This will give the corporation another line to the fast-growing south side of the city.

In addition to making all these improvements the Indiana Service Corporation is going deeply into the problem of "selling" all these additions to the general public. It is felt by officials that the public should be told about the things in an interesting and entertaining way so that a deep and lasting impression may be made. It is believed by the traction officials that the institution of the weekly pass had much to do with improving the feeling of the public toward the company. While the average man may not actually ride more during the week now than he did formerly, still he knows that there is no limit to the amount of riding he can do and he accordingly feels that he is getting his money's worth for his purchase. This desire on the part of the corporation to tell the public what it is doing has led it to institute a rather extensive publicity and advertising campaign, which is to be put in charge of a man hired expressly for the purpose of handling it.

Public to Be Told

Some of the stories which are to be prepared and printed have already been outlined. For instance, one of them is to be a story of what has been done underground at the power plant. This story will carry a diagram or map showing the underground activities and will tell how long it took to carry through the various portions of the work and just what was accomplished by the work. Another story will tell about some electric switches which are to be installed at the main transfer corner at the corner of Main and Calhoun Streets. And so on.

It is also planned to use a double-page spread in the local papers at the time the new cars are put in service, and the principal feature of this advertisement will be a drawing showing an exterior view of the car and another drawing showing the seating arrangement and indicating just how the car will be operated, where the fare will be paid and how the rear exit will be operated. Also there will be a list of the lines on which the cars will be run, together with a complete timetable showing the schedule for the various lines.

Letters will be sent out to all the auto owners in the county when the new cars are placed in service telling them to watch for people alighting from the rear ends of the cars instead of at the front ends.

The company is now using car cards regularly for the purpose of "selling" its service to the public and is also going to put on an anti-jay-walking campaign.

J. Allen Greenland, superintendent of transportation, has direct charge of the company's publicity work.

Directors Named

Financing Plan of Saginaw Transit Company Before the Public Utilities Commission for Approval

Six of the nine directors of the Saginaw Transit Company who will govern the affairs of the company that will furnish street car-bus transportation under the terms of the franchise that was approved by the electors on June 25 have been named by the Mayor and two local circuit judges. Those who will finance the new company have approved them. They are: A. A. Alderton, secretary and treasurer of a wholesale grocery company; Charles C. G. Christensen, proprietor of a general store; Henry T. Robinson, cashier of a local bank; William C. Wiechmann, proprietor of a department store; E. Walter Secord, business agent for the carpenters' union, and John Troy, general foreman of boilers of the Père Marquette Railroad, where he has been employed for forty years.

The company's three men have not been named. The selection will be made without regard to the city.

Financing Before Commission

Financing of the company is now before the Michigan Public Utilities Commission. The petition was filed and testimony was taken by the commission Aug. 30, and an early decision was promised by the commission. It is expected that the plan of financing will be approved and immediately afterward the temporary organization that has been at work will then resign and the new directors, who will be permanent, will then take office.

The franchise provided that the directors could serve only after two-thirds of their number had the approval of the Mayor and two circuit judges. After many conferences these officers presented the company representatives with the six men they would approve, which apparently was satisfactory to all concerned.

This action is contrary to the expectations of those who during the last two years fought the return of street cars in Saginaw. They asserted time and time again that such a proposal was only made to catch votes and those who would finance the project could not be expected to allow outsiders to operate their business. But this apparently is just what has occurred and the announcement of the personnel of the board has created considerable comment locally as it is entirely different from what was expected. One thing is certain, the city's members are all friendly to the cause of street cars.

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Conditions Existing Along the Bamberger Electric Line Right After the Flood

Floods in Utah

As a result of a terrific thunderstorm and cloudburst which struck the canyons east of Farmington and Willard, Utah, on the evening of Aug. 13 several lives were lost and many thousands of dollars worth of property destroyed.

At Farmington, which is on the line of the Bamberger Electric, about half way between Salt Lake City and Ogden, a wall of water estimated to be between 20 and 30 ft. high rushed down the canyon, drowning seven persons and depositing many hundreds of tons of boulders, mud and débris across some of the farms in its path and completely blockading the state highway and the tracks of the Bamberger Electric. It required forty-eight hours of unceasing labor on the part of some of the railroad company's employees to clear the tracks. For several days thereafter the electric road was the only means of transportation, its facilities being used to good advantage in relieving flood sufferers, in the transportation of passengers, supplies, etc.

At Willard, Utah, about 30 miles farther north, on the line of the Utah-Idaho Central, similar conditions were brought about as a result of the heavy storm. There two lives were lost and much property destroyed. After the tracks of the electric road were cleared its trains were the only means of transportation until the state highway could be cleared, and the right-of-way of the railroad was offered and used as a highway for automobile traffic for two hours each day.

Substantial recognition of their services in this emergency was received by about twenty employees of the Bamberger Electric Railroad. These men, ranging from superintendent to section foreman, were working on a monthly basis for the railroad. During and after the flood in the vicinity of Farmington they worked early and late to get the road in running order. They had no reason to expect any overtime or other compensation and were agreeably surprised when they received personal letters signed by former Gov. Simon Bamberger, chairman of the board of directors, enclosing checks as rewards for faithful services. The men working on a daily basis were paid for all the overtime they put in.

The letter from Mr. Bamberger to the men read as follows:

> Your extraordinary efforts in assisting in getting our line open to service after the terrible catastrophe of Aug. 13 are very much appreciated, and I am pleased to enclose a more tangible expression of our thanks.

A Tribute to Warren G. Harding

Electric railways throughout the country joined in paying tribute to our deceased President on Friday, Aug. 10. In many cases the operation of trains and cars was suspended for a short period at the time services were being conducted in Marion, and in some cases passengers on cars were requested to join with the employees in observing the day. Company publications, in many instances, paid a tribute to the Chief Executive, reviewing his achievements as a leader and as a man. An instance of the extent to which some companies went in paying tribute to the late President was evidenced by the exercises undertaken by the Eastern Massachusetts Street Railway.

At the Fall River district cars were run on Sunday time and the offices were closed. The cars stopped for a minute at 5 p.m. and all operators bowed their heads. All passengers on the cars at that time were asked to join with the operators in standing, bowed and silent, for one minute. In addition to these exercises one of the greatest factors in keeping before the minds of the people the significance of the day was the placing of dasher signs on both ends of every car carrying the picture of the late President.

A Semblance of Order Being Restored After the Flood

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Trackless Trolley for Rochester

Ordinance Passed by Council for Operation of Trackless Cars for Four Months Trial

An ordinance authorizing the operation of trackless trolleys on a crosstown route in the city of Rochester, N. Y., for a four months trial period was passed by the Common Council on Aug. 28. The ordinance permits the Rochester Railways Co-ordinated Bus Lines, Inc., to operate the route from Sept. 5 to Jan. 5, 1924. The bus company is a subsidiary of the New York State Railways.

Considerable agitation has resulted from the opposition of certain residents of the section to be traversed by the line, who have appealed to the city for gasoline buses instead of the trackless cars.

James F. Hamilton, president of the New York Railways, declares that if the trackless trolleys prove unsatisfactory at the end of the trial period, crosstown service will be abandoned and the trolley buses removed to Utica and Syracuse, which cities, he says, would be very glad, indeed, to have this service. It is his belief, however, that after a trial under the limited franchise, the new trackless car line will prove to be not only more economical but also entirely satisfactory from the service point of view.

It is expected that the line will begin operation within the next few weeks.

The route will traverse the northern section of the city and will provide crosstown service, connecting the parts of the city on the opposite sides of the Genesee River, by way of Driving Park Avenue bridge. It will serve a rapidly developing industrial and residential section.

At the same meeting of the Council, the law and finance committee recommended a judicial review of the appraisal of the property of the railways in Rochester under which the service-at-cost contract, now in operation, was formulated.

Seattle Trainmen No Longer on Monthly Basis

Trainmen of the Seattle Municipal Railway have lost their fight to keep their wages on the monthly basis, but the City Council has voted to recommend the establishment of "one day off in eight" without pay for trainmen. Representatives of the union appeared before the Council to discuss further the request of the trainmen for an increase to 68 cents an hour from the 66 cents recently voted by the budget committee, but the request was denied.

Rates of pay were fixed by the Council at 56 cents an hour for beginners, with a pay of 63 cents an hour at the end of the second year and a maximum pay of 66 cents an hour. Former rates of pay were 56¼ cents an hour for men while learning, a rate of 60½ cents an hour at the end of the instruction period, 62½ cents an hour at the end of the second year and a maximum of 64¾ cents an hour.

The budget committee states that the change in pay and one day off in eight will make no difference in the budget. Request of the shopmen for slight increases were granted in some instances, but the request for a two weeks vacation with pay was denied.

D. W. Henderson, superintendent of the railways, will be officially instructed to train sufficient men to relieve the platform men on their day off. It is estimated that the number needed is 150.

New Wage Contract Signed in St. Louis

A new wage agreement has been entered into by the receiver of the United Railways and the Amalgamated Association, whereby first year motormen and conductors retain the pay of 50 cents an hour, a raise from 55 to 56 cents for second year men, a raise from 60 to 62 cents for third year men and a raise from 65 to 67 cents for older employees. The men had asked 55, 60 and 65 cents.

Shop and carhouse employees received advances ranging from 2 to 6½ cents an hour.

Only minor changes were made in working conditions under the renewed annual contract, which is retroactive to July 1.

About 5,000 men are affected by the contract, but only 1,225 attended the union meetings and voted on it on Aug. 27, the contract being ratified by 1,031 to 194.

Columbus Railway Believes Perpetual Franchises Benefit City

In an effort to present the facts and to dispel misinformation, the Columbus Railway, Power & Light Company, Columbus, Ohio, has recently issued some advertising matter which calls the attention of the public to the desires of the company to give the best service possible. The company says that it wants to be considered as a part of and not apart from the community. The matter of the perpetual railway contracts in Columbus is explained fully in the advertisements giving the history of the making of these contracts, which were started some fifty or seventy years ago. The advertising by the company is its answer to the moves under way looking toward a surrender of the perpetual franchise. Against those who are opposed to perpetual franchises the company champions this method of contract. It claims that it has been able to borrow money at a lower rate of interest than many other similar companies in the country because of its perpetual franchise. Further, that it has enabled the company to operate on extremely low rates of fare, the present rate of fare being nearly 40 per cent less than the average rate of fare in all the larger cities of the country, besides giving a free transfer. The company contends that it has not sought, or will not seek, in any way to take advantage of the public, but believes that the public, when fully informed, will act fairly toward the company.

Another Railway Adopts the Bus

Over at the Fair Grounds in Brattleboro, Vt., are five street car bodies. Removed from their trucks they are being used as ticket selling stands and concession booths. Up to Aug. 28 the bodies mounted on their trucks were in regular service in that city transporting passengers for public hire. The following day the lines over which the cars were run were thrown in the scrap heap and the new motor bus line began operating for the first time. The buses ran at thirty-minute intervals, an improvement of ten minutes over the street car schedule. The tracks, which have served the public for thirty-five years, with the trolley wires and poles will be removed soon. The railway has promised to place the roadbed previously occupied by it in as good shape and condition as the adjacent roadbed. An investment of about $27,000 has been made by the Twin States Gas & Electric Company in establishing the bus line, and $7,000 more will be expended in the building of a suitable garage to house the vehicles.

Vancouver Men Seek Ten per Cent Increase

Platform men of the British Columbia Electric Railway, Vancouver, B. C., recently requested a 10 per cent increase in wages, reinstating the terms of the agreement prior to January, 1922, when the company obtained a reduction. A conciliation board is now sitting, consisting of A. M. Pound, a local broker, as chairman; A. G. McCandless, representing the company, and R. P. Pettipiece, representing the men. This board, appointed under the industrial disputes act of Canada, has no power of enforcing its findings upon either party.

Among the requests of the men is one for a modification of the working conditions. They claim that since overtime rates were reduced from double time to time and a half, the company has increased its use of men in overtime hours considerably. This the company denies. The reinstatement of the 10 per cent is asked on the basis of the alleged advance in the cost of living. The added strain of work with the increase in traffic on streets is also cited as a reason for higher wages. Another request is to have four motor bus operators included in the union. Protests were made by the men's representatives that the company used non-union men in its construction gangs and paid lower wages than were paid civic gangs. On a recent job, rushed through by the company on a main thoroughfare, the union representatives claimed that "slave-driving conditions" obtained. On the other hand, the company had obtained credit for performing the work efficiently and expeditiously.

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Test of Endurance

Public Officials in New Jersey Cite Railway for Contempt of Alleged Contractual Obligations

Moves made in the last few days on the part of various public authorities in connection with the suspension of railway service in New Jersey have been of a punitive rather than a conciliatory nature. There have been several moves on the part of public officials toward placing both the Public Service Railway and the Public Service Railroad in receivership, but the hope behind these actions appears to lie in so-called technical default of their public obligations by the companies rather than for financial reasons. The proceedings involving the railroad and the railway are entirely different in nature. One has in mind a direct receivership for the railroad, while the other has in mind ultimate receivership for the railway if *quo warranto* proceedings fail. So far as the company is concerned it is still resting its case on the basis of its settlement offer.

The idea behind the attempt to bring about receiverships is that this would bring resumption of service under the direction of the court. The proposed actions against the two companies, as noted previously, are to be brought on different grounds, but they have for their object the same thing, namely, resumption of railway service. This is, in fact, the insistent cry nearly everywhere throughout the State, but the very insistence of the municipal authorities on their program that service be resumed first and terms of settlement then be discussed has not advanced matters a step so far as the principals to the controversy are concerned.

On its part the Board of Public Utility Commissioners, in replying to the railway's statement filed in the mandamus action seeking to compel the company to resume, contends that the attack upon the board by the company contained in its answer is entirely immaterial and plainly designed to cloud the issue. The board says that the sole question at issue is whether it is practicable, under the rate fixed by the District Court of the United States, for the company to afford service to the public pending an adjustment of its present difficulties. It regards the refusal of the company to resume service as an effort to club the public into accepting a demand arbitrarily made as a condition upon which it will resume. The board says that the company's statement is absolutely false that the commission has approved licenses for buses to operate in unlawful competition with the railway. In conclusion the commission says that the answer of the company in the mandamus action brought by the board does not meet the issue before the Supreme Court, viz., whether it is practicable to supply service.

This briefly summarizes the board's answer to the railway. On its own part the commission has instructed its counsel to petition the United States District Court to dismiss the pending proceeding under which the railway was empowered to put into effect a base rate of 8 cents. The legal grounds upon which this move is predicated are that the company has ceased to operate and that it has submitted a plan of settlement involving a fare lower than that allowed to the railway in the federal litigation. The commission says in short that the company's plan of settlement involves placing the problem of rates upon a new basis and constitutes an abandonment of the remedy it sought in the Federal Courts.

Early in the week it appeared that in Camden, where the buses charge a 7-cent fare, there might be an early separate peace with the company, but these hopes were not realized.

In Newark City Commissioner Raymond has issued emergency permits for 200 omnibuses. These permits, which are for six months duration, will be considered by the Public Utility Commission on Sept. 11.

Most of the newspapers in their editorial comments emphasize again and again that in reality the cities and the company are not really so far apart on the fundamental matters contained in the plan of the company, but despite this seeming nearness the matter appears at this writing to have reduced itself to a test of endurance.

The Electrical Trade Tie-in with the Jersey Shutdown

How the electrical trade in New Jersey is interested in bringing a settlement of the transportation situation in favor of the railway, and why all parties in the electrical trade should support the railways' plan, are brought to the attention of the trade by the following statement. It appears in *Nelectra-Grams* published by the Newark Electrical Supply Company:

Street car development kept pace and kept ahead of the other economic development of the state until jitney competition undermined the structure of the street railway system. Where street car systems create values, jitney lines merely cash in on existing values. There is no doubt but what there is a practical place for jitneys in the transportation system of New Jersey, but jitney transportation is only a constructive factor in the economic development of the territory if it is operated in conjunction with, and in co-operation with, and completely co-ordinated with the street car system.

The plan of settlement of the transportation crisis as submitted to the State Board of Public Utility Commissioners by the Public Service Railway Company, is of such character that it provides fair consideration and fair compensation to all parties concerned. It is reported that the striking street railway employees have endorsed the plan substantially as submitted. Every thinking citizen of the affected communities cannot help but be in favor of it. It is up to the public to convey to the Public Utility Commission its opinion on the subject.

You are asking just why all this from an electrical supply house. Here is the answer: The Public Service Railway Company is an integral part of the Public Service Corporation. Jitney competition during the last few years built up increasing deficits in the cost of street railway operation, which deficits had to be paid out of the pockets of the Public Service Electric Company. A self-sustaining railway company means that the electric company can devote its funds to developing electric power houses and transmission lines. The more transmission lines and the easier it is for the householders and home owners to buy electric service, the more houses will be wired; the more appliances will be sold, and the better will be the business of every electrical contractor-dealer.

As a matter of self-preservation, you should support the Public Service Railway Company in its efforts to secure a basis of operation which will protect its thousands of stockholders against loss, and enable the Railway Company to be self-sustaining. Before you put this *Nelectra-Grams* aside, write the Public Service Railway Company, telling them that you consider their plan of settlement fair, and that you are endorsing the basic principles conveyed in that plant. By so doing you will help the electrical industry in this territory which can only prosper in direct proportion to the way that Public Service Corporation prospers.

Few Casualties Among American Business Men in Japan

Nobody knows the real extent of the damage done by the earthquake and fire in Japan. The loss of life and property damage are appalling in their extent, but the later accounts of the disaster indicate the first reports, particularly those relating to the estimates of the loss of life, were exaggerated. In the electrical trades the principal companies doing business with permanent representatives abroad were the General Electric, Westinghouse and Western Electric.

The General Electric Company has received a cablegram from that country saying that all its representatives are safe, although some were injured. With their families the General Electric men, who escaped in a boat from the scene of destruction, are now on their way back to the United States. The company had about fifteen Americans stationed in Yokohama and a smaller number in Tokio.

The Westinghouse company has received a cable from Shanghai saying that its Japanese representatives are safe. The company had about six men stationed in Japan, four at Tokio and two being engineers engaged in installation work.

The Western Electric Company has been unable to get any direct word from its employees except a cablegram from Kobe relating to its comptroller, E. S. G. Elliott, and his family, who are safe. A newspaper dispatch published on Thursday said that W. T. Blume of the General Electric Company had been killed. Mr. Blume, however, was a Western Electric Company man. The Western Electric Company operated a factory in Tokio employing 1,200 operators with a staff of four Americans, but the district in which this plant was situated was practically undamaged. P. K. Condit, vice-president of the International Western Electric Company, was expected to arrive in Tokio on the day of the earthquake, and considerable anxiety is felt as to his safety.

So far as the property damage is concerned, the extent to which the public utilities have suffered will necessarily not be known for some time as all the present efforts toward restoring order are entirely of a temporary nature, having for their first aim the lending of succor to the suffering.

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Foreign News

French Company Will Extend Lines

The Compagnie Générale Française de Tramways, which operates street car lines in four chief provincial cities of France—Marseilles, Nancy, Le Havre and Orleans—is increasing its capital from 50,000,000 francs to 75,000,000 francs. The increase was made necessary by conventions passed recently with the municipalities of Marseilles and Le Havre, where in each case it had been agreed to develop various suburban lines. It is to be remarked that interurban electric railways are something scarcely to be noted in France save in the contiguous Lille-Roubaix-Tourcoing district, largely intermarried industrial communities where there is an intense interchange of traffic.

Above all, the situation in Marseilles is one that requires as early a solution as possible. The city is extending its habitable limits far beyond that reached by the street car lines and with the exception of the intercity lines running to Aubagne on the east and to Aix-en-Provence on the north, 12 or 15 miles in each case, there is practically no catering to suburban traffic. Accommodation by the single line of railway centering at Marseilles, the Paris, Lyons & Mediterranean, which is only just beginning its electrification program, is wholly inadequate with respect to its Marseilles suburban stations and in fact does not reach many outlying communities, which are entirely bereft of any means of public service communication. The municipality of Marseilles is to advance the company 40,000,000 francs for the immediate undertaking of the required extensions, while Le Havre is to advance 10,000,000 francs for work to be carried out there.

Profit Sharing in Public Service Concessions in France

The permanent Council of Labor, recently in session, passed a motion calling upon national, state and county authorities to grant franchises for public service concessions—light railways, heat, light and power, omnibus routes, gas companies, etc.—only upon the acceptation of a clause which shall provide for the sharing of profits with employees of whatever rank who may be associated with the enterprise. It was recommended that a law be passed by the national government to this effect and that this law should state clearly the conditions under which such profit sharing should apply, flexibility of the law, in the sense that it would permit the directors to take advantage of the means to widen the scope or increase the volume of business, being as desirable for the employee as for the employer. The platform appears to have been most liberally conceived and is in no way to be considered as antagonistic to capital and employer as being the concurrent elements to the employee.

Electrification of Finnish Railways Progressing

According to the director of the Finnish State Railways, the question of the electrification of the State railways, which has been in abeyance for some time, will soon be taken up, as the work on the power station at Imatra has advanced so far that preliminary arrangements have already been made for obtaining turbines and power machines. The State Railways must therefore hurry this matter forward. It is intended to electrify first the local lines near Helsingfors and then the long-distance line, particularly Helsingfors-Systerback. The project, however, is still very indefinite.

First Important Electrification in Central Africa

The Department of Commerce at Washington has received from Consul-General H. M. Morgan of Brussels the statement by the Belgian Minister of Colonies on the electrification of the Leopoldville - Matadi Railroad. According to his statement this will be the first important railroad in Central Africa to be electrified. For the electrification of the railroad 30,000 hp. will suffice, at least in the beginning. It is estimated that the money required for this project will be 150,000,000 francs. The gage of the line is at present 75 cm. It is impossible, for technical reasons, to electrify the line efficiently unless the gage is made at least 1.06 m. "Consequently," says the statement, "the widening of the lines will have to be undertaken before any other work is begun."

Electrification in Sweden Extensive

Electric power is furnished to 40 per cent of the total area of Sweden, according to the Government Committee for Information on Electrified Acreage. The present annual consumption of electric power by rural Sweden is 110,000,000 kw.-hr., while the total consumption of the country is approximately 390,000,000 kw.-hr. This committee has reported also on the possibility of electrifying the island of Gottland off the west coast of Sweden and recommends the establishment of a plant near the town of Tingstade, where large deposits of peat would afford cheap and satisfactory fuel.

Private Operation Being Considered in Milan

Reversion to private operation of the Milan tramway system will be discussed before the Municipal Council of that city. Although a surplus will be earned this year, the general feeling is that utilities had better be operated by private companies because they are then less affected by politics. The example of the municipal electric light and power service of Milan, which from a very successful undertaking had been brought to the verge of ruin by the former socialistic city administration, is recognized by the public, who compare its rather irregular service with the much better and more reliable Edison service.

The only consideration that is adverse to a return to private operations is that a company would not perhaps consider building extensions unless these should appear to show an early profit, and new street railway lines are necessary to the growth of Milan, which now has more than 750,000 inhabitants within its corporate limits.

The street railway tracks in Milan are generally in very good condition and so are the cars, though many are of small capacity and somewhat obsolete in type. Fares, which are straight, are 40 centesimi during the day (about 2 cents at actual exchange) with return tickets sold for 40 centesimi before 9 a.m., entitling to a return trip in opposite direction within the same day after 9 a.m. The municipal tramways system consists of about 1,300 cars operated over forty different routes.

Will Extend Weekly Pass

The weekly pass has proved so popular from a public and operating standpoint on the Lidget Green route of the Bradford Corporation Tramways, Bradford, England, that it has been decided to extend the plan to other routes at an early date. The revenues for the first four weeks, beginning June 18, on the test route were respectively £546, £556, £557 and £557, while pass sales at 2 shillings (48 cents) per pass were 897, 950, 941 and 923. The additional routes for two months trial are Thornton, Allerton and Duckworth Lane. The last named will have the same price pass as Lidget Green, since it is also a single fare 1.5d. (3 cents) route. The others will have a two-zone pass in addition, at a price yet to be determined.

Fares on Gold Basis

A car ride in Cologne now costs 33 gold pfennigs, in contrast to the rate of only 10 pfennigs before the war. Fares are now determined on a gold basis, in order to protect the city against losses resulting from the depreciating paper mark. It is said now that an electric railway ride has come to be considered a real luxury for the average man, who is paid his wage in paper marks.

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Financial and Corporate

Net Income Up $490,497

Brooklyn City Railroad's Report for the Year Shows the Company to Be Making Remarkable Record

The gross revenues from transportation of the Brooklyn City Railroad for the year ended June 30, 1923, increased approximately $300,000 during the year, with no increase in fares, the average receipts per passenger being 4.68 cents. There was an increase of approximately $30,000 in the cost of operating cars, due to increased service and to the higher wages paid the employees.

The net corporate income of the Brooklyn City Railroad (excluding the Brooklyn City Development Corporation), after providing for all operating expenses, maintenance, taxes, bond interest and reserves, amounted to $2,256,025. This was an increase of $490,497 compared with the previous year.

INCOME STATEMENT
BROOKLYN CITY RAILROAD AND BROOKLYN CITY DEVELOPMENT CORPORATION

	Consolidated Fiscal Year Ended June 30, 1923	Brooklyn City Railroad only Fiscal Year Ended June 30, 1922
Passenger revenue	$11,715,813	$11,413,403
Other car revenue	150	247
Total transportation revenue	$11,715,963	$11,413,650
Advertising and other privileges	$85,872	$100,006
Rent of land, buildings, etc.	131,660	127,498
Rent of tracks and terminals	50,753	46,053
Miscellaneous revenue	2,004	543
Total operating revenue	$11,986,252	$11,687,750
Operating Expenses		
Maintenance—way and structures	$1,246,178	$1,203,976
Equipment	1,404,315	1,368,204
Power	1,023,282	986,910
Operation of cars	3,865,305	3,835,850
Injuries to persons and property	419,436	524,309
General and miscellaneous expenses	512,592	530,972
Total operating expenses	$8,471,108	$8,450,221
Net operating revenue	$3,515,143	$3,237,529
Taxes assignable to operation	889,532	931,521
Operating income	$2,625,611	$2,306,008
Non-operating income	210,942	160,950
Gross income	$2,836,553	$2,466,958
Income Deductions		
Interest	$367,454	$428,319
Rent of cars, tracks, etc.	213,884	273,111
Total income deductions	$581,338	$701,430
Net income	$2,255,215	$1,765,528

During the year the company carried 250,700,975 passengers, an increase of 7,162,508 passengers as compared with the previous year. Expressed in another way, the company carried approximately 100,000 more passengers on every business day of the year ending June 30, 1923, as compared with the period ending June 30, 1921.

During the year the company expended for maintenance or credited to the reserve therefor $2,606,640, thus adequately meeting all current maintenance in addition to providing for the deferred maintenance which had accumulated at the time the property was returned in October, 1919.

The company is now engaged in the reconstruction of 68,760 ft. of track system, the old 94-lb. rail being replaced with new rail weighing 122 lb. per yard.

The payment of dividends on the stock of the company was resumed during the year. Three quarterly dividends of 2 per cent each were paid respectively on Dec. 15, 1922; March 1 and June 1, 1923.

In view of the increased earnings and the resumption of dividends, the directors determined in November, 1922, to suspend the collection of a second fare on the Flatbush Avenue Line at Foster Avenue. This and the generally better and more frequent service given have enabled the public to share with the company the results of its prosperity.

The Brooklyn City Development Corporation, all of the capital stock of which is owned by the Brooklyn City Railroad free and clear of liens of any kind, has contracted for the delivery in the early autumn of 200 new passenger cars of the most modern type. The company is also converting fifty-four center-entrance trail cars into motor cars, traffic conditions being such that the public can be better accommodated by more frequent service of single motor cars than by the operation of cars and trailers at longer intervals. Seventy-five semi-convertible motor cars have been rebuilt into prepayment one-man-two-man cars and are now rendering satisfactory service. This has enabled the company to dispose of twenty-five of its small single-truck safety cars that were no longer needed.

Operation to Cease in Trinidad

After requests covering three years, the Trinidad (Col.) Electric Transmission, Railway & Gas Company has been granted permission to discontinue all its city and interurban railway lines by the Colorado Public Utilities Commission. The decision was announced on Sept. 1. Cessation of service will be permitted after Sept. 15, thus cutting off Sopris, Cokedale and other large coal mining camps in the southern part of the state.

Discontinuance was originally requested by the company on May 10, 1920. The application was renewed in November, 1921. Hearings on the last request were started in May of this year when it was shown that the company had lost more than $22,000 in 1922. The abandonment was opposed by the city administration in Trinidad, the Chamber of Commerce and other civic organizations.

According to W. P. Southard, general manager of the company, it is not known whether the trackage will be torn up or be allowed to remain pending a period when operation might again be made profitable.

Passengers and Net Income Decrease in Detroit

The total operating revenue of the City of Detroit, Department of Street Railways, for July, 1923, was $1,764,174 compared with $1,584,795 for the same month a year ago. Included in the first figure is $1,660,055 covering revenue from transportation for July of this year. The total operating expenses amounted to $1 299,326 in July, 1923, compared with $1,103,441 in the same month a year ago. The net revenue from railway operations was $464,848, a small decrease compared with the same month a year ago, when it was $481,354. The net income shows a considerable falling off as compared with July, 1922. In that month it was $100,892 and in July, 1923, it was $30,951. The total passengers carried in July of the current year was 40,934,203, while 36,904,425 passengers were carried in July, 1922.

Accuses Men of Blocking Bonafide Reorganization

R. Floyd Clinch, a local member of the protective committee under the reorganization plan of the Chicago Elevated Railway, made a statement in answer to the announcement that the Chicago Elevated Railways preferred stockholders' committee threatened legal action against the proposed plan submitted by the noteholders' protective committee.

Mr. Clinch said that the stockholders' list showed only three of the preferred stockholders' committee as being stockholders; that two of these three acquired their stock within the last three months and at a time when it was generally known that the reorganization was under way and also that the company's finances, generally, were in bad shape and that the preferred stock had little or no value.

Further that the oldest stockholder of this so-called committee purchased his stock beginning in March, 1922, and even at that time the financial condition of the companies was generally known and reflected by the market. These gentlemen, he said, all told, own only about 2,600 shares, which were mostly purchased at a time when the market was at a nominal figure and probably $3 or less a share. It was his opinion that these men were now trying to block a bonafide reorganization which was in the interest of the properties and public alike.

It will be recalled that the time for making deposits under the terms of the reorganization has been extended.

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Charleston Interurban Acquires Kanawha Valley

The entire common capital stock of the Kanawha Valley Traction Company has been acquired by the Charleston Interurban Railroad. Announcement to this effect has been made by Robert Garrett & Sons, Baltimore, who handled the transaction. Five thousand shares of a par value of $100 were involved.

The Charleston company has heretofore leased the properties of the Kanawha Valley Traction Company, comprising the railway system in the city of Charleston, W. Va., and the interurban lines connecting therewith a number of towns and villages in the surrounding territory of Kanawha County, under a ninety-nine-year lease with a privilege of purchase.

The steady growth in the business of the company and the plans for further development in the future have made it advisable and advantageous for the company to acquire the abovementioned stock, so that it will be sole owner as well as operator of the property.

The plans contemplate an extension of its lines to serve a section which is well developed beyond its present radius. Provision is also made for necessary funds through a sale to patrons and employees of a new issue of preferred stock. This will give the company the benefit of closer financial relations with the communities which it serves and at the same time increase the security behind the bonds.

The earnings of the company for the six months ended June 30, 1923, which have recently been reported, show:

Gross receipts	$489,564
Operating expenses and taxes	339,327
Gross income	$150,237
Bond interest	59,102

Refuses Purchase Price for Rate-Making Purposes

The Missouri Public Service Commission on Aug. 8 declined to accept the purchase price of a public utility as a fair valuation for rate-making purposes. This decision was in the case of the purchase by the Public Service Company of Missouri from the Watts Engineering Company of the gas plant and property at Columbia, Mo. The purchase price of $130,000 was approved conditioned upon the purchasing company amortizing within twenty years out of its earnings the excess of $16,000 of the purchase price above the commission's rate-making valuation of $114,000. The order specifically stated that the commission would not consider the purchase price as a rate-making basis, or as acquiescence by the commission in the value placed upon the property in the present transaction and that nothing in the order shall be construed as an approval of the rates now charged for service at Columbia nor as a finding that the present rates are not excessive and not discriminatory. Consumers at Columbia had complained to the commission that the amount paid for the utility was too high and might be urged later as a basis for increased gas rates.

New Company to Take Over Doherty Colorado Properties

The Cities Service Company, New York, N. Y., H. L. Doherty & Company fiscal agents, has organized a new company, the Public Service Company of Colorado, to acquire through an exchange of stock the Denver Gas & Electric Light Company of Denver, the Western Light & Power Company of Boulder and a new power plant development at Valmount, Col. The merger plans parallel in some ways a consolidation two years ago of nine public utilities in Ohio under the name of the Ohio Public Service Company.

The Colorado merger plans provide for financing the completion of the big plant at Valmount, which is designed for an ultimate capacity of 200,000 kw., and for joining the Denver and Boulder properties with high-tension transmission lines. An Eastern group of bankers has underwritten the financial requirements. The capitalization will consist of $3,500,000 of 7 per cent preferred stock and $15,000,000 of common stock.

Holders of the Denver Gas & Electric Light Company have received a letter as to the terms of stock exchange. The 6 per cent cumulative preferred stock of that company will be exchanged on a share for share basis for the 7 per cent preferred stock of the new company. Western Light & Power Company 7 per cent cumulative preferred stock will be exchanged share for share plus par in the new preferred stock for cumulative dividends on the old stock. The Western Light & Power Company, with operating offices at Boulder, runs the local railway there.

Auction Sales in New York.—At the public auction rooms in New York there were no sales of electric railway securities this week.

Acquires Property.—The Milwaukee Electric Railway & Light Company has acquired the electric lighting and power interests of the Honey Creek Electric Light Company.

Mortgage Gold Bonds Being Offered.—Bonbright & Company are offering at 96½ and accrued interest to yield more than 6.25 per cent $1,000,000 of United Light & Railways Company first lien and consolidated mortgage gold bonds known as Series "A" 6 per cent. The bonds are dated April 1, 1922, and are due April 1, 1952.

Utilities Consolidate.—The stockholders of the Central Illinois Public Service Company, a subsidiary of the Midvale West Utilities, in a special meeting held at Springfield voted for the resolution to consolidate the Middle West Power Company and other corporations with the Central Public Service Company, etc. At the same time a meeting in Chicago of the stockholders of the Middle West Power Company, another Middle West subsidiary, voted for the resolution to consolidate.

Reorganization Postponed.—Another postponement in the proposed reorganization of the Pittsburgh Railway has been recently announced. With the permission of the Pennsylvania Public Service Commission, the date for carrying out the proposed reorganization has been set for Oct. 15. There had recently been a postponement until Sept. 1. The postponement was granted on the petition of the Philadelphia Company, which is undertaking the reorganization. It was agreed to by the city of Pittsburgh, which is a party to the proposed railways reorganization plan.

Gold Bonds Offered.—A syndicate including Dillon, Read & Company, New York, is offering at 98½ and interest, to yield more than 6.10 per cent, $10,000,000 of the 6 per cent refunding and first mortgage gold bonds, series C, of the Milwaukee Electric Railway & Light Company. The bonds are dated June 1, 1921, and are due Sept. 1, 1953. The purpose of the issue is to retire $3,600,000 of five-year 7 per cent notes due in November and to reimburse the corporation for expenditures for additions to the property. The bonds are secured by a first lien on the company's property.

On the Way to Resuming Service.—The name of the Bryan College Interurban Railway, Bryan, Tex., has been changed to the Bryan Traction Company. The stockholders of the company recently met for the purpose of organization. Work will very shortly get under way looking toward the resumption of operation. The following board of directors was elected: F. C. Bolton, James Sullivan, W. Wipprecht, E. H. Edge, J. M. Gordon, John M. Lawrence, J. Webb Howell, E. H. Astin and George Chance. The directors met and elected officers as follows: E. H. Edge, president; E. H. Astin, vice-president; James Sullivan, secretary, and J. M. Gordon, treasurer. Todd A. White has been selected manager of the property.

Long Island Line May Resume Service.—Following a conference at which were present representatives of the city, receivers and bondholders of the North Shore Traction Company, Judge Inch announced that he would enter an order directing that the work of dismantling the line be stopped. It is now probable that service on the abandoned lines in Flushing, Whitestone, Bayside, Douglaston and Little Neck will be restored. Judge Inch, in his chambers in the Federal Building, Brooklyn, at the conference on Aug. 23 suggested a plan calling for operation while a special master to be appointed by him would try to reconcile the claims and counter claims of interested parties. Vincent Victory, representing the city at the hearing, said that after a tour of inspection which he had made along the line, he thought service could be started within three weeks.

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Traffic and Transportation

Election Rules Jitneys Out of Birmingham

Jitneys were virtually voted out of existence in the city of Birmingham, Ala., by a majority of 6,175 at an initiative election on Aug. 28, when the jitney men's ordinance submitted as a substitute for the city's jitney regulations was defeated overwhelmingly. Canvass of the election returns on Aug. 29 by the Birmingham Election Commission showed that the vote in favor of the jitney men's ordinance was 2,827. The vote against the ordinance was 9,002. The total vote cast was a light one.

As a result jitneys probably will cease operations on Sept. 15 and reductions of cash fares to 7 cents and ticket fares to 6 cents probably will be put into effect by the Birmingham Railway, Light & Power Company immediately after that date. In fact, preparations for taking off the jitneys and reducing car fares are now being made.

At a meeting of the Birmingham Jitney Owners' and Drivers' Association, which obtained the injunction now pending and submitted the ordinance on which the initiative election was held, it was decided to abide by the results of the election and cease operations. The meeting of the association was held on the night of Aug. 29, following the official canvass of the returns. James Weatherly, attorney for the jitney men, advised the city attorney's office of the decision on the morning of Aug. 30 and stated that he would join with the city in asking the Alabama Supreme Court to dissolve the injunction, now in force, on Sept. 15.

J. S. Pevear, co-receiver of the Birmingham Railway, Light & Power Company, stated that a new schedule of rates carrying into effect the reductions will be made up and as soon as the injunction has been dissolved and the city's regulations put into effect the company will ask the approval of the Public Service Commission for the new rates.

Judge W. I. Grubb of the United States District Court, following the election, approved the order for the purchase of twenty new cars, which were contracted for by the company some months ago.

Clause Fixing Ten-Cent Rate in Youngstown Asked

A request that the Council of Youngstown, Ohio, fix fare rate J, providing for a 10-cent fare on the Youngstown Municipal Railway, was made in a letter sent to the Council recently by G. T. Seely, president of the Pennsylvania-Ohio Electric Company.

The request is made, according to Mr. Seely, in accordance with section 14 of the franchise which provides that Council shall fix two higher schedules than the one in effect.

Schedule H, providing for an 8-cent fare, is now in effect; Schedule I, providing for a 9-cent fare, is provided for by ordinance of Council, but Schedule J has never been provided for. The Council in 1920 disregarded a similar request. It is said that the present request is merely preparatory in nature, there being no intention of involving the 10-cent rate at present.

The deficit to the stabilizing fund of the railway passed the $1,000,000 mark, the annual report for July showed.

Local Five-Cent Fares Popular on Boston "L"

Many very interesting facts regarding the Boston Elevated Railway were brought out by Edward Dana, manager of the road, at the hearing on wages for the employees, concluded recently. In speaking of the success of the 5-cent fare now in effect, Mr. Dana said that 100,000,000 a year ride on 5-cent lines. The Elevated lost 25,000,000 riders, he said, on these lines when the fare was raised from 8 to 10 cents. The 5-cent riders represent one-fourth of the entire traffic. Their average ride is 1 mile. He said that the universal 5-cent fare formerly in effect was a false economic basis.

The total investment in the Elevated system, Mr. Dana testified, is $143,000,000, of which $52,000,000 represents stock, $46,000,000 bonds and $45,000,000 state and city bonds on the subways and tunnels.

He said that it had taken a number of years to bring wages up to 48 cents an hour, under the old 5-cent fare. Since the establishment of a sound economic basis, the wages have increased from $9,000,000 to more than $15,000,000. The item for wages is now more than the entire operating expenses of the road in 1918.

The depreciation allowance since 1919 has been $2,000,000 a year, whereas it was only $352,000 before public control and the 10-cent fare.

Mr. Dana gave computations as to the number of day's receipts required to pay the various charges in the operations of the system, as follow: 161 days required to meet the payroll; 39 days to pay for the cost of materials, 34.5 days for the return on $52,000,000 of stock; 25 days for interest on bonds, 22 days for fuel; 22 days for interest on state and city funds; 22 days for depreciation, 19 days for Federal, state and municipal taxation; 12½ days to pay back the deficit to cities and towns.

Mr. Dana said that an increase in wages must come out of the amount which ordinarily could be applied toward reducing the 1919 deficit of $5,415,500. If wages should require more than that amount, it would mean an increase in fare temporarily.

United States Supreme Court to Decide Shreveport Fares

The Shreveport Railways is operating under the 7-cent fare as ordered by the court. Three years have passed since the fare agitation started in Shreveport. The matter is still not settled. In 1920, by a vote of the people, the Shreveport Railways was granted an increase in its fare from 5 cents to 6 cents. The election was contested by Huey P. Long, chairman of the Louisiana Railway Commission, acting as a citizen of Shreveport. The State Supreme Court upheld it.

In 1921 the State Constitutional Convention changed the name of the Railroad Commission to the Public Service Commission and gave the Public Service Commission authority to fix rates to be charged by public service utilities. In April, 1922, the Public Service Commission issued an order, without a hearing, fixing the street car fare in Shreveport at 5 cents. After an appraisal of the property had been made by valuation engineers, the Public Service Commission granted a hearing on the application of the company for an increase in fare Jan. 15 and 16, 1923, at which evidence was introduced on both sides on the question, but the commission failed to make a decision. The company appealed to the United States District Court and secured a temporary injunction against the Louisiana Public Service Commission, restraining that body from interfering with the company's collecting a 7-cent fare.

Huey P. Long, chairman of the commission, then sought and was granted an appeal to the United States Supreme Court. He based his appeal on the plea that the Federal District Court was without jurisdiction.

Milwaukee Company Defines Its Use of the Bus

Be not the first by whom the new are tried,
Nor yet the last to lay the old aside.

This advice of Pope the Milwaukee Electric Railway & Light Company has followed. The company is progressive but particular. So that its owners may know, the company inclosed with the dividend check to the holders of its preferred stock accompanying the payment made on Sept. 1 a statement reviewing its affairs. In this statement it contrasted the ten-year growth of the company business from a gross of $7,729,822 in 1912 to $19,493,012 in 1922, a gain of more than 152 per cent. Many other facts were given. The outlook for the future was pronounced to be most promising. On just one matter, the bus, holders of the company's securities are reassured as follows:

During the past two years your company has added a large fleet of passenger motor buses to its street railway branch. These buses co-operate with the street cars in carrying city passengers, and they supply new travel routes between Milwaukee and scores of cities and towns in the Milwaukee trade territory throughout southeastern Wisconsin.

Your company has always been a leader in inventing or adopting new machinery to get each job done with the fewest necessary men working under humane conditions.

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Hyde Park Service Started by Boston Elevated

An arrangement has been completed whereby the Boston Elevated Railway has taken over a part of the Eastern Massachusetts Street Railway system in Hyde Park, a community annexed to Boston some years ago. The Boston Elevated began service over the line on Sept. 1, which has the effect of giving Hyde Park a 10-cent fare to Boston.

The sole purpose of this arrangement was to provide a single fare for Hyde Park, which has fought for it for twenty years. It wanted a 5-cent fare when that was the unit, and its principal reason for seeking annexation to Boston was to obtain the single fare.

In order to accomplish the change the city of Boston acquired a section of the Eastern Massachusetts system and leased it to the Boston Elevated, as it leases the subways and tunnels to the Elevated. Not only does the Elevated run its own cars to the center of Hyde Park, but it has established two lines of buses to other sections of Hyde Park and to Readeville, giving the privilege of transfer from one to the other. The fare unit on the jitneys for the present is 10 cents. So elated are the people of Hyde Park over the change that they had a public celebration on the evening before the new service went into effect and entertained Mayor Curley of Boston, other city officials and the trustees and officers of the Boston Elevated.

Co-operating in Toledo for Safety

Toledo utilities are co-operating in a city-wide campaign for safety. Results already include a new traffic code, plans for a safety week, Sept. 23 to 30, anti-jay-walking campaign, motor drivers' school and a complete industrial and school campaign for the entire year.

The Toledo Safety Council has been organized and is headed by V. J. Waltz, claims attorney for the Community Traction Company, as president. Ray Metzger, manager of the Toledo, Ottawa Beach & Northern Railway, is chairman of the public utility committee. H. E. Brosius has been hired as secretary-manager of the council. He has established offices at 1734 Nicholas Building.

The Toledo Automobile Club has appropriated $5,000 for the printing and distribution of a pamphlet containing the new traffic code, state motor laws and digest of important traffic rules.

May Adopt New P.A.Y.E. Cars in Duluth

As a result of a mild rebellion which has developed among the patrons of the Duluth Street Railway on its West Duluth and Aerial Bridge lines against the use of the turnstile in connection with the pay-as-you-enter-cars, officials of the company in conference with city officials have suggested a way out of the difficulty by abolishing the turnstiles and having a front-end exit.

Herbert Warren, vice-president and general manager of the company, told city commissioners at the conference that the company now desired to make the change and had already made plans to convert ten cars into this type, if the sanction of the City Council could be obtained. An agreement has not yet been reached by the city officials.

For the past week patrons of the line on which the turnstiles have been in operation have taken concerted action in refusing to pass through them. No serious trouble, however, has resulted and the incident has merely served to cause the company officials to confer with the City Council with reference to the adoption of a new type of pay-as-you-enter cars.

Seeks to Use One-Man Cars.—Application has been made to the Wisconsin Railroad Commission by the Wisconsin Public Service Corporation to introduce the one man car between Kaukauna and Green Bay.

New Rates Filed.—The Pittsburg & Beaver Street Railway, Pittsburgh, has filed a new tariff of rates with the Public Service Commission effective Sept. 17. The tariff increases the fare between Sixth Street, Ambridge, and Station Street, Leetsdale, from 5 cents a round trip to 5 cents each way.

Bible Students Break Pass Records.—During the week ended Aug. 19, the Tacoma Railway & Power Company reached the record total sale of 12,512 dollar weekly passes compared with a sale of 8,400 in the same week (Pass No. 4) of last year. The record was attained through the patronage of 500 delegates to the International Bible Students Association.

Will Protest Bus Competition.—The Levis County Railway, Levis, Que., is protesting against the alleged illegitimate competition of motor buses. A ruling was recently handed down by the Public Service Commission asking the city of Levis to co-operate with the electric railway so as to assure fair returns to that company and to take means, if necessary, to prevent undue competition from auto bus owners.

Interurban to Run Buses.—The Chicago, Ottawa & Peoria Railway, included in the Illinois Traction System, has been authorized by the Illinois Commerce Commission to abandon operation of 3¼ miles of track between Hick's Junction and the village of Ladd, contingent upon the company arranging to supply adequate service by bus between Spring Valley and Ladd. It has already agreed to do this.

Must Continue Safety Practice.—Motormen or conductors on the Wisconsin Public Service Corporation line operating between Kaukauna and Green Bay must flag their cars across a number of steam line tracks, according to a ruling of the commission. The steam trains move slowly and are infrequently used, but the commission refused to permit discontinuance of the safety practice.

Authorizes One-Man Cars.—The Missouri Public Service Commission has authorized the use of one-man cars by the Hannibal Railway & Electric Company. A hearing was held on the company's application at Hannibal on Aug. 8. The city officials informed Public Service Commissioner E. J. Kean, who conducted the hearing, that there was no objection to the cars provided they received and discharged passengers on the right side. The order permitting the use of the cars issued on Aug. 14 makes this requirement.

Wants More Cars Operated. — The City Council of Buffalo has asked the Public Service Commission to direct the International Railway to operate more cars and under shorter headway on the local lines in Buffalo. Figures compiled by the municipal authorities indicate that approximately 440 cars, not including interurban cars, are being operated in Buffalo during the rush hours between 4:30 and 6:30 p.m. Two years ago, the figures show, the International was operating 805 cars, with 925 in 1921 and more than 1,200 in 1913 and 1914.

Rerouting Plan Rejected. — After a discussion in which neither the Davenport City Council nor Manager R. J. Smith of the Tri-City Railway would agree on the proposed rerouting plan for the city, the Council rejected the plan in toto. Previous to the rejection Manager Smith proposed to introduce two bus feeder lines tapping the districts east and west of Vander Veer Park and to agree to allow the Thirteenth Street-Grand Avenue line to remain as it is now, to extend the Rockingham line to the city limits and to extend the Northwest line from Division Street out to Lombard.

Buses Make Connection.—A new bus line started operation on Aug. 1 which connects southeast and southwest Washington. The line is operated jointly by the Capital Traction Company and the Washington Railway & Electric Company. Two buses are operated, giving a twelve-minute service each way. The fare is 8 cents cash, six tokens for 40 cents, with a 2-cent transfer charge to or from electric railway cars at points where the buses connect with various lines of the Capital Traction Company or of the Washington Railway & Electric Company.

Extends Service.—The United Traction Company, in keeping pace with the development of Albany, which has recently annexed a portion of the town of Colonie, has extended its service over its West City line route a distance of 0.65 mile to the city boundaries, which adds 1.3 miles to the trackage of the traction company. This territory had been served by the interurban cars of the Schenectady Railway and the residents of the section are now given a much better service with the payment of but one regular city fare. The first car was run over the extended route on Aug. 27 and was driven by Mayor Hackett of Albany.

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Perfecting Plans for Bus Operation.—Plans are being perfected by the Boston Elevated Railway management under which practically all the trolley lines will be eliminated in Malden, Mass. Motor buses will replace them. Tracks will be ripped up and streets repaved. This action is expected to relieve traffic congestion. A bus terminal will be placed on land owned by the road at Main and Center Streets, from which two-car and three-car trains will be operated from the bus terminal to the Everett terminal of the elevated structure.

Transfer System Changed.—The present system of transfer will be simplified on the lines of the Los Angeles Railway by making it necessary for conductors to carry only two kinds of transfers instead of four. The new plan will be introduced within the next two months. One of the important features of the new plan is that the transfers will have p.m. coupons. Transfers issued in the a.m. period will be torn off the pad, so as to leave the p.m. coupon on the stub. This will eliminate the necessity of carrying a.m. and p.m. transfers. Another feature of the new transfer is that characters will be substituted for dates. In this way fraud can be easily detected.

Bonus for Car Men Under Safety Plan.—Under the safety plan of the Memphis Street Railway, which went into effect two months ago, earnings of platform employees for the month of July totaled $2,721. This brings the total for the two months up to $4,927, or a bonus of $9.36 for each platform man for the two months. The bonus is distributed every three months, and with the first distribution being made in September the bonus for each employee at the present ratio will amount to about $14. The plan was adopted by the company as a measure of safety, the company agreeing with its men to share with them the amount saved by avoiding accidents.

Serving Injunctions on Jitney Operators.—The Schenectady Railway has commenced the service of copies of restraining injunctions on jitney drivers in an effort to drive them off the streets of the city. Service has been had on about forty operators who are summoned to appear in the Supreme Court on Sept. 10 and show cause why they should not be in contempt for failure to abide by the injunction order restraining them from operating. Papers are being prepared for the service of about sixty additional operators. If such procedure does not have the salutary effect desired, the company will proceed to gather evidence against several hundred other operators and serve them as rapidly as possible.

Express Service Provided.—In accordance with the "public be pleased" policy of the Brooklyn-Manhattan Transit Company, Brooklyn, N. Y., passengers on the stations from Ocean Parkway to Parkside Avenue voted, on Aug. 30, to determine the new schedule of trains on the Brighton Beach Line. More than two-thirds of the patrons voted, the figures showing 21,692 votes by 31,919 passengers on the Brighton line. Plan No. 1, which provides for express service from Brighton Beach, by way of Manhattan Bridge, to Forty-second Street, with local service from Coney Island and Brighton Beach, via the Montague Street tunnel, to Fifty-seventh Street won by a plurality of 3,186 votes. The new schedule will go into effect on Oct. 1.

May Class Buses as Public Utilities.—A public hearing will be given by the Massachusetts Department of Public Works on Sept. 12 at Boston on the question of placing jitneys, buses and motor trucks under the provisions of law classifying them as "public utilities." Under such classification they will not be permitted to operate anywhere within the state before the public authorities declare that "public convenience and necessity required" that the specific service be performed. The plan would virtually place the buses and jitneys in the same class with street railways and steam railroads for the purpose of regulation, and the Department of Public Utilities probably would be empowered to regulate fares and schedules.

Book Reviews

Properties of Chilled Iron Car Wheels

Part I—Wheel Fit and Static Load Strains; Bulletin 129.
Part II—Wheel Fit, Static Load and Flange Pressure Strains, Ultimate Strength of Flange; Bulletin 134.
Part III—Strains Due to Brake Application, Co-efficient of Friction and Brake-Shoe Wear; Bulletin 135.
By J. M. Snodgrass, professor of railway mechanical engineering, University of Illinois, and F. H. Guldner, special investigator. Published by the Engineering Experiment Station of the University of Illinois, Urbana, Ill.

These three bulletins of the Engineering Experiment Station of the University of Illinois are the result of a three-year investigation of properties of cast-iron car wheels, made under the direction of the Railway Engineering Department of the University, in collaboration with the Association of Manufacturers of Chilled Iron Car Wheels. Investigation of the strength of wheels has been made with a view toward improving the design and increasing the safety of cast-iron car wheels. Particular attention has been paid to testing the flanges of the wheels, as breakage at this point is extremely serious.

The program adopted by the committee was embraced to determine (1) the strains caused by mounting the wheel on its axle; (2) the strains caused by the static or wheel loads; (3) the ultimate breaking strength of flanges, and strains caused by flange pressure; (4) the strains due to temperature gradients in the wheel caused by brake application; (5) incidental problems related to the above.

Part I deals principally with strains due to mounting the wheel on the axle, while Part II, in addition to giving further information on this subject, covers the effect of different thicknesses of flange on the strength, and also shows the effect of wear on the wheel flanges on their strength. The general conclusion from the results of these tests is that the flange strength of the chilled iron wheel can be increased to keep pace with probable future service requirements by a proper placing of additional metal in the tread and flange.

Part III deals principally with tests of friction and wear of brake-shoes applied to chilled iron wheels and, for comparative purposes, to steel wheels, rotating at constant speed. Temperature changes due to brake-shoe pressure were very carefully determined. The principal conclusion was that the stresses in chilled iron wheels, set up by temperature gradients due to brake application, are transmitted mainly through the outer plate, the strains or stresses on the inner plates being relatively small. The stresses resulting from temperature gradients may be kept within safe limits by the use of cooling periods or cooling stations. The so-called "arch-plate" design gives better service results than the M. C. B. type, due to better placing of the material.

Prolonged and excessively heavy brake application may cause strains of sufficient intensity to crack either chilled iron or steel wheels. This emphasizes the necessity for careful attention to operating conditions of breaking apparatus in both level and mountainous regions.

Proceedings of the Eighteenth Convention of the Union Internationale de Tramways

The report of the proceedings, held in Brussels, Oct. 2-7, 1922, has just appeared in a volume of 482 pages. They contain the papers and discussions, together with a brief account of the social events. The latter are illustrated by views of the places visited.

Explosives, Their Materials, Constitution and Analysis

By C. A. Taylor and Wm. H. Rinkenbach. Bulletin 219, United States Bureau of Mines, Washington, D. C.

This is a comprehensive, well-indexed book of 188 pages, covering in a thorough manner the properties and analysis of materials used in explosives, and full information regarding the explosives themselves. It will be useful to electric railway engineers who are responsible for blasting operations.

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Personal Items

Mr. Banghart in New York

Former Augusta-Aiken Official Made Vice-President of Staten Island Properties

Charles S. Banghart has resigned as general manager of the Augusta-Aiken Railway & Electric Company, Augusta, Ga., to accept the position of vice-president of the Staten Island Edison Company and the Richmond Light & Railroad Company, with offices in St. George, Staten Island, New York City. All of these properties are under the management of the J. G. White Management Corporation. Mr. Banghart will be succeeded at Augusta by F. Bayard Culley, who has been assistant secretary and treasurer there. Mr. Culley will in turn be succeeded by M. H. Hendee, commercial manager and purchasing agent at Augusta.

This formal announcement means, of course, that Mr. Banghart is coming back to New York to live. And that means a great deal to Mr. Banghart's many friends in the Metropolitan district. Augusta's expressed regret at losing Mr. Banghart is sincere, but Augusta's loss is indeed New York's gain. Mr. Banghart looms large wherever men gather.

A Factor in Public Affairs

If ever praise was heaped—yes, heaped, that's the only word—upon a man by the daily press of the city he was about to leave that man is Charlie Banghart. Augusta took Mr. Banghart to itself at once. There is probably no gift within the power of the people of that city to bestow which Mr. Banghart could not have had at a mere hint of desire from him. While Mr. Banghart did enter actively into civic affairs and the social life of the community, business reasons made it necessary for him to decline some of the honors which Augusta in fact sought to bestow upon him. Of the Rotary Club he was one of the most active members. Last year he was tendered the presidency of that organization, but had to decline. The Augusta *Herald* said of Mr. Banghart that he is a technician without pedantry; a street railway manager without enemies; a disciplinarian without harshness; a humorist without cynicism; a leader without egotism, and a man without guile. Praise, indeed, but not too much. So much for the man. Of his work the Augusta *Chronicle* said that "he found the local system in bad condition and has built it up in efficiency and in the esteem of the people and it can be stated without any exaggeration that the Augusta-Aiken Railway & Electric Company is in better standing with the people of the community than in many years, and a large part of this improved esteem is due to Charles S. Banghart."

Mr. Banghart went to Augusta in 1919. He has been engaged in electric railway work since 1892, being connected in turn since that time with the Thomson-Houston Company, the Union Traction Company, Reading, the New York & Queens County Railway and the Binghamton Street Railway. The properties on Staten Island with which he now has become connected are the successors after reorganization of the Richmond Light & Railroad Company. The White interests bought into them some time ago, and under the reorganization the lighting and railroad properties have been segregated. Of all the boroughs of Greater New York the borough of Richmond, in which Staten Island is located, has, on account of its somewhat isolated position, been the last to feel the impetus of the growth of the greater city, but with the prospect of its connection by tunnel with the rest of the city, great expansion appears to be ahead of it in the next few years. The White interests are planning for this, and in the work of rehabilitating the properties there and expanding them Mr. Banghart will undoubtedly be called upon to play a large part under the direction of President J. H. Pardee.

C. S. Banghart

R. L. Rand, formerly vice-president and manager of the Richmond Light & Railroad Company, will continue with the successor company in the capacity of general manager. He has been connected with the properties for a long time.

Mr. Queeney Appointed Assistant to Mr. Mitten

J. A. Queeney, for many years special representative of the railway department of the General Electric Company at Schenectady, has resigned from that concern to accept the position of assistant to T. E. Mitten, chairman of the board of the Philadelphia Rapid Transit Company.

C. S. MacCalla at Youngstown

Made Vice-President and General Manager of Pennsylvania-Ohio Electric Company

C. S. MacCalla has been made vice-president and general manager of the Pennsylvania-Ohio Electric Company and the Youngstown Municipal Railway and other subsidiaries of the Pennsylvania-Ohio System operating city railway lines in and interurban lines between Youngstown and Warren, Ohio, and Sharon and New Castle, Pa. He assumed the duties of these offices on Sept. 1, succeeding Garrett T. Seely.

Mr. MacCalla brings to his new field of activity a wide and varied experience in public utility operation, both in the railway and the light and power divisions of the electrical industry. He was born in Wallingford, Pa., in 1876. Immediately upon leaving Lehigh University, where he was graduated in 1896, Mr. MacCalla began his work with public utilities, spending brief periods in the installation department of the Philadelphia Bell Telephone Company and as a "trouble shooter" for the Edison Electric Light Company, Philadelphia, now the Philadelphia Electric Company. Then followed four years with the Edison Electric Illuminating Company of Brooklyn (Brooklyn Edison Company) successively as draftsman, construction boss and general construction foreman.

Active electric railway experience began in 1901 when Mr. MacCalla joined the foreign department of the General Electric Company as principal assistant engineer in charge of the installation and initial operation of the Sydney, Australia, tramways system for the New South Wales government, the work including the installation of the steam-electric generating plant, substations and railway equipment, the system being the then largest three-phase transmission plant south of the equator.

In 1903 Mr. MacCalla went to the Pacific Coast, where he was identified with the Washington Water Power Company, Spokane, Wash., for fifteen years, successively as assistant to the general manager, assistant general manager, general manager and vice-president and general manager, continuing in the last named position for five years, and having full charge of operations, both power and railway, in Spokane and some thirty-odd smaller cities and towns within a radius of 100 miles. He equipped the Spokane city railways with one-man Birney safety cars, the installation being the first in any city of more than 100,000 population.

Returning to the east, Mr. MacCalla was elected vice-president and general manager of the Virginian Power Company, Charleston, W. Va., which position he recently resigned.

During his residence in West Virginia he was appointed by the Governor

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to the state board for registration of engineers and as a delegate to represent the State at the water power conference in New York in February, 1922.

Mr. MacCalla is a member of the American Society of Civil Engineers and a fellow of the American Institute of Electrical Engineers, being active in both organizations.

G. T. Seely Resigns from Youngstown Companies

Garrett T. Seely has resigned as vice-president and general manager of the Pennsylvania-Ohio Electric Company and the Youngstown Municipal Railway, Youngstown, Ohio. Mr. Seely succeeded Richard T. Sullivan with the properties at Youngstown in 1919. Previous to that time he was assistant general manager of the several elevated railways in Chicago. Coming from work in the steam railway field, his first connection in electric railway work was as engineer maintenance of way of the South Side Elevated Railroad, Chicago. He was subsequently advanced to the position of vice-president and general manager of this company. When the four elevated railways in Chicago were consolidated in 1911 as to operation and management he was made assistant general manager of the combined system. He remained in this capacity until 1919, when he went to Youngstown.

Mr. Seely was graduated from the University of Illinois in civil engineering in 1899. At the meeting of the American Electric Railway Association last fall Mr. Seely was elected president of the Transportation & Traffic Association. He has always been active and interested in sectional and national association work and previous to his election as president of the Traffic Association held important offices in the Illinois Electric Railway Association, the Central Electric Railway Association and National Electric Light Association. He has been one of the most progressive among railway men in adopting the bus as an additional transportation tool, and also in devising ways of better merchandising of the transportation services.

New Manager Named at Augusta

F. Bayard Culley, assistant secretary and treasurer of the Augusta-Aiken Railway & Electric Corporation, has been appointed general manager of the company to succeed Charles S. Banghart, appointed to the Staten Island Electric Company, as noted elsewhere in this issue. Mr. Culley is an Augustan. He has been with the Augusta-Aiken since 1907, and has won promotion after promotion until he has now earned a position which places him in charge of the property. He has worked in the closest touch with Mr. Banghart and is particularly well qualified to take over the general managership. Mr. Culley is a Virginian by birth and lived for a while in South Carolina, but Augusta has been his home for many years.

N. H. Brown at Alliance

Former Buffalo Executive Made General Manager of Stark Electric Railroad

Nelson H. Brown has been appointed general manager of the Stark Electric Railroad, Alliance, Ohio, a high-speed line operating between Canton and Salem, Ohio. Prior to accepting appointment to the company at Alliance, Mr. Brown was general manager of the Buffalo & Lackawanna Traction Company and the general manager of the Depew & Lancaster Railway Corporation, Buffalo, N. Y., for two and a half years.

After many years of service in steam and electric railway work, including connections with the New York Central Railroad, the Syracuse Rapid Transit Railway, the Worcester Consolidated Street Railway and the Albany Southern Railroad, among others, Mr. Brown

N. H. Brown

in January, 1913, accepted the position of assistant superintendent of transportation of the International Railway, Buffalo, N. Y., realizing the broader field of opportunity which the position with that company opened to him. On June 1 of the same year he was promoted to the position of superintendent of transportation of the Buffalo Division, and in November, 1915, was made general superintendent of the company.

In 1917 Mr. Brown was transferred from the position of superintendent of transportation at Buffalo to that of manager of the electric railway properties of the New Orleans Railway & Light Company, both of which were then subsidiaries of the United Gas & Electric Corporation. He returned to Buffalo from New Orleans in the spring of 1921 and became general manager of the Buffalo & Lackawanna Traction Company and the Depew & Lancaster Railway Corporation.

H. W. Witherspoon, general manager of the Stark Electric Railroad, Alliance, Ohio, has resigned to enter business for himself in Alliance. Mr. Witherspoon will terminate five years of active service with the railway. He was general superintendent for two years and general manager for a year and a half.

John T. Boifeuillet, Macon, Ga., has been elected vice-chairman of the Georgia Public Service Commission to succeed James A. Perry, who had served as vice-chairman of the commission for some time. Mr. Perry was deposed by the other members due to his activities before the recent session of the Georgia State Legislature, in which he advocated reduction of the commission from five to three members.

Malcolm H. Hendee has been appointed to succeed F. Bayard Culley as assistant secretary and treasurer of the Augusta-Aiken Railway & Electric Company. He is a Georgian, and came to Augusta when a very young man. He went with the Augusta-Aiken in 1908 as a stenographer. Recently he has been the commercial manager for the organization, having worked his way up step by step.

Granville Lyon, formerly connected with the securities department of the Wisconsin Power, Light & Heat Company, Madison, has been appointed manager of the newly formed utilities securities department of the Eastern Wisconsin Electric Company, Fond du Lac. He will have charge of this branch of the business in the state of Wisconsin, as well as being head of the new department.

Donald R. Keith, formerly of Lima, Ohio, has been placed in charge of the Springfield, Ohio, office of the department of public relations of the Indiana, Columbus & Eastern Traction Company, according to an announcement on Sept. 3. The appointment follows the transfer recently of Arthur V. Bland, director of the department, and his aids to Columbus. Mr. Keith will represent the department in Springfield and also will supply publicity for his district to the newspapers. M. W. Henney, who was temporarily in charge of the Springfield office, has been transferred to Dayton, where he will represent the department.

Obituary

Andrew B. Shelton, conductor on the Denver Tramway lines for more than thirty-three years, died recently after a brief illness. "Pop" Shelton, as he was affectionately called, came to Denver in 1874. He was one of the first employees of the old cable system.

Harold Wayne Arnold, who had been with the Arnold Company, engineers and constructors of Chicago, for the last seven years, died on Aug. 3 after an illness of five weeks. He was some time ago a salesman with the Sprague Electric Company and also served in that capacity with the Western Electric Company. Mr. Arnold was a native of Nebraska, but went to Arkansas in 1894, where he entered the electrical business. He was a brother of Col. Bion J. Arnold. He was forty-nine years of age.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Weekly Soft Coal Output Sets Record for Year

The week ended Aug. 25 showed the largest production of soft coal for any week during the present calendar year, according to reports of the United States Geological Survey. The total for the week is estimated at 11,346,000 net tons, which is an increase of 503,000 tons over the figure for the preceding week. Early returns on car loading for the week Aug. 28 to Sept. 1 indicate a further increase, with a probable total of about 11,500,000 net tons.

Bituminous production for the first 201 working days of 1923 was 357,036,000 net tons. This total is almost identical with production in 1917 and is exceeded only by that of the year 1918, which was one of abnormal activity owing to the war. Figures for the years 1919, 1920, 1921 and 1922 all fall far below those of production for the current year.

Bituminous Storage Increased

Soft coal continued to flow into storage during July, and on Aug. 1 commercial consumers had on hand approximately 51,000,000 net tons. In comparison with the figure for the first of the preceding month, this was an increase of 5,000,000 tons. Progress in the building up of stock from the low point reached on Sept. 1, 1922, owing to draft on reserve during the strike last summer, has been practically uninterrupted, and in the eleven months that have elapsed there has been a net gain of 29,000,000 tons. Stocks on Aug. 1 of this year were 10,000,000 tons in excess of those on hand a year ago. Available records show that the supply in storage on Aug. 1 this year has been exceeded only during the period at the close of the war and just prior to the miners' strike of 1922.

Measured in terms of tons, stocks increased 10.9 per cent during July. Measured in terms of days supply the increase was 18.9 per cent. The larger increase in days supply was due to the fact that the rate of consumption decreased in July, thereby increasing the length of time the tonnage on hand would last. At the rate of consumption in July, the stocks on hand Aug. 1 were sufficient to last forty-four days on the average. This average is based on the assumption that stocks were evenly divided, and as such is never the case, the figure has value only for general comparison.

Stocks are far above the average in some communities and far below in others. New England is well supplied, having over ninety days supply on hand. The Eastern seaboard generally is in good shape, the supply of bituminous on hand being sufficient for from sixty to ninety days. About the same condition prevails in the Northwest. In the Central and Southwestern states the conditions are not so good. Stocks in those regions vary from a sixty days supply down to almost nothing.

Hard Coal Stocks Low at Present Time

Anthracite stocks, on the other hand, are in very poor shape. Throughout New England and the Middle Atlantic states the retailers' stocks of hard coal on Aug. 1, 1923, ranged from 25 per cent to 50 per cent below those on hand Aug. 1, 1921, the last normal year. Conditions in the Central states were somewhat better, but in no case is any large surplus on hand. Retail dealers generally received more anthracite in July than they delivered and their total stocks on Aug. 1 were 4 per cent larger than on the first of the preceding month. These stocks, however, were much lower than during the summer of preceding years, largely because of the rapidity with which coal has been taken by the consumers. The production of anthracite in the week ended Aug. 25 established the year's high record for weekly output. The total for the week ended Sept. 1 will probably be much reduced because the collieries were shut down on Saturday and production slowed up on Friday in anticipation of the present suspension.

Fuel Oil Has Limited Possibilities as Substitute for Coal

As a result of periodic labor troubles in the mine fields and consequent coal shortages, many consumers have been tempted to replace coal burning furnaces by oil-burning apparatus. According to some oil refineries, however, this step should not be taken without careful consideration. It is likely that the economies now possible by the use of fuel oil will not continue to be possible for a period much longer than five years.

It is pointed out that the crude oil supply in the United States is strictly limited, the amount yet available being estimated at about 9,000,000,000 bbl. Of this amount 5,000,000,000 may be classed as being actually in sight and the other 4,000,000,000 bbl. as a possibility. A survey by geologists indicates that there are three principal sources of petroleum in the United States and gives the approximate quantity to be expected from each. It is thought that there are in the Gulf Coast region, including the states of Texas and Louisiana, about 2,100,000 bbl. The California oil fields should yield about 1,850,000 bbl. according to their estimate, and those in Oklahoma 1,340,000 bbl. The remainder of the 9,000,000,000 is distributed in numerous states with no very large concentration at any one point. Since the publication of the report, additional wells have been discovered in California and it now appears probable that a greater supply than was estimated will be available there.

The ordinary life of a flowing well is said to be about two years. Pumping may add one year more to the life of a well but will likewise add very considerably to the cost of the oil. It is expected that the California oil fields will be able to maintain their present output for about eighteen months more. A large production may be expected from the wells in Oklahoma and the Gulf Coast states for about two years more. The output of crude petroleum after the expiration of that time will depend largely upon the opening up of new fields in the future.

The total production of oil in the United States at the present time is not quite 500,000,000 bbl. annually. The consumption, however, is well over 500,000,000 bbl. Under these circumstances, with the total supply limited, it is evident that present low prices and abundant production will not continue indefinitely. There is, however, a possibility that the development of South American oil fields will balance the decreasing supply in the United States. At the same time refiners point out that methods of extraction are being constantly improved and there remains less residue for fuel oil. On this account any hasty decision to replace coal burning furnaces by oil-burning furnaces would seem to be unwise.

Copper Price Declines

Recent quotations give a price of copper in small quantities as low as 13⅞ cents per pound. This is a reduction of more than 2 cents per pound from the price prevailing a number of weeks ago. At this figure manufacturers say copper is selling below the actual cost of production. The particular occasion for this decline appears to be a further slackening in the foreign demand.

Metal, Coal and Material Prices

Metals—New York	Sept. 4, 1923
Copper, electrolytic, cents per lb.	13.687
Copper wire base, cents per lb.	16.50
Lead, cents per lb.	6.80
Zinc, cents per lb.	6.82
Tin, Straits, cents per lb.	41.375
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.125
Somerset mine run, Boston, net tons	2.50
Pittsburgh mine run, Pittsburgh, net tons	2.30
Franklin, Ill., screenings, Chicago, net tons	1.80
Central, Ill., screenings, Chicago, net tons	1.425
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$7.00
Weatherproof wire base, N. Y., cents per lb.	18.75
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal.	$0.91
White lead, in oil (100-lb. keg), N. Y., cents per lb.	11.375
Turpentine, (bbl. lots), N. Y., per gal.	$0.95

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Track and Line

Muskegon Traction & Lighting Company has been granted permission to extend its Ottawa Street car line to Getty Avenue.

Memphis Street Railway will extend the Florida Street line 900 ft. south of the present terminus to the point intersected by the Horn Lake Road.

Toronto, Ont.—The City Council has sanctioned the payment of $5,000,000 to the Toronto Transportation Commission for the program of rehabilitation of the street railway system for 1923.

Niagara, St. Catharines & Toronto Railway has planned improvements throughout the Niagara peninsula calling for an expenditure of $2,300,000. Of this amount it is estimated about $300,000 will be used for the building of a new terminal in St. Catharines.

Charleston Consolidated Railway & Lighting Company, Charleston, S. C., will soon start work on putting in a single track on King Street between Line and Cleveland, taking the place of the present double track. The old rails will be taken up and new ones laid.

Southern Public Utilities Company, Charlotte, N. C., will construct an extension of the West Highlands line to the new city high school. The work will be pushed to completion so that the greater facilities thus presented may be supplied to the pupils in the coming session.

Tennessee Electric Power Company, Chattanooga, Tenn., is making extensive improvements to its system in the Chattanooga district. A double-track section is being laid on East Fourteenth Street and work will soon be started laying new tracks on Central Avenue, West Ninth Street and on Chestnut to Main.

Indiana Service Corporation, Fort Wayne, will receive a franchise for the laying of a double car line on Lafayette Street from Lewis Street to Wallace Street. A petition for the franchise has been under advisement since it was presented to the board some months ago. The laying of tracks on Lafayette Street will give the company another line into the southern part of the city and will eliminate some of the congestion on Calhoun Street. Under the agreement, the company agrees to bear some of the expense of constructing the subway at Lafayette Street.

San Francisco-Oakland Terminal Railways, Oakland, Cal., has just finished rebuilding a double track on North Grove Street, in Berkeley, from Berkeley Way to Hopkins Street, a distance of 4,802 ft. The cost was $92,000. The company is now engaged in one of the most expensive pieces of double-track reconstruction it has ever undertaken. The work is being done on Telegraph Avenue, from Fifty-Second Street, in Oakland, to Dwight Way, in Berkeley, a total distance of 9,733 ft. The Oakland portion of the job will cost $127,700 and the Berkeley portion $87,200.

United Railways, St. Louis, through Receiver Wells, has been authorized to spend $1,218,806 during the balance of 1923 for construction, reconstruction, repairs and maintenance of the company's properties. For buildings and alterations in shops and substations, $212,000; for substation equipment, $161,450; for bridge construction $10,000 has been set aside. Earlier in the year Judge Faris authorized expenditures totaling $1,628,455, the total for the entire year being $2,847,261. For street paving and trackwork $1,366,480 has been allotted. Most of this will be spent for reconstructing tracks.

Power Houses, Shops and Buildings

Illinois Power & Light Company, Chicago, Ill., will construct a power plant on Lake Decatur to cost $5,000,000.

Eastern Wisconsin Electric Company, Sheboygan, Wis., will construct a freight depot at the local carhouse in Fond du Lac. This will take care of service demands on account of the establishment of through interurban passenger and freight service connecting Fond du Lac, Milwaukee and Green Bay.

Wisconsin Public Service Corporation, Green Bay, Wis., has purchased the Davies Falls waterpower site on the Pike River south of Amberg, where the company proposes to add and erect another hydro-electric plant to its rapidly growing hydro-electric generation business. This company has just completed construction work on its Johnson Falls hydro-electric plant and is now actively engaged in developing another plant at Caldron Falls.

Springfield Traction Company, Springfield, Mo., is increasing the size of its carhouse by the erection of a brick and structural steel addition 81 ft. wide by 78 ft. 6 in. This addition is necessary to take care of cars and buses operated by the company. The building is being constructed by Sanderson & Porter, who are doing considerable other work in the city, and will be completed about Oct. 1. The entire cost of the addition will be in the neighborhood of $30,000.

Trade Notes

Hoggson & Pettis Manufacturing Company, New Haven, Conn., has acquired by purchase the assets, good will and business of the Sterling-Meaker Company. It is prepared to furnish repair parts and accessories as well as registers of this make to electric railways in the market for this type of equipment.

Uehling Instrument Company, Paterson, N. J., combustion engineers and manufacturers of steam power plant economy apparatus, including CO_2 recorders, has appointed three new Southern representatives, namely, Connor-Hudson Company, Southwestern Life Building, Dallas; Gibbens & Gordon, Inc., 532 Canal Street, New Orleans, and the Cornell Mathews Company, 10 Oak Street, Orlando, Fla. These new representatives are fully equipped to give the personal service demanded by the growing business in the Gulf States.

American Railways Equipment Company, Dayton, will locate its new plant in Springfield if citizens of that city will subscribe at least $30,000 in stock. Representatives of the company made this statement on Aug. 25 while in Springfield in an effort to interest local organizations in the proposition. The company manufactures a new type of street car fare and transfer device, demonstration of which was given before members of the Springfield Chamber of Commerce, street railway men and others recently. The machine, in one operation, distributes the money, totals the fares and issues transfers.

New Advertising Literature

Bates Expanded Steel Truss Company, Chicago, has issued a forty-nine-page pamphlet on its steel poles. The pamphlet is mainly illustrations, with some descriptive matter accompanying each picture.

Johns Pratt Company, Hartford, Conn., has just issued two attractive folders, one describing its "Noark" meter service switch for single-phase and direct-current service; the other emphasizing safety features of "Noark" fuses.

Reliance Electric & Engineering Company, Cleveland, has issued a new bulletin, No. 1014, descriptive of type "AS" Reliance adjustable speed motors of the armature shifting design. The booklet contains twenty-four pages and is illustrated.

Metal & Thermit Corporation, New York, N. Y., has issued a new Thermit rail welding pamphlet, which brings up to date the whole subject of Thermit rail welding to cover the many recent improvements in economy and efficiency. The pamphlet includes detailed instructions, accompanied by illustrations and drawings, showing steps in making the improved Thermit rail weld which has greatly reduced the cost per joint. Improved apparatus used in connection with Thermit rail welding, such as the self-luting mold box and the new lightweight double-burner preheater, which have greatly accelerated the speed of operation, is described in detail for the first time, as well as illustrations showing results of a ten years' service test of the Thermit rail weld, also rail bending and drop tests. Instructions for using Thermit for welding compromise joints, constructing frogs and crossings and repairing loose arms of mates and switches have also been included in complete form. At the end of the pamphlet is a discussion of the theory of rail joints.

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New York, Saturday, September 15, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 11

Coal Commission Report on Civil Liberties

THE United States Coal Commission has issued its report on the violations of civil liberties in the coal industry—an intensely interesting and informative document. It is an eminently fair treatment of this phase of the causes of conflict between the operators and miners. While condemning various practices on both sides, it finds that any fixing of responsibility for past violations is practically impossible. It disposes of the Herrin murders in a manner that is rather startling, viewed from the light of true American justice, but finds that all justice is human and fallible and that "it will only approach perfection when the intelligence, the judgment and the conscience of men are educated more and more toward higher ideals. . . . The law has been, is now, and ever will be but the average of the judgment and conscience of the community."

The commission took volumes of evidence, out of which it says it would be possible for one to show that the miners were intent upon unionizing all the mines of America, even by force if necessary, or that the operators were determined, by use of force if necessary, to break up the United Mine Workers—whichever way the reviewer's bias might lean.

But the commission chose to seek something better for the future than the mere fixing of responsibility. The most definite corrective proposal in this report is that Congress must compel full publicity of their activities from both operators and United Mine Workers in prescribed reports to some governmental agency "to the end that the people of America may determine whether they will longer permit, even under governmental supervision, the existence of these artificial persons (*de facto* or *de jure* corporations)." The final admonition is that "if neither the patriotism, private conscience nor business common sense of the industry shall lead all persons engaged in it not only to observe the law but to help enforce the law; and if state and local authorities shall be impotent in prosecuting and convicting violations thereof, then it is the solemn duty of the Congress of the United States to assume jurisdiction over these American rights, bringing the full power of the Union to their preservation by the prosecution and conviction of all persons, whether high or low, who shall dare to violate them. The legislative, judicial and executive branches of this government must not permit a union of operators, a union of miners, nor a union of both to become greater than the Union of the States."

These are plain statements for the benefit of the coal interests. Just exactly what the commission means, however, is obscure. One can easily read into them that in case of a strike the government would take control of the situation by providing ample protection of the mines and then inviting whoever would to work them. Some such interpretation as this seems reasonable, as the commission is on record as being opposed to nationalization of the coal industry.

The commission's report is valuable particularly for the unbiased enlightenment it affords on the causes of trouble. The commission has done its part well, and the evils in the situation which it sets forth would, if eliminated, bring peace to the industry and satisfaction to the public. Unfortunately, however, there is required a long process of corrective measures and the moving of many minds before the coal consumers will reap any benefits. Yet there seems to be no short cut. The most promising hope is that the operators and miners will catch the spirit of the report and themselves take steps to correct the practices frowned upon.

Who Shall Go to the Convention?

LAST year, after the convention at Chicago, the chief executive of one of the largest railways—he himself had not gone to the convention—called a meeting of company executives and department heads to find out what had happened at the convention. Addressing one of his principal executives, he inquired what was the outstanding thing he found at the convention. This man thought a while and finally said he considered a certain address was the best thing there. Passing down the line the same question was put to each man and each, in turn, gave the same answer. The chief executive voiced surprise at such unanimity of opinion among men of such different tastes and experience and started to question their power of discernment.

"Was this all that happened at the convention? What did each of you get out of it?"

In answer to this each man told of some details in his particular line of work that had appealed to him, but when the rounds had once more been made the chief executive was still dissatisfied.

"Didn't any of you get a picture of the whole situation? Where is the industry trending? What are the outstanding problems? I can commence to piece together the parts you bring back and draw some conclusions, but they are inadequate. Here this company has spent hundreds of dollars sending ten or fifteen men a good many hundreds of miles to a convention and I can get only a piecemeal report—no one has the whole picture!" One of the younger department heads spoke up:

"It looks to me that what was most necessary was that you should have gone to the convention yourself, for you can see the whole situation. We were each busy in our own line and benefited from it, but what was missing was your ability to measure it as a whole —your own contact with other executives."

The younger department head was right. There is something at a convention for everyone in the company, from chief executive down. Each will get value from the convention in his own way and in proportion to his capacity. It is important that chief executives send

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their engineers, their transportation men, their accountants, their claim agents, their publicity men, and their various executive associates and assistants. But it is still more important that they go themselves and take an active part in the whole convention. It is of too much importance to attempt to measure, with the above-described unsatisfactoriness, the trend of conditions in the industry through reports of others. Who will go to the convention from your company? Make it a full delegation from president clear down the line!

More Thought to Reward for Selling Transportation

APPARENTLY quite a little thought is being given to bonus schemes for inducing trainmen to exercise greater care in avoiding accidents, as some thirty companies have now adopted some such plan. The interesting thing about this is that every one of these companies reports a very decided improvement in the accident record, in spite of the fact that in some cases the amount of the reward seems almost inconsequential. What seems strange is that not more thought is being given to plans for rewarding the trainmen in making better efforts to merchandise transportation. The result of bonuses in accident prevention is to save a percentage of a small piece of the total expenses, while a bonus for selling more transportation would make an improvement in the gross revenue. While it is realized that it is extremely difficult to apply a commission or bonus plan to the work of the trainmen, nevertheless the possibilities are so great that it warrants more thought than is being given the subject.

The San Diego Electric Railway has a plan whereby 3 per cent of the gross amount received from the sale of certain forms of transportation, principally 7½-cent tickets or tokens, and weekly passes is paid to the platform employees on the basis of hours worked. The result of the plan is that platform employees are receiving an increase in the hourly rate of pay of about 4 per cent or from 3.5 to 5 cents an hour above the scale.

A new idea is embodied in the bonus plan inaugurated the first of July by the receiver of the New York & Queens County Railway on Long Island. This provides that the men shall receive 1 cent an hour above a fixed rate of pay for every cent that the average earnings per car-mile during the month exceed 31 cents. To the railway executive this means that out of every 7 to 9 cents additional revenue turned in per car-hour 2 cents is given to the crew, but it has seemed to be difficult for the New York & Queens trainmen to understand that average earnings per car-mile of 1 cent an hour more than 31 cents means 1 cent an hour more pay for them.

This last plan has some merit, but it has the same weakness that is common to all plans now in effect, so far as these are known, which is that the basis of arriving at the bonus is a matter remote from the trainman. He cannot figure it himself, even though he might understand the basis of computation. He does not have the immediate feeling that for every passenger he gets on his car there is something in it for himself.

Whenever it is proposed that individual trainmen should get a certain percentage of every fare collected, the experienced transportation man maintains that the trainmen would then drag the line. This and most of the other practical defects in the direct bonus plans are matters of discipline. This means that enough supervision must be provided so that rules will be observed.

Because it never has been possible to work out a satisfactory bonus plan need not necessarily be taken as proof that such a plan cannot now be worked out. It is a thing that is particularly needed these days. Trainmen want higher wages, yet higher hourly wages do not increase the inducement for them to sell the service. Perhaps a simple, direct bonus plan that would mean real money to the trainmen would make them think well enough of their jobs to permit of the high order of discipline necessary, and would develop in them the energy and selling instinct so badly needed to cope with the growing competition of the private automobile, the motor bus and the sidewalk. At any rate, some new thinking in this direction would not be time wasted.

Pollyanna— or Mr. Gloom?

A MAN who attended a recent electric railway convention commented on it afterward as follows:

"Throughout the whole meeting there was a spirit of depression and gloom. The speakers did not aid any in enlightening the situation to the operating men of the state. If I were an operating man in that territory I would feel uncertain about my job, and would be much discouraged regarding the future."

The same man, after telling something of the scope of the papers presented, made this further observation:

"If conditions exist as they say they do there relative to the railway situation I would think it highly desirable to import some speakers from the outside who might give advice and counsel on things to be done to improve the situation. In the absence of this, the discussion had to do largely with the serious difficulties confronting one of the railways in the territory, and the result was that a general depression prevailed throughout the meetings."

In the past few years electric railway men have had a tendency at times to meet and tell each other how bad things are, and how hopeless it is to try to better them. But is that the true state of affairs in the industry generally? Statistics for eighty companies printed on page 73 of the issue of the JOURNAL for July 14 show that the greater revenue during the first four months of 1923 has been more than enough to offset the rise in expenses. The operating ratio has continued to drop, and as this is a measure of the underlying condition of the industry, it can be said that it is in a stronger position today than it was at the end of 1922, and in fact than it has been at any time since 1916. And then the trend was downward, while today it is upward, which is distinctly encouraging.

The industry, by and large, is now on a firm basis, despite the various prophets of gloom. Naturally it is unwise to adopt the attitude of Pollyanna, and see only the good side. There is yet much to be done in modernizing the whole business of transportation and better adapting it to the present-day needs of a rapidly growing country. A sure way to bring cause for gloom is to let things drift in an aimless way.

Conventions and meetings of railway men are much more helpful when the delegates devote the time to the exchange of constructive ideas that will lead to better handling of the individual road's problem. Nothing much is gained by a rehearsal of ailments. These are the things that should be kept well in mind by those who are responsible for convention programs. There are few bellwethers in the flock, and to them the others look for information and guidance.

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Hauling Ford Workers

The 70,000 Employees Engaged at the Highland Park Shops Present a Big Traffic Problem—Mr. Bibbins Analyzes the Conditions — Prepayment, Queue Loading, Additional Streets and Better Traffic Regulations Among Recommendations

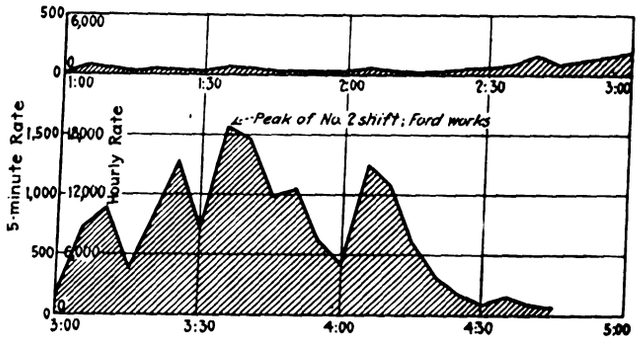
THE transportation problems involved in the carrying of the 70,000 employees to and from the large Woodward Avenue plant of the Ford Motor Company in Detroit are unique. Strictly speaking, the plant is not in Detroit, but in Highland Park, which politically is a separate municipality, but surrounded entirely by the city of Detroit. Acting for the Council of this city, J. Rowland Bibbins of Washington, D. C., recently made a study of the situation and from the preliminary report submitted by him the accompanying facts and suggested remedies are taken. A later report with detailed plans and final recommendations will appear in abstract in another issue.

On Woodward Avenue, the main northerly highway from Detroit, and about 6½ miles from the business center of the city is a large rectangular tract of land with a frontage on each side of the street of about half a mile and a depth on each side of about a mile to a mile and a half through which there are no north and south secondary through streets to relieve the traffic on Woodward Avenue. The southern half of the tract on the west side of Woodward Avenue is occupied by the Detroit United Railway and the Department of Street Railways of the City of Detroit. The rest of this large area is reserved for use by the Detroit Terminal Railway and the Ford Motor Company, whose main factory is on the east side of Woodward Avenue, directly opposite the car yards of the Department of Street Railways. A short distance to the north of this tract are large park and cemetery properties which limit the opportunities for housing and traffic movement in that direction.

The output of the Ford works has doubled three times in ten years, and about 70,000 men are now employed there, an increase of more than five times since pre-war days. At present the number of workers leaving the factory is about as follows:

Shift No. 1, 7:30 a.m., 10,000 men
Shift No. 2, 3:30 p.m., 38,000 men
Shift No. 3, 11:45 p.m., 21,000 men

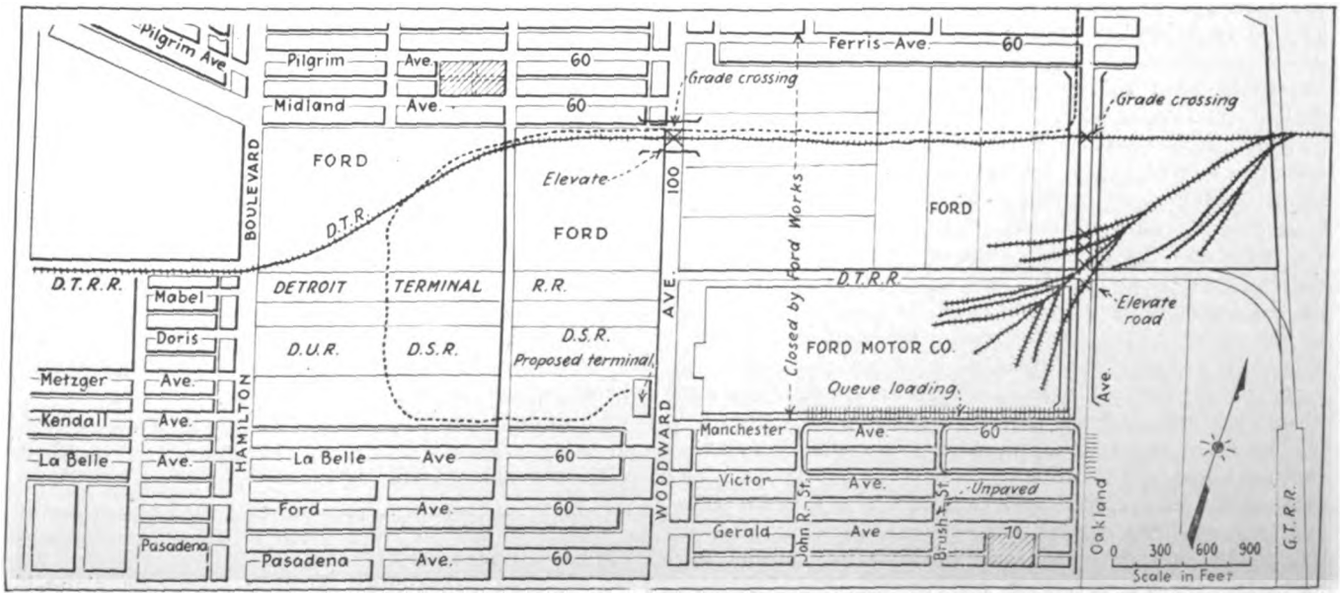
In addition to these factory workers, there are approximately 700 office workers leaving at 5 p.m., 750 trade school workers leaving at 4:30 p.m., and 550 visitors per day. It is estimated that from 20 to 25



Pedestrian Movement on Manchester Avenue, Showing How the Ford Works Staggers the Release Times of Its Departments

per cent of the employees live within walking distance of their work, and about two-thirds use Woodward Avenue traffic facilities.

The pedestrian movement out of the works on the afternoon shift exceeds at one point, Woodward and Manchester Avenues, a rate of 18,000 people an hour, not including the incoming shift. This is shown by the diagram charting the pedestrian movement for an average day (June 29, 1923) on Manchester Avenue between 1 p.m. and 5 p.m. This curve shows clearly the result of scientific scheduling by the Ford works



Portion of Highland Park Showing Ford Works, Detroit United Railway and Detroit Street Railway Properties, Proposed Terminal, Etc.
(Dotted line shows connection to proposed terminal of interurban line running north. Electric railway tracks on Woodward Avenue omitted from this drawing.)

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to spread the peaks. In fact, the plan of staggered hours of work adopted by the Ford Company has been the only thing which has saved the situation up to the present. The main afternoon shift is discharged at intervals throughout the hour from 3:30 to 4:30, with the new shift entering between these intervals.

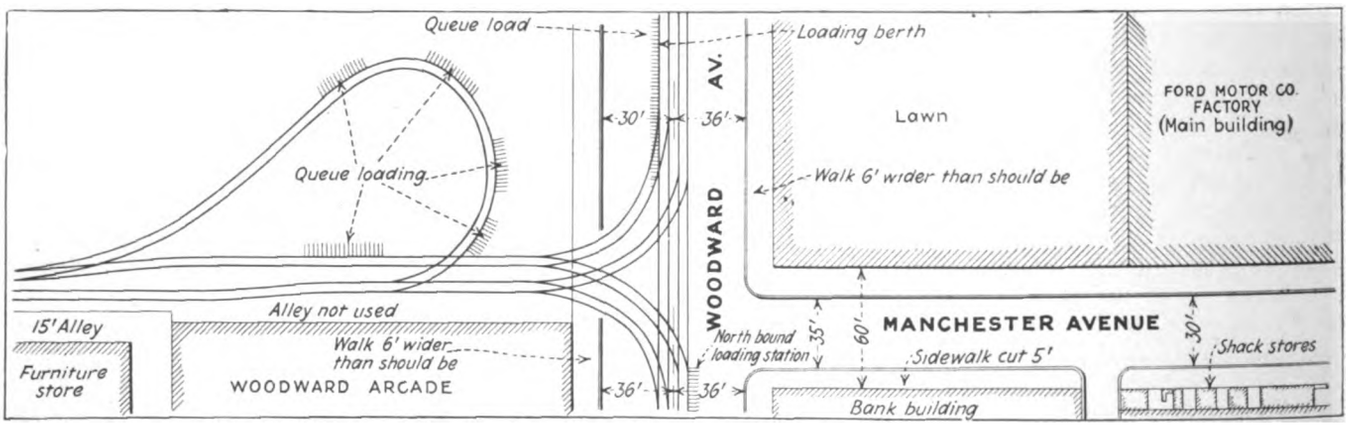
The city of Highland Park alone could not house this vast number of employees. In fact, its population trend has lagged behind that of assessed property values and output of the Ford factory, and the employees seek their homes in all parts of Detroit and its suburbs. A diagram showing the percentages which travel the different distances, based on pre-war conditions, is given.

The great bulk of those who need transportation to and from the works use the street cars on Woodward Avenue of the Detroit Municipal Railway. This movement has reached about the maximum possible under present loading conditions, i.e., a two-car train every sixty seconds with practically full car loading. Passengers board the cars at present in the street or on the loops in the Detroit municipal car yards, in queues, and the loading speed averages one second or more per passenger boarding. It will be noted that this movement of factory employees is in the contrary direction to the normal city rush-hour traffic, morning and evening. This is most fortunate as it results in a large proportion of the railway tripper cars securing full inbound load just prior to a full outbound load from the city. Thus, the development of industrial subcenters is seen to be an extremely valuable aid to efficient traction service.

In addition to street cars there is on Woodward Avenue a loop of jitney service. These jitneys are large eight-passenger automobiles which, during the rush hour, operate on a headway of about one-half that of the street car trains. The fare on these motor cars to downtown Detroit is from two to three times the fare on the trolley cars, and the speed is nearly twice that of the latter. This service was encouraged by the city when the railway was operated by a private company, and the jitneys are now in litigation to retain their licenses in competition with the municipal railway.

The third transportation service is given by private automobiles. On the Ford grounds are special parking places for company employees, and about 2,500 cars park there daily. Some other private parking space is available, and there is some parking on neighboring streets. In a count made on June 28, 1923, between 3:10 p.m. and 4:30 p.m., 1,200 automobiles per hour were found to be moving south on Woodward Avenue past the corner of Manchester Avenue, 915 moving north on Woodward Avenue, 226 moving east and 169 west on Manchester Avenue in addition to 10,920 pedestrians homeward bound through this street, mostly crossing Woodward Avenue.

The greatest congestion occurs at the corner where Manchester Avenue enters but does not cross Woodward Avenue. At this "T" street junction there is a traffic during the rush hour of about 200 street cars, 1,800 motor cars, and from 10,000 to 20,000 pedestrians.



Detail Map of the Congested "T" Junction of Woodward and Manchester Avenues

Recommendations for Immediate Relief

Mr. Bibbins makes a number of suggestions for immediate relief, among them the following:

1. Abolish left-hand turns at the main "T" crossing.
2. Parking yards to be made one way, with exit off the main highway.
3. The motor bus and jitney loading station to be moved away from the main street car loading station.
4. Carhouse switching to be done off the main highway tracks.
5. Electric switches or switchmen at all heavy main-line branchoffs.
6. No parking opposite car loading or air service station. The compressed-air tank system is still used in Detroit.
7. Reserve a 25-ft. far-side stop for motors at all near-side car line stops to clear the roadway.
8. Co-operation with business firms and industries to reroute traffic around the congestion instead of through it.
9. Roadway widening where conditions demand, so as to provide at least one clear free line of traffic.
10. The opening of secondary relief streets, with grade separation over the steam railroad shop tracks in the rear of the Ford plant.
11. Good paving, especially on the relief streets; one of the best forms of traffic control.
12. Front-end car loading and modification of rear platform railings to permit the full use of the platform area at heavy loading points.
13. Limited parking time on heavy traffic streets and more effective police inspection—the duty of all police, not alone traffic officers.

Recommendations for Future Development

These include:

1. Covered prepayment loading terminals alongside the factory exit gates, with selective berthing for different routes.

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2. Underground passageway under Woodward Avenue to the loading terminals from the approximate center of gravity of the factory workers.

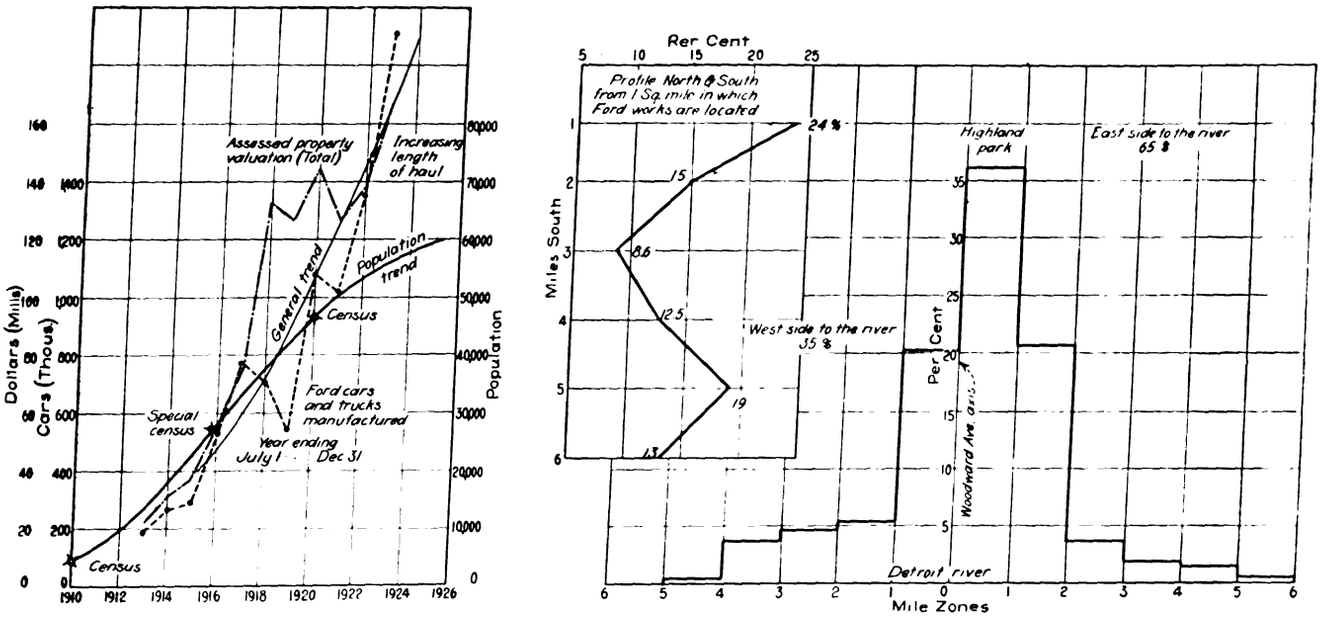
3. Terminal building opposite the factory with passenger loading terminal in the rear, also an interurban terminal accommodating passengers and freight, and a motor bus terminal to prevent the present overlapping traffic through the congested center.

4. Certain steam railroad grade separations to secure relief of main arteries.

5. Day-storage for business automobiles.

6. Closer co-operation in city and district planning to secure most efficient city development and avoid wasteful expenditures and duplications of facilities.

Mr. Bibbins points out that detour streets and prepayment loading stations stand out as the most important need. He also believes that there is opportunity for valuable concession terminal property which will be self-supporting commercially, will properly develop the valuable car-yard frontage on Woodward Avenue and will bring to one point, off the main highway, all facilities for transit, interurban and motor bus. Eventually such a terminal would be in a position to connect most efficiently with rapid transit, both local and through, and also with interurban routes.



Left—Chart Showing Growth of Industry, Property Valuation and Population of Highland Park, Detroit. Right—Distribution of Street Railway Traffic, Originating in Highland Park, Based on Figures from the 1913 Parsons Report

More Rapid Car Loading Possible

In developing these suggestions Mr. Bibbins makes some interesting observations on car and bus operations. Commenting on the speed of loading the street cars, he says, in part:

No adequate facilities are available for speed and facility in loading and unloading the heavy traffic in the vicinity of the Ford Motor Works. Typical observations show that the average cars, even when coming into the terminal empty, do not load passengers faster than about one second per passenger, which seems to be the average rate at which fare-box collection can be maintained. When the platforms are full and aisles filling up, about one and one-half or two seconds per passenger are required. This is altogether too slow for such important traffic loading points and results from a combination of circumstances such as: No prepayment of fare, no front door loading by special collectors, fixed handrail obstruction on rear platform, one-half of rear door kept closed, no raised platforms to eliminate one step, no special car berths for certain routes, no signing for these special berths, interference of car movements of various routes.

Of course, the absence of prepayment inclosures is the greatest source of slow loading in this district They should cut the loading time in one-half if not one-third and thus make it possible to increase the number of cars on the trunk lines, provided the police signal control at the key crossings is adjusted to conform reasonably thereto.

There is no reason at the present time why street collectors could not be used with great advantage in order to enable cars to load at both ends, especially at the heavy Woodward Avenue loading points and in Manchester Avenue. This would probably increase the speed of loading 20 per cent if not more. The difficulty often cited as an objection to the plan, of accurate accounting between receipts of various routes, can readily be overcome by determining occasionally a fixed distribution of revenue based on counts taken on typical days. The front-end collectors are also of considerable assistance to the terminal inspectors in clearing the way for the rapid exit of loaded cars.

The fixed hand railings of the rear platform of the Detroit cars were put in to separate passengers boarding and alighting by the rear platform. While this is advantageous in the mid-day operations where the traffic is not heavy, it is a decided disadvantage at points where all the traffic is in one direction, especially loading. The actual standing capacity of the platform is the most important part of the rapid loading feature, as the platform is simply a reservoir designed to accommodate a maximum number of people before they pass the fare box. On modern large cars, as many as twenty-five people can be assembled on the rear platform awaiting fare payment. This means that a carload can be put aboard and the car sent away on its trip at least twelve seconds sooner than if only half the platform were available. The objection that some passengers might sneak by the fare box without paying is believed to be exaggerated, and even at its worst, represents a loss which will be very small compared with the total cost of operating and fixed charges on the total equipment delayed by slow loading.

In many cities, the difficulty is solved by hinging the hand railing at the fare box so that it can be dropped down to make the entire platform available for standees. Both rear platform doors can then be opened for boarding.

Speed of Cars and Jitneys

On this point Mr. Bibbins says that records were made of the speed of the Woodward Avenue cars through the Highland Park district during rush and non-rush hours. It was found that the northbound speed was fairly constant, with an average non-rush hour speed of 9½ m.p.h., sagging only slightly to 9 m.p.h. during

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rush-hour periods between certain points, due no doubt to increased loading. Southbound results were quite different, and the speed was found to drop nearly 50 per cent between 1 p.m. and 4:30 p.m. through the loading territory as far as Gerald Avenue to an average of from 4 m.p.h. to 6 m.p.h. rush. South of Gerald Avenue high speed is maintained of from 15 to 16 m.p.h. On through movement the average southbound speed was from 9 to 10 m.p.h.

Under present conditions of loading, and counting trailers as cars, an average headway of thirty-one seconds was maintained southbound during the maximum hour of from 3:30 to 4:30 p.m., and a minimum headway of twenty seconds from 3:45 to 3:50 p.m. This indicates that a thirty-second headway is about the practical limit under present loading conditions. On the assumption of 100 passengers maximum per car, this would mean a line capacity of 12,000 passengers per hour out of any terminal point with single cars, or 24,000 per hour with two-car trains.

On their trip to Detroit the cars make from five to ten stops per mile, due to the constant interchange of passengers. With stops of thirty seconds, 1,000 ft. apart or 5.3 stops to the mile, approximately seventeen minutes of the run from Detroit to Highland Park is consumed in stops. At 8½ m.p.h. schedule speed, the 6½-mile run should consume about forty-six minutes. This means that more than one-third of the street car schedule time is consumed in stops, or over half of the actual running time.

The "de luxe jitneys" are giving a headway throughout the afternoon nearly equal to the average rush headway of the street cars (including trailers), but they carry only seven pay passengers against ten times or more per street car and twenty or more for a two-car train. General observation indicates that the passenger turnover on these jitney buses is such that they carry about ten passengers per trip, except during the light hours. On one-minute headway there would be during a day of eighteen hours a total carrying capacity in excess of 10,000 passengers, and with rush extras probably 12,000 passengers or more. But this traffic of 12,000 passengers is practically the line capacity per hour of a double-track single-car trolley line operating on a thirty-second headway.

The jitneys, however, make a much faster scheduled speed. This is the principal reason for their existence. On an average one-way trip from Detroit to Highland Park they make from five to seven stops, or about one stop per mile exclusive of traffic stops. If this stop takes only thirty seconds only 3.3 minutes are required for stops out of a run of perhaps twenty minutes.

It is a question what conditions would prevail if this service was rendered by large buses, providing say twenty to forty seats per bus. Such buses would probably have to stop much more frequently to accommodate the larger number of interchanging passengers, like the street cars, which already have limited stops, and as the rate of acceleration, braking and running would probably be less than the jitney bus, the use of the larger bus unit would probably defeat in considerable measure the purposes of the faster service. The only remedy for this condition would be to reduce the number of stops, which again would detract considerably from the facility of the present unlimited stop jitney service. This is clearly an economic question requiring further study.

The importance of police signal control is emphasized. For in effect, the line capacity and headway is limited directly by two main factors: (1) Duration and frequency of signals, and (2) loading speed at terminals or heavy points, other conditions being the same.

A Broad Approach to the Traffic Problem Recommended

In discussing the method of approaching the problem Mr. Bibbins' report lays great stress on the need of securing a proper relation between the several factors involved. In other words, he early reached the conclusion that a solution of the traffic problems of Highland Park should not be attempted without regard to that city's physical, traffic, and community relations to the larger city of Detroit. This means that it is necessary to bear in mind Detroit's future rapid transit program, the municipalization of its surface railways, the railroad development program under way, including the city's grade separation program, and the tremendous development of commercial activity along Woodward Avenue. Fortunately, a broad solution, both for present and future, which will harmonize all of these interests, is practicable.

Another important approach to the problem is to secure the intimate co-operation of various agencies already at work on the problems involved.

These agencies are the municipal governments, the Detroit City Planning Commission, the Detroit Department of Street Railways, the Detroit Rapid Transit Commission, the Grade Separation Commission, the Ford Motor Works and various civic and commercial bodies. That this plan of co-operation has not been fully developed in the past in the formulation of transportation development programs is considered evident by the failure of or opposition to many plans locally developed, good in themselves but not best fitting into the general needs of the entire community.

Mr. Bibbins reports that the problem of the Highland Park District is one of a magnitude and complexity quite equal to that arising in industrial cities of several million inhabitants and with a concentrated traffic movement at one point perhaps exceeding in total that of any other point in the country. It is a good example to the transportation industry of what may happen in the development of sub-centers—so greatly to be desired in spreading our cities—when adequate planning is not made to forestall future demands on the street and rail transport systems. It emphasizes, it is believed, the fact that neglect of the transportation features of city planning will inevitably become a matter of grave concern and cost to the traction and other utility service.

One-Man Car Facts Told in Augusta

A BOOKLET of twenty-four pages has been prepared by the Augusta-Aiken Railway & Electric Corporation addressed to the citizens of Augusta, informing them of the new system of transportation (one-man car) and facts of value regarding it. The booklet contains twelve letters explaining in detail the features of the safety car. Its safety, speed and comfort are made the subject of one letter, destination signs and numbers of another and its symmetry and beauty of a third. Included in the pamphlet is an editorial on the one-man safety car by E. M. Walker of Terre Haute, Ind. The pamphlet will also be found useful for its bits of advice and pertinent facts about the use of "your auto."

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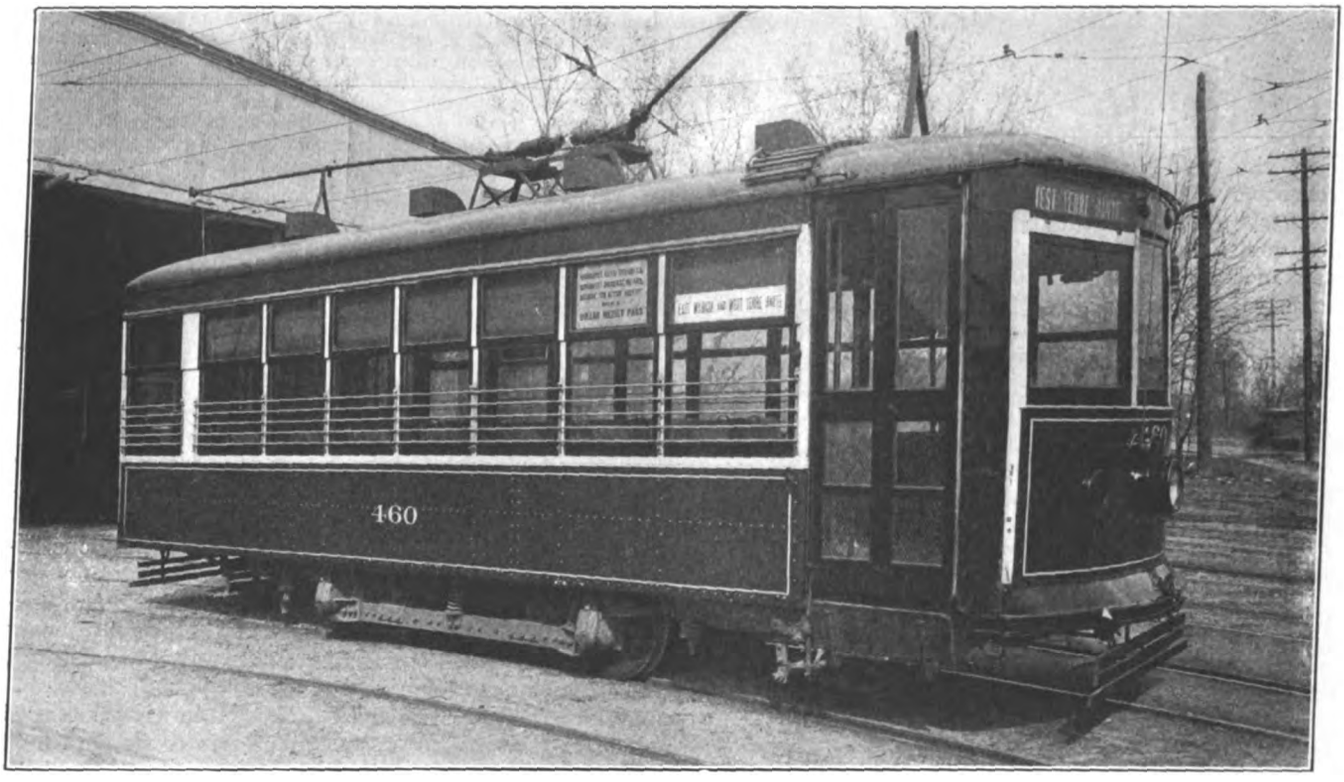
Experience as to Life of Birney Car

Five-Year Record in Terre Haute Shows that the Light-Weight Birney Car Has Given a Good Account of Itself and that It Is Good for at Least Another Five Years of Service

By E. M. Walker
General Manager Terre Haute Traction & Light Company



Appearance of Five-Year-Old, 13,750-Lb. Birney Safety Car After Going Through Forty-nine Accidents and Operating 205,000 Miles

IT IS now nearly seven years since the first Birney safety car was placed in operation and therefore much more is known as to its sturdiness and durability than was surmised at the time of the innovation.

According to the records the honor of placing the first Birney safety car in operation must be given to Everett, Wash., where the first car of this type was placed in regular service on Oct. 23, 1916, and has been running ever since. This was followed after only a few days by another car built at the same time which was placed in operation on the city lines at Seattle. Following these two by only a few weeks several Birney cars built at the same time were placed in operation in Fort Worth, Tex.

The first criticism heard after the innovation was made was directed to the fact that the car was too light in weight and would not stand up under the rigid requirements of average street car service. The standards as to weight have been considerably increased since the building of these first cars, as they weighed in the neighborhood of 10,000 lb. Also, with the increase in weight there has been an increase in the seating capacity and naturally a little increase in the size of the car. As these first cars are still in regular operation it must be assumed that the criticism which was directed against the lightness of the car and which predicted a short life has long since fallen to the ground.

The following notes deal with a car built in 1918 for the city lines in Terre Haute, Ind., and by that time the weight of the standard Birney car had been increased to 13,750 lb. The car was one of a lot of thirty, which was, it is believed, the largest order of Birney cars up to that time for a single city. The car about which the following details are recounted was selected at random. At the time the idea of putting the biography of a car on paper was first conceived this particular car happened to be in the shop for minor repairs. It had but a few months before been repainted and looked as though it was still fresh from the paint shop, although it had been on the street for several months since the painting. Hence it made a good subject for a picture.

Car No. 460, shown in the illustration, was purchased in the summer of 1918 and was, as stated, one of a lot of thirty. It was received in Terre Haute during the latter part of November and was first placed in regular service on Dec. 4, 1918. Briefly, its history since that time has been as follows:

Since Dec. 4, 1918, and up to Aug. 31, 1923, it has run 205,389 miles. During this period, or a total of 1.366 days, the car has been out of service 246 days or 18 per cent. On March 2, 1920, it came out of the paint shop after having been retouched and revarnished with one coat of varnish. It was again put through the

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paint shop in January, 1921, coming out on Jan. 15, after retouching and receiving one coat of varnish. It was again put through the paint shop in October, 1922, when it was completely gone over with one coat of enamel and one coat of varnish. The photograph shown herewith was taken early in April, 1923.

During the period covered the accident record was:

	1919	1920	1921	1922	1923
January	2	0	0	0	1
February	2	0	1	1	0
March	2	0	0	3	4
April	2	1	1	0	1
May	0	2	0	0	0
June	1	2	1	2	1
July	0	1	1	1	0
August	0	0	0	0	0
September	4	2	0	1	.
October	3	0	0	0	..
November	1	1	0	1	..
December	1	1	1	0	..

Of the accidents listed not one was of very serious consequence, but the list shows that all were reported. Analysis of the accidents shows that there were thirty-five collisions with automobiles, two accidents to persons not passengers and twelve collisions with other cars, making a total of forty-nine accidents. The number of accidents with which this car was concerned works out at one accident for each 4,191 miles operated. This is not so good a record as the general average for all the cars on the city system at Terre Haute. In 1921 the car-miles per accident on the city system were 4,748; in 1922 the average of car-miles per accident had increased to 5,546; and in 1923 for the first seven months the average figure has risen to 6,008. The above historical record of the car and the detailed statement of accidents in which it has been involved, taken into consideration with a study of the illustration, will show that the car has given a good account of itself.

Of course, in the case of any piece of rolling stock the first consideration is the economic balance between its cost and length of its useful life and its earning capacity. Reverting again to the often expressed fear that the car when originally built was too light to last long enough to pay for itself, it would seem that a glance at its actual performance would readily dispose of this misgiving.

The car was built, as stated, in the fall of 1918 and cost approximately $5,700. It has earned gross through the forty-five months in which it has been operated approximately $45,000, and its net earnings from operation have been approximately $18,500, this being the amount left after the payment of all operating expenses, including general expenses; and represents what is left with which to pay its own first cost, taxes, interest and so forth. If called upon to give a minimum estimate of the duration of its useful life we should say without hesitation that it is not by any means half gone. Therefore, it was felt that the accompaning facts and figures might be an interesting contribution in justification of the designers and builders and early operators of the light-weight Birney safety car.

Commissioner Asks Public Co-operation in Getting Accident Witnesses

IN A recent handbill, Harry Engle, Street Railway Commissioner of the city of Youngstown, Ohio, draws attention to the fact that under the service-at-cost plan in effect there the public has a direct interest in helping to reduce the large sum which the Youngstown Municipal Railway pays annually for claims. After showing that something between 10 and 12 cents out of every dollar of gross is being paid for damages, he says:

You will readily appreciate what the effect would be on the fare situation if we could in some way cut down on the cost of these claims.

It goes without saying that the company must take the money you pay in fares and from it pay for all damages to person and property which is caused by the negligence of the employees of the company. Furthermore, it will have to pay out further large sums for claims, even when no employee is negligent, unless it has the full facts of the accidents with which to protect the car riders' pocketbooks.

When you see an accident you should give your name and address to the operator or conductor of the car involved. Then the company can readily learn just how the accident happened and who, if anybody, was careless or negligent.

On the other hand, when you see an accident which is the fault of some one other than the operator co-operate by giving your name and address to the street car men and thus enable the company to learn the true facts from you. You then make it possible for the company to defend against a wrongful claim for damages, which, if paid, is paid for with your money.

Voltage Control and Ventilation Features of New San Francisco Converters

THE Market Street Railway of San Francisco has ordered two additional synchronous converters for its substation in the city. One of the new machines will have a 3,000-kw. rating and the other will be rated at 2,000 kw. This material increase of capacity has been necessitated by the general growth of street railway traffic in the congested downtown districts of San Francisco and in the residential section known as the Richmond district. The same departures from previous design which were specified when a new substation was built two years ago will be continued in the new machines. The chief departure was the use of means for voltage control by varying, under any load condition, the number of primary turns in the transformers.

The larger machine will be installed in what is termed "the downtown substation" (described in ELECTRIC RAILWAY JOURNAL for Aug. 20, 1921, page 269). This station was originally equipped with two 2,000-kw. converters; the added machine will therefore bring the rated capacity up to 7,000 kw.

The 3,000-kw. machine will be built for directed ventilation and will therefore avoid the usual difficulty in cooling such machines in substations on closely built-up property. This is said to be the first converter for railway service to be so equipped. The air passages through the machine will be so arranged as to take air into the armature from the room at both the collector and commutator ends and to blow it out radially around the pole structure into air ducts by which it will be carried away. This will avoid any inclosure of parts requiring inspection and attention and will be preferable in this respect to the usual axially directed ventilation.

The 2,000-kw. machine ordered at the same time will be installed in the Eighth Avenue substation to take care of increasing travel in the Richmond district. This will also be equipped with means of voltage control similar to that referred to above, but will not have directed ventilation.

The 3,000-kw. machine is being built by the Westinghouse Electric & Manufacturing Company, which supplied the original equipment in the downtown substation. The other machine is being made by the General Electric Company, which built the existing equipment in the Eighth Avenue station.

The extensions are being carried out under the direction of Ford, Bacon & Davis, Inc., consulting engineers.

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Selling Street Car Rides in Dallas

Co-operation, Better Public Relationship, Together with "Smiling Service," Have Been the Outcome of the Recent Publicity Inaugurated by the Dallas Railway

By Z. E. Black
Manager Publicity Department, Dallas Chamber of Commerce

AT A time when merchandising transportation is a foremost topic with street railway men, the case of Dallas is significant. In this city of 200,000 population a notable program of sales management by the street railway is being carried on. The task of merchandising transportation is being attacked from the same point of view as is used by department store sales managers.

A few years ago the Dallas Railway encountered severe hostility from the public. When the company asked anything from the city opposition invariably resulted. To remedy this condition a careful review of the situation indicated the necessity of an intensive program of selling the company to its employees and to the public. The first step was an analysis of service from the rider's point of view. This study of transportation service revealed many possibilities of improvement, and as rapidly as possible these were put into effect. In most cases the changes were not along the line of expensive additions to service or equipment, but along the line of public relations and methods of handling the public.

As a start it was assumed that the rider paid his fare to be carried from one point to another. Any service in addition to this ride he regarded as "extra service." A school for training platform men was established. In this school trainmen were taught how to give pleasing service. They were impressed with the necessity of having at all times a clean, pleasant personal appearance. This meant clean face and hands, properly cared for teeth, clean shirt and collar and an attractively kept uniform. Men were made to see that a cleanly shaved face was not only more comfortable to themselves but that it made a much better impression on their passengers.

In addition to teaching proper care of the person and the technique of giving service, special emphasis was placed on the finer human relationships that should enter into that service. Trainmen had earned a reputation of being uncivil. They were called "gruff, short-spoken and discourteous." Many of these complaints were justified. It was recognized that a smile is the best vehicle for pleasant personal relations. Cumbersome rules were eliminated and trainmen instructed to treat their passengers as they themselves would like to be treated if their positions were reversed. "Smiling service" became a byword among the employees. No effort was spared to impress them with the worthwhileness of a pleasant disposition. They were taught that a man's disposition is contagious; that the conductor who greets his passengers with a smile, thanks them for their fare and possibly adds a word pleasantly spoken, showing a friendly interest, receives in return the friendly co-operative interest of his passengers. On the other hand the man with a chip on his shoulder soon learns that the street car is the best place in the world to have it knocked off quickly.

Frequent meetings of employees are held in which the officials of the company instruct the men along the lines of selling service. A large portion of the program is usually given over to suggestions from the trainmen themselves about methods that they have found to be satisfactory.

The Dallas Railway Has Found Car Cards Very Effective. These Are Some that Have Been Used

Along with the grading up of service from within, a campaign of publicity was carried on. This consisted of newspaper advertising and cards displayed in the front and rear vestibules of street cars. The car card was found to be the most effective advertising medium. These cards were prepared with great care and passed the scrutiny of a large number of individuals before they were used. A standing offer of $5 for each piece of car card copy accepted from an employee created a great deal of interest in the organization and produced some valuable advertising material. The value of the cards as a public advertisement was at once demonstrated. Another and even more valuable result, which at first had not been considered, was the effect on the trainmen themselves. They formed the habit of watching for these cards. They felt it to be their duty to make the statement of the cards come true in service. A few general principles in the preparation of cards were established. The card used in Dallas Railway cars is 11x14 in. The type used is always arranged for easy reading the whole length of the car. Statements

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are boiled down to the fewest possible simple words. No negative commands are given. Instead of saying "Please keep your shoes off the seat," a card read: "Women appreciate the thoughtfulness of men who keep their shoes off our seats." The point went home. Direct suggestion is always used. Epigrammatic statements that passengers will remember prevail. Human interest is always sought. Frequently the advertising is of such nature as to boost the city without direct reference to the company. This indirect advertising has been especially valuable.

First Campaign of Personal Service

One of the first of the series of advertisements on the cars was written to promote relationships between the trainmen and their passengers. This card contained the photograph of the oldest trainman in order of seniority. It was headed "Personal Service," and read: "Each trainman wishes to give you the kind of service his best friend deserves. He, personally, wants you to be proud of Dallas and its street car service." Under the photograph on this card were the following explanatory words: "Mr. Trotter is the oldest trainman in order of seniority. He has devoted twenty-seven years continuous application in the upbuilding of our personal service." Another card followed this with the heading "Friendly Service": "All trainmen will go out of their way to give real service. They are proud of their work for a greater and better Dallas." These cards attracted much favorable comment, and the one on which the trainman's photograph appeared called forth editorial comment from two newspapers—and also news stories. In this connection newspaper reporters were encouraged to obtain interviews from prominent visitors who complimented the street car service. Carrying out the idea of personal service pleasingly rendered, prepared interviews from visitors are given the newspapers. These are always published.

Along the line of associating street car service with city pride, a series of advertisements, of which the following are examples, appeared in the newspapers and on the cars: "Building Dallas—Our exceptionally good street car service is a strong point in drawing new industries and building a Greater Dallas." This was signed by a prominent business man. This card was followed by: "City growth is but the lengthening shadow of good street car service. Watch new homes spring up along new car lines." This thought was repeated in a card: "Homes spring up wherever street car service goes. Vacant places give way to homes. It is the lifeblood of city growth."

The series of civic advertisements closed with one suggested by the Dallas Chamber of Commerce: "What are you doing to make Dallas forge ahead? Civil pride is the result of each citizen doing individually what he wants done collectively. Are you doing your part?"

When the local real estate board conducted an "Own Your Own Home Week" the company advertised widely the importance of good street car service as an element in home ownership. People were made to realize that their street car service meant much to the city's welfare. "Own your own home. Buy a lot now near the route of one of the new street car lines. Prices will double when service starts. We are building up Dallas."

The publicity manager of the Dallas Railway frequently addresses noon-day luncheon clubs and civic organizations. The company is proud of its organization and service and the speaker unhesitatingly says so. Aggressive publicity policies are pursued and no effort is made to avoid public discussion. In fact, it is encouraged.

Save the Difference

The Dallas Railway originated, and has employed, the slogan, "Ride the Street Car and Save the Difference," for more than two years. This has become a byword in Dallas. It is kept alive by continual repetition in advertising. During the State Fair last year this slogan was painted on twelve of the largest and most prominent illuminated billboards in the city. These billboards were the most desirable to be had, and the billboard service for thirty days cost $1,000. By this means the slogan was hammered home so effectively that it has been kept alive with a very small amount of paid advertising.

Recognizing the direct competition between the privately owned automobiles and street car, the company determined to make its fight solely on the economy effected by its service. A long series of related advertisements followed in which the economy of the street car was played up. Examples of this advertising follow:

"*Ride the Street Car*—Isn't it a pity that old Ben Franklin can't come back to talk plain sense to folks about the relation of thrift to riding street cars? Save the difference."

"*Figure It Yourself*—The cost of one automobile tire will pay for your street car rides all winter. Ride in the street car. Save the difference."

"How many street car rides in a gallon of gasoline? Save the difference."

"*Save the Difference*—Up town and back for a few cents. No worry about costs and repairs."

When the Southwest Automobile Show opened in Dallas liberal display advertising space in the automobile section of the local papers was utilized for aggressive advertising like: "Some depreciation! What can you get for the new car after driving it a few days? Your loss, on the average car, will take you to and from town daily on the street car for more than ten years. Figure it yourself." The effect of this ad was so striking and occasioned so much comment that the Automobile Trades Association seriously considered asking the company to desist playing up so strongly the comparative elements. Several automobile dealers asked the company to have mercy and not discourage car ownership. Connection was made with the local Thrift Week campaign of the Y. M. C. A. and a permanent arrangement made whereby the company would work with them along the lines of thrift advertising. Examples of this follow:

THRIFTGRAMS

"The Dallas Thrift Committee will use this space regularly for valuable thrift messages. 'Thrift broadens your grin.' Let's all smile together."

"Every little bit added to what you have makes just a little bit more. Ride the street car. Save the difference."

"Thrift Leads Surely to Success." "Thrifty people ride the street cars and save the difference."

The legitimate use for the automobile for pleasure purposes is always admitted. The only criticism in the company's publicity was directed against the unwarranted use of the private automobile as a means of going to and from work. The following cards are along this line:

"*Save Your Auto*—Are you grinding the life out of your car by driving it to work? Use your car for pleasure trips and the saving will surprise you. Ride the street car. Save the difference."

"*Save Your Auto*—No blowouts, no punctures, no parking worries, no danger of accidents, no thieves to guard

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against when you ride in the street car. Six cents pays the whole bill."

"Why Not Let the Motorman Be Your Chauffeur?—You can avoid all parking worry, responsibility, expense and petty annoyances that come from driving your car down town."

The advertising and publicity promoting the use of the street car instead of the automobile is believed to have been worth many times its cost. Passenger receipts have increased materially, and on every hand people have the habit of saying, "Ride the street car and save the difference." The cost of this type of publicity is surprisingly small. Dallas has four daily newspapers, in each of which the company contracted for a minimum of 10,000 lines of display advertising space a year. This cost is about $8,000. Car cards are changed once each week in the cars so that each card is displayed two weeks. For 300 cards of simple one color printed matter, without illustration, the cost is $9.25. Where two colors are used, the cost is $11.75. Where illustrations are used, the cost will depend upon the work of the artist and the engraving. These cards range in cost from $25 to $190 for 300 cards. The most expensive card ($190) was a beautiful eight-color job in which children were shown boarding a street car. This card appeared the next day after the Dallas Railway had given free transportation, on Children's Day at the State Fair, to more than 200,000 children, without a single accident of any sort. The card read: "Parents, you may safely intrust your children of school age to the street car."

Editorial Comment by Newspapers

All daily newspapers carried complete stories and editorial comment about the exceptional safety record of the Dallas Railway.

Unfavorable publicity is kept out of the newspapers by giving them accurate reports of happenings. Formerly it was always said that "the street car collided with the automobile, etc." Now the publicity department has an arrangement with all newspapers that they will publish no street railway news without first obtaining verification from the company. Reports of all accidents are immediately given to the newspapers before they ask for it. This co-operation with the newspapers and the willingness to give them facts have come much to promote their friendly attitude toward the company.

The Dallas Railway believes in advertising and spends $15,000 annually for this purpose, exclusive of salaries. C. J. Crampton handles publicity for the company. Mr. Crampton is superintendent of the efficiency department and his duties include interdepartmental relationships, public relations, safety and supervision of employment and training. His work is that of a personal representative of Richard Meriwether, vice-president and general manager. He knows street car operation in a practical way. His work is not primarily publicity, but includes actual supervision of service conditions. Probably one of the most important elements in the success of the public relations program of the Dallas Railway has been that its publicity manager is capable of keeping the service up to the character that is advertised. He has brought about a high degree of co-operation between departments and employees and has sold the company to itself. The platform men, in turn, sold the car service to the public. With characteristic Southwestern egotism the Dallasite tells the world that the street car men in his town are the finest lot he has ever seen. He likes the company and its service. To prove this, when a candidate for Mayor in the last city election made his race almost solely on the issue of reducing street car fares to 5 cents this candidate received 508 votes and his opponents 19,657 votes.

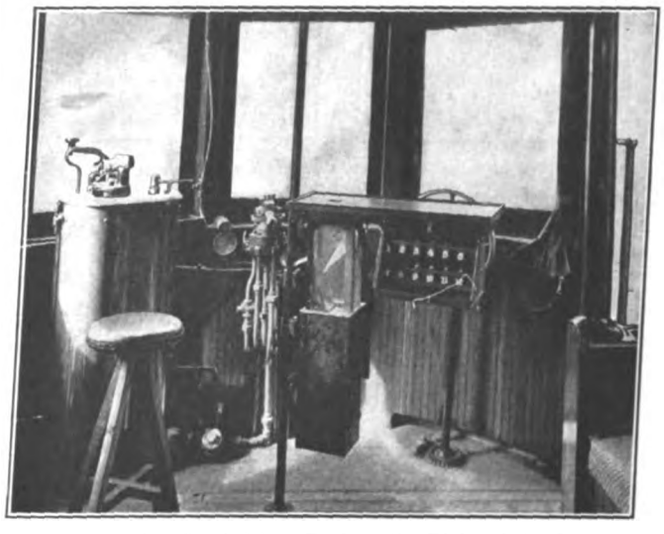
Evidently Dallas likes the street railway company and the service it renders. Pleasant public relations make strong friends and stimulate traffic when the public realizes what "Save the difference" means.

Fare Collection on One-Man Interurban

Hat Checks Used in Conjunction with the Pay-Enter Plan Are Deposited in a Cleveland Fare Box When Passenger Leaves Car

THE method of fare collection on the Saanich interurban line, British Columbia Electric Railway, Victoria, B. C., is interesting because one-man operation has been recently inaugurated. There are thirty-one stations, Victoria to Deep Bay inclusive, divided into eleven zones. Identical fares are charged to and from all stations in any zone.

Hat checks are used which carry on both sides the number of the zone to which the passenger has paid fare. Tickets are sold on the cars only. Passengers board and alight at the front end of the car. On boarding the car, the passenger ascertains from the operator the amount of the fare and places the exact amount in a Cleveland fare box. The operator then gives the passenger a hat check punched with the number of the station where the passenger boarded the car. This check is retained by the passenger until he has arrived at his destination. When leaving the car he exhibits the check to the operator, who can tell at a glance from the large zone number that the passenger is not overriding, and then places the check in the Cleveland fare box.



Zone Checks Are Carried in a Rack at the Right of the Operator

The fare box is attached to a vertical stanchion directly to the right of the operator's seat. Attached to the same stanchion over the top of the fare box and swinging with it is a change counter with a hole above the hopper of the box where the passengers deposit their fares. This board extends toward the right beyond the farebox, as shown in the accompanying illustration. From the underside of this counter

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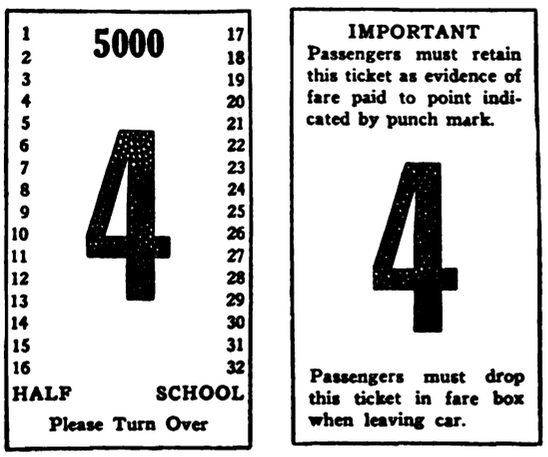
is suspended a rack having twelve compartments to hold the zone checks. The latter are separated into eleven groups for the eleven different zones and are held in the rack in a manner similar to that customary in railroad ticket offices. A cover is provided for the ticket rack, which slides into the space immediately beneath the change counter, and which can be drawn down and locked so that the operator does not need to remove the zone checks each time he leaves the car.

The usual round-trip tickets have been withdrawn, also the ordinary commutation or settlers' tickets. There have been no increases in the ordinary one-way fares except in one or two instances, where an increase of 5 cents has been made.

Taking the place of the commutation tickets and for all who have occasion to make frequent use of the



Collecting Fares on One-Man Interurban

The hat check is deposited in the fare box as the passenger leaves the car. The large number indicates destination. The operator punches a small number to indicate the boarding point.

Saanich interurban, low-rate tickets are sold for $3 in books of eighty, the face value being $4. They can be used at all times, and in payment of any fare. If a passenger wishes to pay a 40-cent fare with these tickets he will deposit eight of them in the fare box.

One-man operation has now been in effect for three months. There has been no difficulty in maintaining the efficiency and frequency of the service. No accidents have occurred and there have been no complaints.

English Railway Electrification Progress

ELECTRICITY will take the place of steam power on several hundred miles of railroad in the south of England and the Midland counties under the schemes being undertaken by the British railways. Two of the routes planned to be electrified, the work to commence immediately, are part of the South Eastern & Chatham system, says Consul-General R. P. Skinner in a report to the Department of Commerce. The lines from Charing Cross to Orpington (14½ miles) and Dartford (17¾ miles), and to Addiscombe and Hayes, are mentioned as the first, and will be followed by a second section comprising lines to Gillingham (36 miles), Tonbridge (30 miles) and Dorking (23 miles). On the London, Brighton & South Coast Railway work is proceeding on the line through Croydon to Coulsdon (14 miles) and Wallington, and is expected to be finished this year. Then will follow the change over from Coulsdon to Brighton, Brighton to Eastbourne (running east) and Worthing (running west).

Cement that Sets in Fifteen Hours

THE circumstances of the military situation during the World War at times required a cement which would set much more quickly than any theretofore used. In order to meet this need the French developed a material that hardened so rapidly that a good concrete platform for a heavy gun could be built in twenty-four hours. Because the utility of a quick-setting cement is perhaps greater to the street railways than to any other industry, this material is of special interest to them. If concrete for track foundation can be poured and the track used within a few hours, it will greatly facilitate the problems of construction and maintenance in city streets where railway traffic cannot be interrupted.

With this thought in mind the Boston Elevated Railway started correspondence about two years ago with the manufacturers of "Ciment Fondu." This is the product developed by the French for military purposes and is now made by the Société Anonymé des Chaux et Ciments de Lafarge du Teil, Marseilles, France. It is a lime aluminate differing from normal Portland cement in the small amount of silica present. Another point of difference is that it is prepared by actual fusion, not by mere clinkering. It is white in color and will harden with remarkable rapidity. The average composition is about as follows: Lime, 50 per cent; alumina, 40 per cent; silica, etc., 10 per cent.

In June, 1922, the railway was able to secure a small sample of this cement, which it then tested in a laboratory in comparison with Edison, Allentown and Atlas cement. These tests were in accordance with the specifications of the American Society for Testing Materials for 1921. More recently, in the spring of 1923, a shipment of five barrels of "Ciment Fondu" was received. A 25-lb. sample was sent to consulting chemists who made laboratory tests for hardening properties, strength, soundness and constancy in volume. Particular attention was paid to early strength. The results of the tensile test are shown in the accompanying table.

It will be observed that at three months the strength

CIMENT FONDU

TENSILE STRENGTH, 1 TO 3 MORTAR, IN POUNDS PER SQ.IN.

	Fifteen Hours	Twenty-Four Hours	Forty-Eight Hours	Four Days	Seven Days	Fourteen Days	Twenty-eight Days	Three Months
	302	360	393	457	472	500	413	469
	280	340	386	445	507	520	455	48
	315	372	375	482	478	490	433	460
Average	299	357	385	461	486	503	434	459

is somewhat better than at twenty-eight days, although it is still not up to the strength shown at earlier periods. According to the chemists' report, however, as long as the strength holds up to that average figure, the cement can be considered as very satisfactory.

The cost of this cement to the Boston Elevated Railway was $4.91 per barrel, to which had to be added the customs duty of 26⅓ cents per barrel and a freight charge of $1.37 per barrel, making a total cost of $6.54. This price, of course, is very much higher than that of domestic cement, which at the present time costs about $2.95 per barrel at Boston.

No practical tests of this cement in actual building construction or track foundation have yet been made. It is planned, however, to try out some of the latest shipment in this way during the coming months. The results of these tests will be told in the ELECTRIC RAILWAY JOURNAL from time to time as they are made.

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Portable Substation with Outdoor Switching Equipment

550-Kw. Rotary Converter Can Be Operated from Either a 13,200-Volt or a 22,000-Volt Three-Phase Line

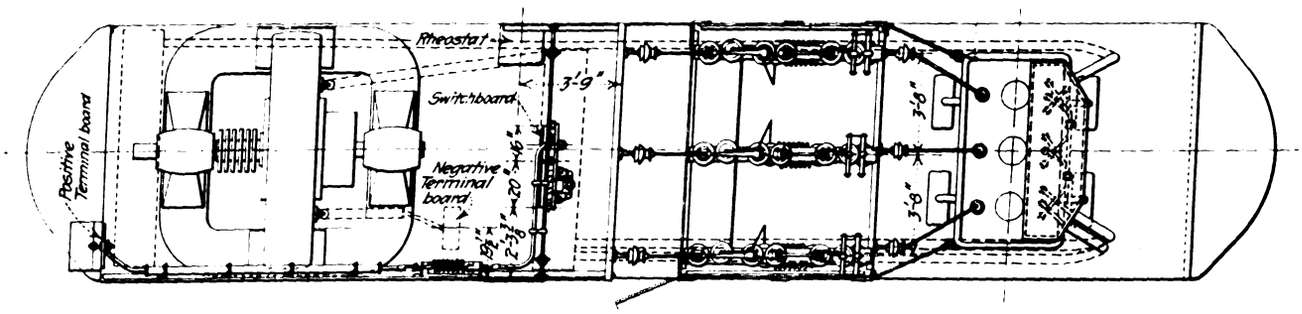
THE Milwaukee Electric Railway & Light Company has recently completed, in its Cold Springs shops, a portable substation of somewhat novel design, for use at various points on its lines where the voltage may be low due to abnormal conditions. The construction differs from that of the ordinary portable substation in that the housing covers only the rotary converter and the d.c. switchboard, the transformer and high-tension switching equipment being of the outdoor type.

The equipment is all mounted on a steel floor, which forms the body of a flat car. The three-phase transformer is arranged for operation on 13,200-volt and 25-cycle alternating current, which is standard for the company's transmission system. In order that the substation may be available for use on the system of the Milwaukee Northern Railway, an associated company, the transformer was designed so that the primary windings could be reconnected for use on its 22,000-volt system as well. The terminals for connection to the high-tension lines are supported on insulators mounted on the end of the converter compartment. From here the current goes through a combination three-pole lightning arrester, choke coil and disconnecting switch, which may be seen in the illustration in the open compartment of the substation. From here it goes to the high-tension terminals of the transformer, which is a 550-kw. Westinghouse three-phase-six-phase unit rated at 22,860/440 volts, 25 cycles. The low-tension leads are brought out from the transformer through a terminal box, which may be seen at the extreme end of the substation, thence going beneath the floor and to the a.c. terminals of the rotary converter.

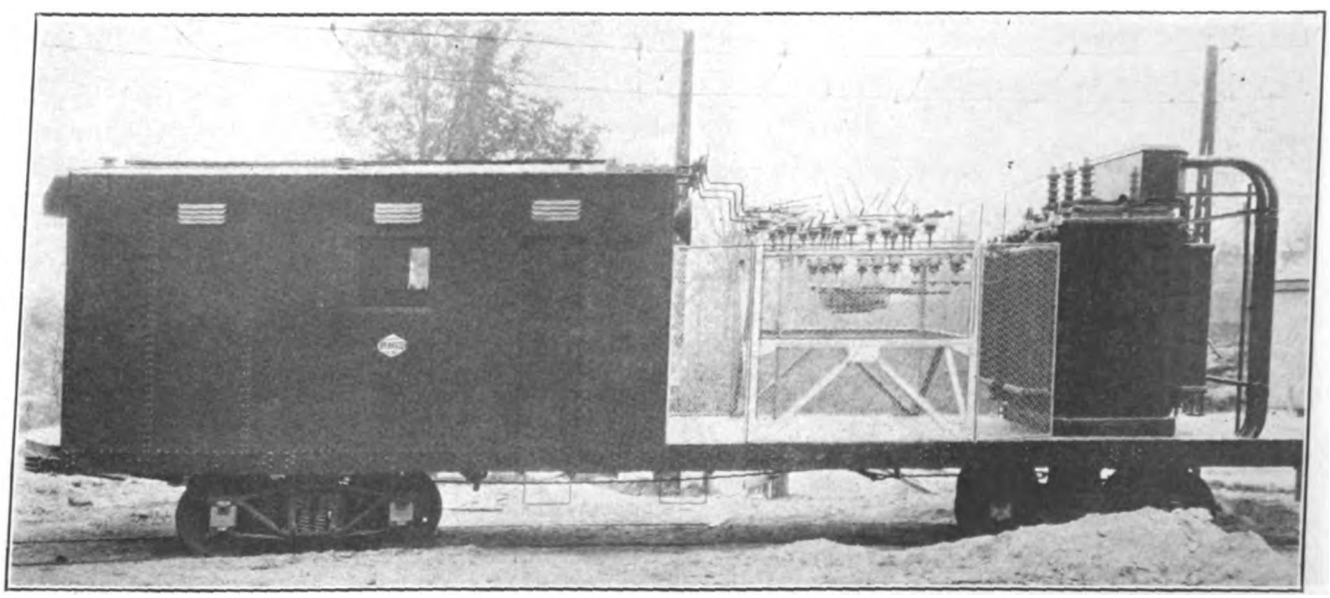
The converter is a 500-kw. six-phase machine which previously had been used in a permanent station. The unit is started at reduced voltage, a three-pole double-throw starting and running switch being provided on the a.c. side.

In order to prevent undue mechanical shock to the instruments on the switchboard, the d.c. control and feeder panel has been mounted on stanchions, which are provided with springs through which they are held to the floor. The d.c. positive lead is carried from the switchboard panel through a choke coil to a terminal board located at the extreme end of the converter compartment. This board is covered with a protection hood that may be seen at the extreme left of the illustration. The negative lead is carried from the converter through the floor to a terminal block located under the body.

The portable substation is being used at present at the terminal of one of the heavy street railway lines. It is expected that in the future the portable substation will be used on interurban lines for taking care of heavy loads due to special attractions which require more than the regular service. It will, of course, be available for such emergencies as may come from the failure of a substation.



Floor Plan of New Milwaukee Portable Substation



Portable Substation with Outdoor Type Switching

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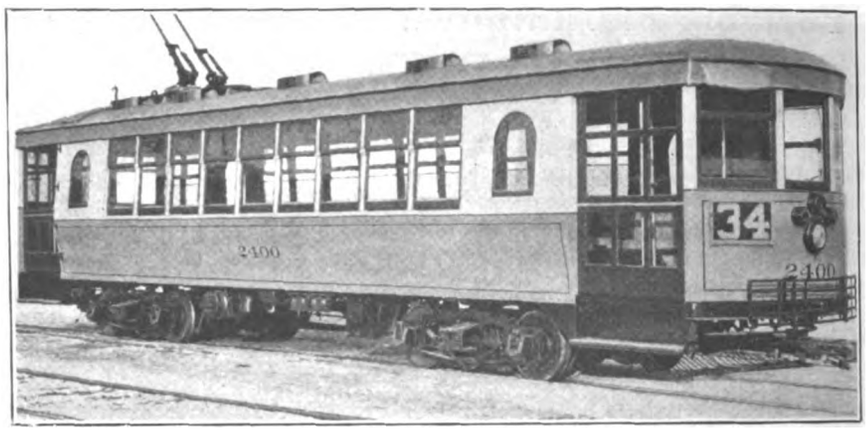
New One-Man, Two-Man, Three-Man Cars

Multiple-Unit Control, Curved Sides, Arched Roof and Low-Level Platforms Are Features of Seventy-five New Single-End, Light-Weight Cars for Cincinnati



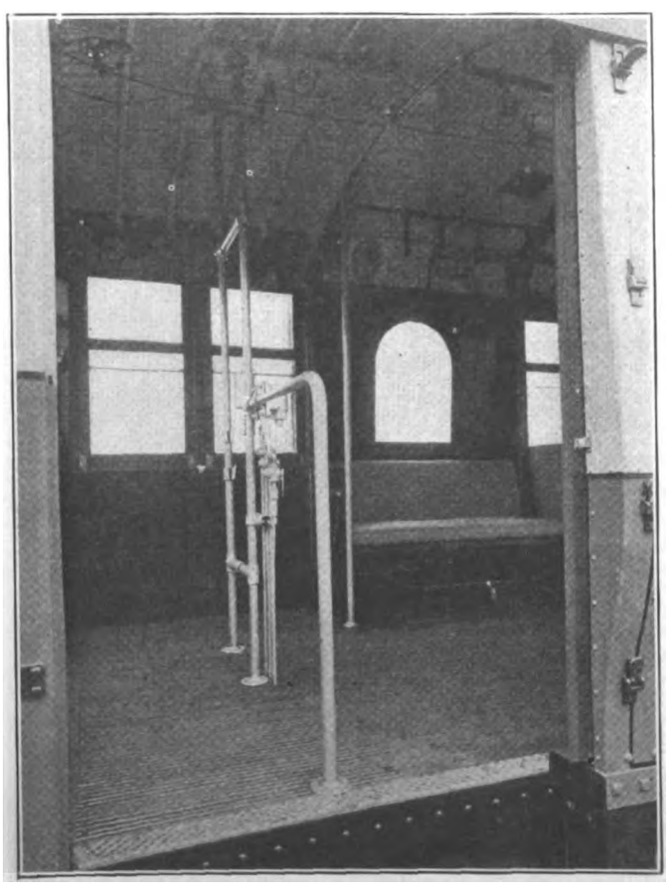
Latest Type One-Man, Two-Man Car Installed in Cincinnati

THREE possible methods of operation were contemplated in the design of the seventy-five new cars recently built by the Cincinnati Car Company for the Cincinnati Traction Company. They are single-end, light-weight cars ordered on July 14, 1922, as previously mentioned in the ELECTRIC RAILWAY JOURNAL, and are now in operation on five routes in Cincinnati, where they have proved to be popular with the public and also with the trainmen.

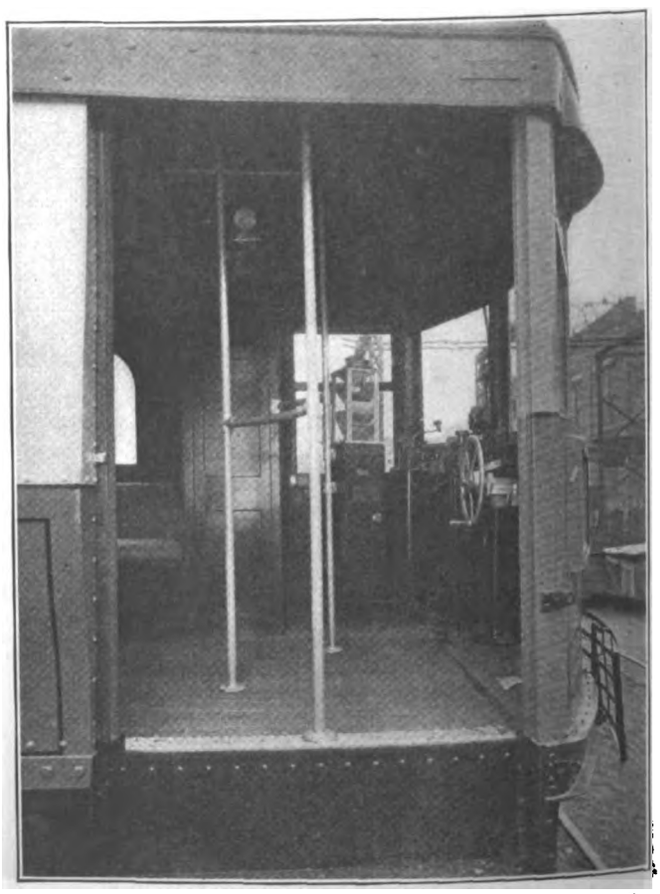
The new car may be operated as a single unit with either one man or two men. As Westinghouse HL multiple-unit control is used, it is also possible to couple two cars together in a train handled by three men. Cincinnati has hills which are both steep and long, but sufficient motor capacity is provided by four Westinghouse 510-A motors of 35 hp. each, so that the cars may be operated singly or in trains on any route in the city. On two routes where the new cars are now in service they are used as one-man cars and on the other three they are operated by two men.

Curved sides give the car an exterior appearance similar to the light-weight cars of the Kentucky Traction & Terminal Company, described in the ELECTRIC RAILWAY JOURNAL for June 3, 1922, and those of the City Railway of Dayton, described Oct. 18, 1922. It is thought that this design has practical advantages as well as merchandising value on account of its distinctive appearance. The greatest width being at the belt rail, there is a maximum space available for cross seats. Likelihood of side swipe is less when cars pass each other on uneven track, because the width is less where the swing is greatest.

Moreover, the shape affords increased lateral stiffness for the same reason that corrugated iron is stiffer than sheet iron. To give maximum rigidity at the corners four small arched windows are used in the side panels instead of the ordinary rectangular windows. This is feasible because these windows are never opened, the entrance and exit doors being of the sliding type



Arrangement of Stanchions and End Seats as Seen Through the 48-In. Opening of the Sliding Door



Exit and Entrance Passageways Are Separate. The Sign Is Illuminated by a Lamp Shining on Its Face

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which, when open, come between the window and the interior of the car.

Side posts are of wood and extend only from the letterboard to the belt rail. They are bolted above to an aluminum bracket casting, and are fastened at their lower ends by bolts through the belt rail, extending through small aluminum castings which fit on top of the belt rail and form seats for the lower ends of the side posts.

Stiffening ribs riveted to the side structure form part of the seat assembly by being attached to the side sheet at an angle corresponding to the slope of the seat back. The outside frame of the seat structure is made of cast aluminum alloy. There are eighteen cross seats and four longitudinal seats, giving a total

The Interior of the Car Has a Pleasing, Roomy Appearance

seating capacity of forty-six. Longitudinal seats on the door side of the car are arranged for two persons each, while those on the opposite side seat three persons each. Seats are of the spring cushion and spring back type, 36 in. wide and rattan covered. The width of the aisle is 23 in.

The body of the car is of semi-steel construction and weighs 16,100 lb. The trucks weigh 8,200 lb. and the equipment 6,000 lb., making a total weight of 30,300 lb.

The arched roof is equipped with Garland ventilators. The headlining is ¼-in. Agasote painted white. Interior woodwork is cherry and trimmings are of polished bronze. The lower side sash are wood and are held in place by cast aluminum pilasters screwed to the outside of the posts. By removing these pilasters the sash may readily be taken out.

The height from the rail to the step is 16 in. and from the step to the platform 14 in., which is lower than on any car previously operated by the Cincinnati Traction Company. There is a 2¼-in. ramp in the car floor, making the inside height in the clear 7 ft. 3 in.

Illumination of the destination sign at night is accomplished by an electric lamp set above the sign and shining on its face, as shown in an accompanying illustration. This is the standard practice in Cincinnati. It has been adopted because the middle front vestibule windows on the older type cars slide to the right, and there is insufficient room to locate an electric lamp behind a transparent sign. The interior of the car is lighted by 23-watt unshaded mill-type electric lamps.

Standard safety car devices are used, and the sliding doors already mentioned are operated by National pneumatic door engines. The door engines, however, do not control the steps, which are of the permanently fixed type. Door openings are 48 in. wide, and step treads are of aluminum.

PRINCIPAL DIMENSIONS OF NEW CINCINNATI CAR

Length over all	42 ft. 8 in.
Width over all	8 ft. 2 in.
Bolster centers, length	21 ft. 0 in.
Height, rail to trolley base	10 ft. 11 1/16 in.
Trucks—Cincinnati passenger type archbar—wheelbase	5 ft. 4 in.
Wheels	26 in. cast iron

Drop-Forged Pull-Overs Used in Detroit

THE Department of Street Railways, Detroit, has adopted drop forgings for such portions of its overhead line material as are subjected to heavy strains and blows. This use of forgings was mentioned briefly in an article in ELECTRIC RAILWAY JOURNAL for May 19, page 846.

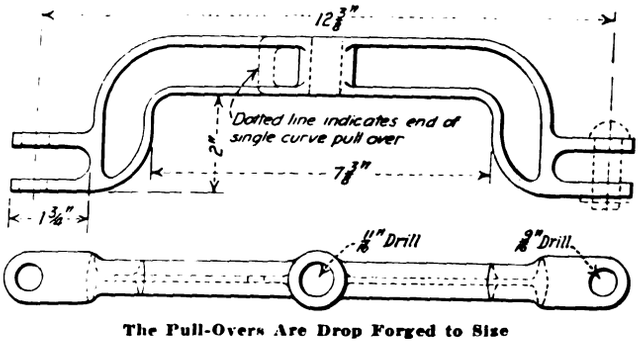
As an example of the type of hardware used, the pull-overs are illustrated. The hangers are made of H cross-section, with area sufficient to stand any ordinary strains encountered in service, the section being fluted so as to give a very light weight. The two forms, one a double-curve pull-over, as illustrated, and the single-curve pull-over, are similar in design, the difference being that the single-curve pull-over is cut off ¾ in. beyond the insulator bolt hole. The only machining required on these hangers is to drill the holes for the insulator bolt and for the pins by means of which the guy wires are attached.

The design of these pull-overs follows specification Df4d of the American Electric Railway Engineering Association. The material used for the pull-overs, the cotter bolts and cotter pins is carbon steel having a composition as follows:

Carbon	0.15-0.25 per cent
Manganese	0.40-0.80 per cent
Phosphorous	0.05 per cent maximum
Sulphur	0.05 per cent maximum

The minimum strength of the material composing these pull-overs is specified as being 60,000 lb. per square inch.

The steel is protected by galvanizing or sherardizing



The Pull-Overs Are Drop Forged to Size

according to the American Railway Engineering Association standard specification Df2b.

Although the Department of Street Railways adopted this type of drop-forged line material on account of its greater strength and freedom from breakage, it has been found that a considerable saving can be made in the cost over that from the ordinary malleable-iron castings, provided the parts are purchased in large quantities, sufficient to justify the expense of making dies.

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Association News & Discussions

Operating Men of Iowa Meet at Davenport

Motor and Gear Development, Maintenance Methods and Operating Problems Among Topics Discussed—Tests of Rail Joints Described

THE Iowa Electric Railway Association's summer meeting was held at Davenport, Sept. 6 and 7, where the members were entertained as guests of the Tri-City Railway. Educational trips were provided for the delegates through that company's shops and to points of interest in the immediate vicinity, including the machine shops of the Rock Island arsenal. While the papers presented were on subjects of interest to operating men in all departments of the railway industry, the discussion pertained largely to the mechanical departments. Morning sessions were held both days, with a luncheon on Thursday noon at the plant of Nic Le Grand, Inc., and a banquet the same evening at the Black Hawk Hotel.

Development of Modern Railway Motors

With John Sutherland, Davenport, presiding as chairman, the first morning session was devoted to a paper by W. A. Clough, General Electric Company, Chicago, on "The Development of the Modern Motor," in which he described the changes which have taken place in the design of the railway motor to reduce the weight per horsepower. Refinements in mechanical design and the use of ventilation have made possible a motor of greater efficiency, with less maintenance cost. Mr. Clough presented several large blueprint drawings of motor designs, among them one showing the development of the armature shaft with large fillets and the absence of abrupt changes in diameter. Breakage with the present armature shaft design is appreciably less than with the former heavier construction.

The question of ventilation, according to Mr. Clough, has been the greatest stride in the development of the motor, and today affords the greatest opportunity for research. Summing up the subject, Mr. Clough said: "At the usual average mileage of 30,000 per year, the modern motor costs $15 annually to maintain, whereas the older type motor costs from $90 to $180 to maintain. The savings that have accrued to the railways through the modern motor, both because of less first cost or less maintenance, and because of reduced weight, amount to millions of dollars per year to the railway industry."

In the discussion which followed it was brought out that during the winter months, with heavy snow, ventilation cannot be obtained because it is necessary to seal up the motor shell, especially on interurban properties. That brush wear, particularly side wear, is due to dirt being blown against the brush was the opinion of John Dean, Westinghouse Electric & Manufacturing Company, as this condition is present only in the multiple fan type ventilated motor. Additional spring pressure on the brushes of small-sized motors was recommended by Mr. Dean as a remedy for flash-overs. Where pressures of 5 to 6 lb. now exist these should be increased to 9 or 10 lb.

Omaha Modern Shop Methods Are Described

O. A. Norene, Omaha, presented a paper on modern shop methods as practiced in the shops of the Omaha & Council Bluffs Street Railway. His talk covered the inspection of rolling stock and various shop methods and practices used by his company. As his paper explained a number of very useful shop kinks, they will be presented as short maintenance notes in the Maintenance of Equipment Department of the JOURNAL. His talk was illustrated with photographs of machines used, copies of which were given to the members to take away.

Many questions on shop practice were asked in the discussion which followed, indicating that the paper had made an appeal to the operating men present whose methods differed from those of the Omaha property. Rebushing armature shafts to keep them up to size is the practice of the Tri-City Railway, according to John Sutherland, while the Waterloo, Cedar Falls & Northern Railway, according to W. G. Lamb, turns down the shaft and fits the new bearing to it. H. S. Day, Westinghouse Electric & Manufacturing Company, urged more modern methods in the shops.

Results of recent tests on welded rail joints as conducted at Ames University were reported in a paper by W. L. Wilson, chief engineer Des Moines City Railway, abstracted elsewhere in this issue.

At the banquet R. C. Smith, manager Tri-City Railway of Iowa, announced in his speech that his property would cease operation in ninety days. Paying out more money than it is taking in, the company finds itself badly in debt. The situation as it now stands, according to Mr. Smith, presents no solution, the city having turned down the last plan which might have relieved the condition, namely, rerouting through the business section. An increase in wages was met, which has added to the ever-mounting operating cost, although other things have been held to a minimum. He said that the only thing left now is for the community to realize the company's predicament and come forward to help.

Transportation Problems Discussed

Opportunity was afforded the transportation men present to discuss their problem following the paper, "How to Overcome Transportation Difficulties," in which M. A. Welsh, Waterloo, offered as a solution the proper training of the car operator. The immediate difficulties, according to Mr. Welsh, are those associated with accidents causing personal injury or damage, abuse of equipment, improper methods of fare collection, maintenance of schedules, and courteous treatment of passengers. Mr. Welsh gave some of the difficulties encountered in city councils of the various municipalities through which his property passes, low rates of fare and unrestricted jitney operation being two of the many injustices thrust upon it.

F. V. Skelly, superintendent Tri-City Railway of Illinois, stated that he had received a diminishing number of complaints since the training of car operators had been improved. It is his opinion that train service employees make the most desirable men for driving buses, which his property uses in conjunction with the railway cars. According to Mr. Skelly, many changes have taken place in the transportation department and the future will see many more such changes.

Development of the Modern Railway Gear

A paper prepared by W. H. Phillips, R. D. Nuttall Company, Pittsburgh, was read by Mr. Dean, due to Mr. Phillips' absence on account of sickness. Mr. Phillips' paper is presented in abstract elsewhere in this issue. With manufacturers spending thousands of dollars yearly in the perfection of the gear, their efforts are wasted if master mechanics allow axle bearings and armature bearings to become badly worn, was the statement made by W. G. Brooks, Westinghouse Electric & Manufacturing Company, in discussing Mr. Phillips' paper.

Adjournment followed the election of John Sutherland as chairman for next year's operating men's meeting of the Iowa Electric Railway Association.

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Development of the Modern Gear*

Methods in the Design and Treatment of Gears Within the Past Few Years Have Made Possible a Great Increase in the Duty and the Life to Be Expected from Gearing

By W. H. Phillips
Manager Works and Engineering, R. D. Nuttall Company

FROM the crude cast iron gear of a few years back, which, even with light loads and low speeds, gave only a few thousand miles, we have passed through a period of gradual evolution to the present-day forged steel, accurately cut and scientifically heat-treated gear that frequently is piling up a million or more car-miles.

The seriousness of vibration, whether of great or small amplitude, has always been recognized, and to no small degree vibration may be traced to the gear. The bearings that wear out too quickly, the shafts and pedestals that get out of alignment, the machine parts that become fatigued and fail, the motors that wear out commutators and brushes too quickly and the armature leads that break—all these may be traced, in part at least, to vibration.

Increasing the life of a gear means far more than the saving in initial investment. Tripling the life not only cuts the cost of the gear to one-third but it also does away with two removals of worn-out gears and the installation of two new gears. It eliminates the necessity of having the particular equipment out of service, possibly for hours, with its possible effect upon still other equipment dependent upon it.

The permissible reduction in sizes, due to improved material, heat treatment and greater tooth strength through better design, offers new possibilities in saving material and space. Together with higher efficiency through better tooth forms and greater accuracy in manufacture, this reduces power consumption, which, while small, is continuous.

One of the surest indexes to the efficiency of a gear is the noise it makes. Aside from the losses due to the noisy gear, it does not tend to promote efficient man power.

Long and Short Addendum Gears

Essentially, the long and short addendum gear system, which came into prominence with the advance in automobile design, accomplishes a short pushing of the tooth into mesh and a long pulling of the tooth out of mesh. The driver or pinion has a long addendum, or portion of the surface above the pitch line, and a short dedendum, or portion of the tooth surface below the pitch line.

The pinion when rotating comes into action near the base, and rolls and slides up until it is in line with the gear and pinion centers. Thus far it has touched only on its dedendum. It now starts to mesh above the pitch line and traverses the addendum over a longer surface. A short arc of approach and a long arc of recession make up the angle of action of the tooth. Contrast this action with that of a gear set of the common type where addendum and dedendum are equal. The arcs of approach and recession are equal.

The relative tooth thickness of the pinions at the base or heaviest stressed section with the long and short addendum pinion tooth is 50 per cent stronger than on the standard involute system, due in part to the greater tooth thickness and in part to the shorter cantilever effect. Fig. 1 shows the gear and pinion teeth of each system superimposed.

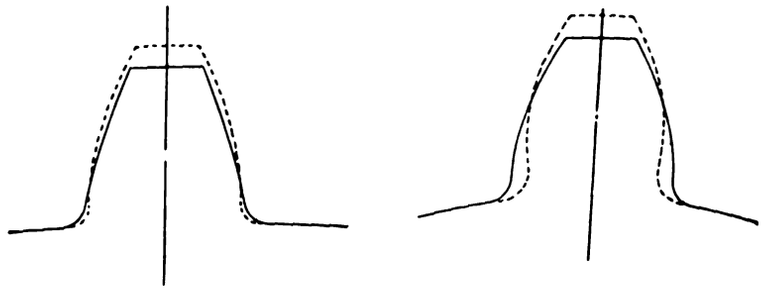

Fig. 1—At the Left Is the Gear Tooth and at the Right the Pinion Tooth
The standard tooth is shown dotted and the stubbed tooth in a solid line

Another distinct advantage derived from this type of tooth is that the relative sliding between contacting tooth surfaces is reduced 50 per cent, as shown in Fig. 2.

The quality of quietness cannot be secured if there is vibration, hence the angle of action of one tooth must be such that it will not leave contact before its following tooth has entered. If it does, action of the gear set will be jerky, causing vibration and noise, together with wear and other undesirable qualities. As involute teeth mesh, the contacting points of their surfaces roll and slide together at such a rate as to produce theoretically uniform rotation of their pitch circles.

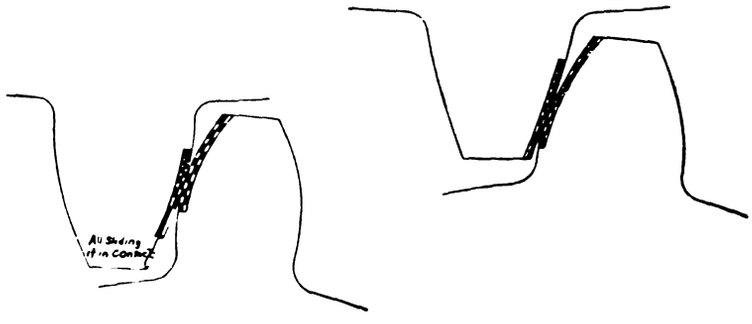

Fig. 2—At Left, Standard Gear Teeth; at Right, Long and Short Addendum Teeth

The more a gear tooth is stubbed the greater will be the percentage of rolling of the contacting surfaces. This is considered desirable for reducing friction, and therefore wear, and consequently promoting smoothness of operation. Angles of action alone, as well as other features, would not permit stubbing teeth excessively to increase the proportion of rolling. Stubbing teeth too greatly would tend to decrease wearing surface.

The standard 14½-deg. involute tooth was among the first in the field. It was, and is, rotary cut and, since the milling cutter must clear itself, the tooth contour was modified decidedly, due to undercut in small numbers of teeth. This modification consists in filling in the flank of the tooth and relieving the tip. A certain amount of relief cannot be said to be objectionable since it eases the teeth in mesh. If involute curves could be generated theoretically perfect, the relief would still be desirable, since teeth under load unavoidably tend to deflect some small amount. This relief, however, should be only sufficient for such functions and not dependent on cutter requirements.

Manner of Placing Teeth on Gear Face

In the last few years engineers have been studying the manner in which the teeth should be placed on the face of a gear. Spur, stepped and herringbone gears are all well known. The latter operate with peculiar smoothness and are stronger than spur gears of the same tooth dimensions. They have disadvantages, in wearing where there is external end thrust, in the gear being unable to slide by the pinion and in extra width of the face, due to the center groove necessary for manufacturing purposes. Also, it is difficult to synchronize the two helixes properly when cutting. Their smoothness of

*Abstract of a paper presented at the Davenport meeting of the Iowa Electric Railway Association, Sept. 7, 1923.

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operation was long supposed to be due to actual tooth overlap and consequent pitch-line lock; that is, there were always teeth in contact at the pitch lines.

Low-angle helical gears were not employed as they necessitated wide faces for tooth overlap, and it was furthermore supposed that the unbalanced end thrust due to the single helix would be excessive. However, experience has shown that a low-angle helical gear, not necessarily having overlapping teeth, gives smoothness and quietness of operation. The first street railway helical gear set has run 500,000 car-miles, is less than one-fourth worn, is still running and has at least doubled the car mileage of the pinion. Just as it is difficult to visualize the advantage of the long and short addendum, so with the helical gear. Apparently the helix permits a minute section of tooth face and a correspondingly minute load to enter engagement, the load picking up as the face in mesh widens out, thus preventing tooth deflection. The end thrust for the usual 7½-deg. helix angle varies from 10 to 13 per cent. Where this is too great, a smaller helix angle is selected. Provision for end thrust usually is found in collars already on shafting or in the resistance of the motor to leaving its magnetic center.

When the helical gear was developed the features of long and short addendum gearing, high-pressure angle and a certain percentage of stubbing were incorporated in the tooth in order to give it the advantage of these desirable qualities.

Strength of Gear Materials

The tooth being loaded as a cantilever beam, the grain structure in the raw material should be radial if possible to give the tooth the benefit of the full strength of the steel. This is being accomplished to some extent in the upset hammer-forged pinion and to a greater degree in the drop forging. The forged and rolled steel gear blank is also produced with this radial grain. When castings are used, especially when they are heat treated, clean steel is necessary, particularly at vital sections.

With heavy masses tied together with thin sections a surprisingly small flaw will cause failure of the piece in heat treatment. Heavy internal stresses at the point where the tooth joins the heavier mass of the body of the gear will seriously impair the strength of the tooth, which is stressed most heavily across this section in performing its work. This condition has eliminated the use of alloy steel in heavy gearing, since it fails through fatigue.

Tests of Welded Rail Joints*

Investigation Made at Iowa State College Indicates that Workmanship of Construction of Joint Is More Important than Type of Welding Employed

By W. L. Wilson
Chief Engineer Des Moines City Railway.

SOME interesting tests of rail joints were made a little over a year ago at the Engineering Experiment Station, Iowa State College. The primary purpose was to determine what kind of an arc-welding machine to buy.

The following tests were made: 1. Solid piece of rail with no joint. 2. Thermit weld. 3. Seam weld, side plate only, Indianapolis arc. 4. Seam weld, side plates only, General Electric arc. 5. Seam weld, side plates only, Rail Welding & Bonding arc. 6. Bolted continuous joint. 7. Seam side weld, side plates and base plate, Indianapolis arc.

In order that there should be no error due to differences in the rail itself all pieces used in these tests were cut from the same rail, the section being 7-in., 80-lb. Tee, H. S. Co. No. 335.

The solid rail was 6 ft. long and each sample joint consisted of two 3-ft. pieces, welded or bolted together. All tests were made on a Riehle 100,000-lb. testing machine. This was the largest machine available at Ames and in order to stress the various sample joints sufficiently to obtain good results it was necessary, on account of the low capacity of the machine, to support the test pieces on 60-in. centers. This was longer than desired, but the results obtained gave good comparative data anyhow. Deflections were read by a Riehle deflectometer, reading to one-thousandth of an inch, and readings were taken at increments of 5,000 to 10,000 lb. loads, applied midway between supports.

The results of the tests have been plotted and are shown in the accompanying chart.

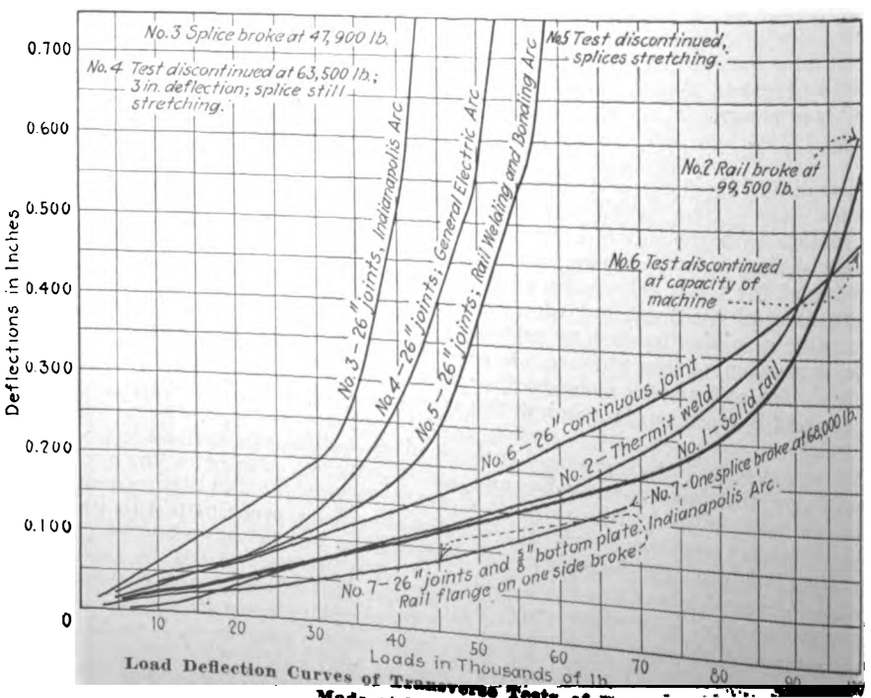
Test No. 6 is an interesting one, being that of a standard 26-in. continuous rail joint held by six 1-in. x 4½-in. heat-treated bolts having Harvey grip threads and Ideal received nuts. This joint has been the standard in use by the Des Moines City Railway for a number of years previous to 1922.

Length of Weld Plates Makes Little Difference

As stated before, the primary object in making these tests was to determine which kind of arc or electrode or which polarity of the electrode was best, but the results, so far as I can see, indicate very little if any difference. Neither does the length of weld plates make much difference, except of course in cases of very short plates. The addition of a base plate, however, does seem very materially to increase the stiffness of a joint.

It has been and still is my opinion that the personal equation or workmanship has a very great deal to do with the life of rail joints. A poorly designed joint, carefully and thoroughly applied, might last much longer than the best type of joint poorly applied. Many plain bolted joints can be found in almost perfect condition after several years of service, while perfectly good continuous joints with heat-treated bolts can be found commencing to fail in a year or less, due simply to lack of care in fitting up, clearing rail ends, tightening bolts or other poor workmanship.

This same line of thought applies not only to the bolted joint but I believe equally well to the seam-welded or any other type of joint. So we must not



Load Deflection Curves of Transverse Tests of Various Rail Joints Made at Iowa State College

*Abstract of a paper presented at the Davenport meeting of the Iowa Electric Railway Association, Sept. 6, 1923.

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sit back and think because we are welding joints today that we are eliminating most if not all of our troubles. The question is, Are we getting good welds? Furthermore, it must not be thought that welding alone will make good track out of track that because of improper design for the traffic it must carry never could be good. In other words, welded joints alone are worthless unless we have the right type of rail, good ties, good ballast, good drainage and, above all, good workmanship in everything.

New Rolling Stock Reduces Maintenance Costs*

THE economies in maintenance of equipment and in upkeep of the right-of-way resulting from the purchase of new rolling stock were the principal points made by R. S. Pilcher, manager of the Edinburgh Corporation Tramways. Mr. Pilcher has had a good opportunity recently of ascertaining the difference in operating cost between old equipment and modern equipment. He has been in charge of the cars operated by the newly electrified Edinburgh Tramways and also those of the Leith Tramways, which recently was amalgamated with Edinburgh. The cars in Leith are a good many years old.

Repair Cost Varies Widely with Different Cars

Mr. Pilcher first pointed out that the working costs of different tramway undertakings, i.e., traffic expenses per car-mile, were all very similar, but car repair costs showed considerable differences. This could in some cases be traced to differences in the type of car operated, variations in road gradients, etc., but after making such allowances there appeared to be too great a difference in the operating costs. In Britain in very few cases has there been a general scrapping of old rolling stock for the purpose of introducing new. From replies to queries which Mr. Pilcher has sent to all the municipal tramway undertakings in the country as to the cost of car repairs, it appeared that the cost varied from 1d. per car-mile to 4.29d. per car-mile. Such a wide range warranted investigation.

In preparing figures for the new Edinburgh cars and the older Leith cars he said that the former had light equipment and had been working for eighteen months. In Edinburgh they had had more experience than had any other system with the light-weight high-speed motor. A general reduction in weight among all parts of the car had been effected, the reduction being from 11 tons 2 cwt. (24,864 lb.) to 9 tons 9 cwt. (21,168 lb.), while the center of gravity had been slightly lowered. By reducing weight much would be accomplished, Mr. Pilcher thought.

The smaller wheels adopted weighed 17 cwt. (two pairs with gears) compared with 22 cwt. Two motors of 50 hp. each weighed 1 to 9 cwt. 2 qrs. (3,304 lb.), against 1 ton 11 cwt. (3,472 lb.) for two of the older motors of 25 hp. each. The new truck and electric equipment complete weighed 3 tons (6,720 lb.) against 4 tons 1 cwt. (9,072 lb.). There were also reductions in car body weights. Yet the new cars seated sixty passengers while the old seated only fifty-four.

New Light-Weight Motors Have Greater Efficiency

The large reduction in dimensions and weight of motors per horsepower was due to the provision of highly efficient fan cooling and the use of very powerful interpoles. These factors allowed of a large increase in output at a much lower temperature rise than had ever been obtained with the older motor design. The average temperature rise of the light-weight motor after sixteen hours running was 87 deg. F., against 121 deg. F. on the older motor. The energy consumption per car-mile with the new motor was 1.18 units against 1.24 units in the case of the old motor. Local conditions varied, but it was quite clear that if new equipment were purchased it was possible to obtain greater speed and smoother running at less cost. The author gave detailed estimates of the various items of cost for running and repairing motors and trucks, and cost of energy per annum. The total for the new type car was £21 8s. 1d., and for the old type £36 19s. 11d. This was on a basis of 44,051 miles per car per annum.

The introduction of new equipment also reduces the maintenance of the permanent way, and new trucks with longer wheelbases lengthen the life of tires by reducing the wear on the wheel flanges. The greatest advantage was obtained by the more rapid acceleration of motors and their extra capacity, as they could be forced on occasions without overheating or injury. In Edinburgh it had been proved in practice that seven new cars do the work of eight old cars, which means a saving in rolling stock of 12½ per cent, and also a saving in drivers' and conductors' wages of £681 per annum for each car saved. The actual saving in motors and trucks plus this saving was equal to £144 1s. 9d. per car per annum, or 0.78d. per car-mile.

On the new light weight cars 25 in. wheels were used and after eighteen months they were found to be wearing very well. They had every appearance of giving as good a life as the larger wheels. The speaker also referred to experiments now being carried out in Edinburgh with rubber packed wheels, but sufficient time had not elapsed to allow of a definite opinion on this subject.

The saving of 0.78d. per car-mile, he pointed out in conclusion, represented about £144 per car per annum. This sum capitalized at 4½ per cent on a twenty-year life represented a capital of £1,515, which was more than sufficient to purchase a new car equipment. In many cases it would be an economical policy, he said, to spend money in order to save money.

*Abstract of a paper presented at annual conference of Municipal Tramway Association, Portsmouth, England, Aug. 22-24, 1923.

American Association News

Preliminary Report on Welded Joint Tests

THE test joints called for in the preliminary series of tests of the committee on welded rail joints of the American Electric Railway Association and the American Bureau of Welding to determine the present state of the art have nearly all been made up and shipped to the Bureau of Standards, the University of Illinois and Purdue University, where they will be given conductivity, tensile, impact and bend tests.

The testing has already been started, and a preliminary report that will show the test results will be available for discussion at the next meeting of the committee. The meeting is scheduled for Wednesday, Oct. 10, at 10 a.m., in the Engineering Meeting Room on Young's Million Dollar Pier, Atlantic City.

It is also planned to have on exhibition in the A. E. R. A. booth some sample joints broken up under the various types of tests. Photographs of other joints tested will also be available.

Educational Luncheon Scheduled

EDWARD DANA, general manager Boston Elevated Railway, who is chairman of the American Association committee on education, has arranged for a luncheon of men interested in employee training, to be given in connection with the convention to be held at Atlantic City.

Invitations have been extended to all members of the committee on education, and to the men who have been appointed by a large number of member companies to look after local educational matters in co-operation with the committee. The luncheon is scheduled for 1 p.m., Thursday, Oct. 11, and it will be held in one of the private dining rooms at the Marlborough-Blenheim Hotel. The luncheon has for its purposes the discussion of plans, methods and a program for next year, and the fostering of friendly relations among the men who by virtue of their appointment are particularly interested in the committee's work. It is expected that officers of the association will be able to attend the luncheon in order to become more conversant with the work of the committee. Chairman Dana desires to learn as soon as practicable the names of the men who expect to attend.

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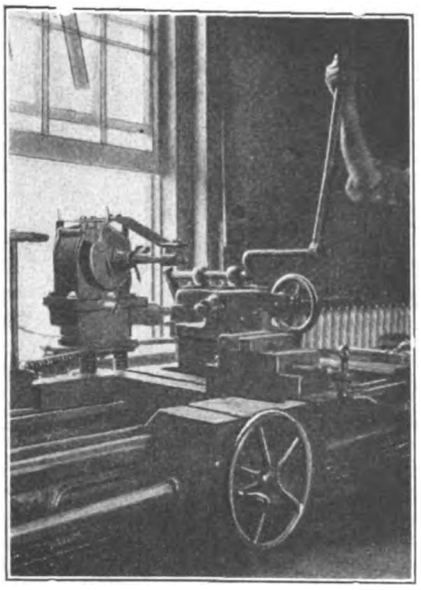
Maintenance of Equipment

Commutator Slotter Operated on Lathe Bed

IN THE armature shop of the Knoxville Power & Light Company the commutator slotter forms an integral part of the lathe which is used in turning commutators and banding



This Commutator Slotter Is Mounted on the Lathe Carriage, but Will Groove a Skewed Commutator

armatures. It is mounted permanently on the back of the lathe carriage and can be brought into action instantly after a commutator has been turned, without any setting up operation to get it ready for use.

The cutting saw is carried on the end of an extension of the shaft of a G. E. 1-hp., three-phase induction motor, the end of the shaft being supported in a bearing carried by a piece of flat steel bolted to the top of the motor frame. The same shaft carries a four-blade fan for blowing away the saw cuttings.

The motor is bolted to the body of a lathe toolpost carriage, the guides of which are set practically parallel to the guide rails on the lathe bed. The toolpost carriage, however, is mounted on a turntable, so that it can be rotated slightly to permit the saw to follow a groove even if the commutator is skewed somewhat. Rotary adjustment is made by means of a set screw opposed by a strong steel spring, visible in the picture.

To provide adjustment of the saw up and down, the whole motor mounting is on a sliding rod and its position is changed by an adjusting screw which can be turned through bevel gears by means of a hand wheel that can be seen to the left of the motor.

For the purpose of feeding the saw through the groove, a simple lever system is provided, so that, by pulling on a handle as indicated, the operator can push the motor toward his left in a direction determined by the toolpost carriage guides. The main handwheel on the lathe carriage is used to bring the saw up to the work, after which the feed is controlled as stated. The feed could not be controlled by the main hand wheel because in that case it would always be exactly in line with the lathe bed.

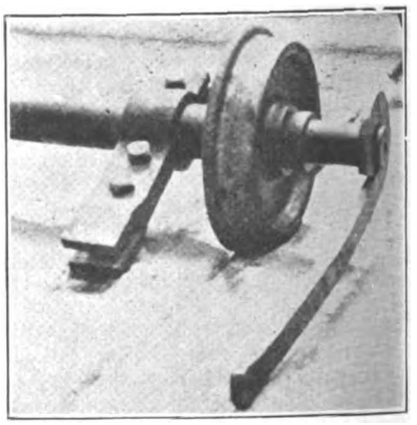
The peculiar crank form given to the rod to which the operating lever is attached is necessary to permit it to clear the tailstock center spindle wheel. At the other end of the rod is the crank by which motion is transferred through a connecting rod to the slide on which the motor is mounted.

C. A. Walker, electrical foreman in the Knoxville shops, who is responsible for the above design, states that the average time to groove a railway motor commutator is about ten minutes. The armature, the commutator of which is being grooved, is turned and set in position by hand.

Simple Dolly for Cars with Broken Axles

BY F. HOLLINGSWORTH
Supervisor Power Saving, San Diego Electric Railway, San Diego, Cal.

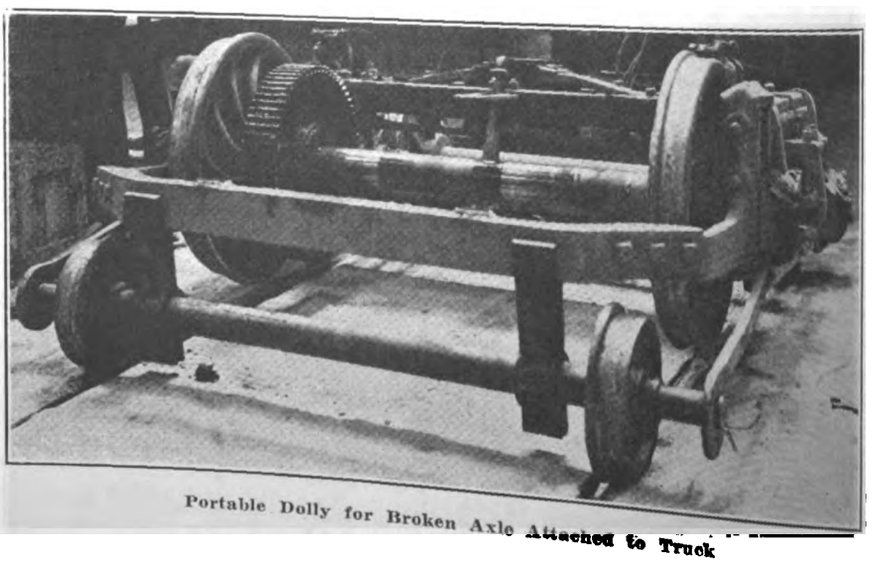
IN ORDER to avoid delay in service from cars with broken axles and to provide for bringing them into the shop promptly, the San Diego Electric Railway has constructed a portable dolly. This consists of a pony axle with two 14-in. cast-iron wheels arranged to support the end of the truck frame through



Construction Details of Portable Dolly

two 1-in. x 4-in. iron clamps. Tie bars made of ½-in. x 2-in. iron form a solid connection to the truck pedestal. The wheels run loose on the axle and are held in place by collars and pins on the outside. The connecting bars fit around the axle in the check plate grooves.

The dolly is quickly installed by raising the end of the truck frame



Portable Dolly for Broken Axle Attached to Truck

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and placing the axle and wheels of the dolly under the bar of the truck end frame. The clamps which fit around the axle are adjustable so as to clamp any width or thickness of truck frame. After these are tightened firmly, the tie bars can be put in place by bolting to the truck pedestal, using the same bolts that hold the pedestal tie bar.

By cutting out the motor on the broken axle, the car can be brought to the shop under its own power with very little delay. The use of this dolly saves the wheels and besides it can be loaded into a small truck and taken to a disabled car very quickly, which avoids the necessity of sending out the wrecking car. This dolly was constructed in the railway company shops of scrap material at small cost.

Making Case-Hardened Pins and Bushings

By O. A. Norene
Assistant Master Mechanic Omaha & Council Bluffs Street Railway

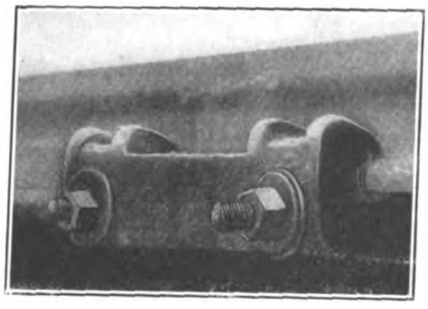
We are using case-hardened seamless steel bushings on brake riggings and door mechanisms on all our cars in Omaha. All bushings are made in our own shop by using a small special fixture in the lathe. This simple fixture can be made at a small expense in any shop equipped with a lathe. One man can cut 1-in. bushings with a ⅛-in wall, chamfered inside and out at one end, at a rate of 100 per hour. The other end is chamfered on a drill press by being held in a pair of tongs.

Brake pins are made in special heading tools, fitted with tool steel dies which can be replaced when worn beyond the limit. With these tools the pins can be made perfectly true, and no other machinery is required except drilling cotter pin holes and chamfering the edges of the holes.

All brake pins and steel bushings, brake adjuster screws, fulcrum and rocker arm pins, etc., are case-hardened in our own furnace. Kerosene is used for fuel. We formerly used crude oil, but it was not satisfactory for regulating the heat of the furnace, as it required too much attention. In our brake-rigging repairs all new and rebuilt brake levers and hangers and brake beams are always drilled by standard steel-bushed templets, that are plainly marked for the type of trucks the parts are to be used on.

Clamp for Emergency Repairs to Third Rail

The third rail of a portion of the New York Municipal Railway is welded together by short pieces of copper cast in place at the joints, the intention being to make an efficient bond at the joints and also to hold the rails together and in line without the use of joint plates. The conductance of the joint is very high, being equal to that of a similar length of unbroken third rail, and the cast type of weld supports the joint in a satisfactory manner.



Clamp for Broken Joint of Third Rail

Some trouble was experienced, however, due to the joint breaking. The bond was too short, and the amount of copper used was too small to withstand the stresses set up by expansion and contraction, and those caused by constant vibration. Repairs to these joints required a considerable length of time and so a temporary connection of the type shown was devised.

This consisted of a clamp as shown in the accompanying illustration. These clamps are made of iron in two portions and are bolted together under the base of the rail. They hold the rail in line satisfactorily, and also carry heavy current without trouble.

New Shop Lighting Plan in Chattanooga

The Chattanooga Railway & Light Company, a subsidiary of the Tennessee Power Company, is improving the lighting of its shops by the following arrangement, which has already proved highly satisfactory to the extent installed: 200-watt nitrogen-filled lamps, in "Ivanhoe" dome reflectors, are placed about 20 ft. apart each way and 16½ ft. above the floor.

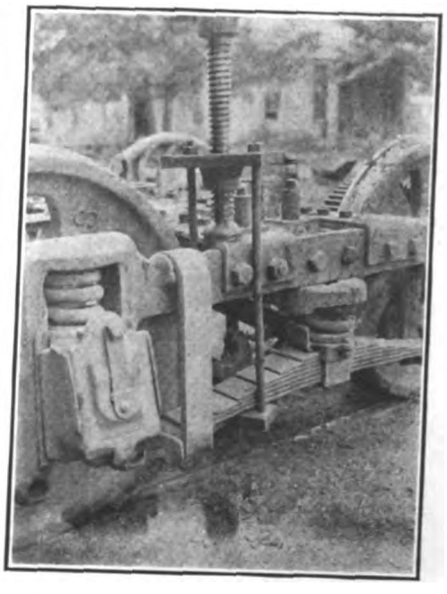
This arrangement not only gives a well-distributed illmination, but locates the lamps well above the cars so that roof repairs can be made without obstruction and with plenty of light.

Removing an Elliptic Spring from a Truck

A device which permits the safe and speedy removal of elliptic springs from a truck is one devised in the shops of the Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va. It is a screw clamp, by means of which one end of the spring can be drawn up toward the truck side frame. The clamp consists of a flat plate through which two bolts pass upward to a crosshead, which is threaded to receive a square-thread screw about 2½ in. in outside diameter. A boss cast under the crosshead provides a sufficient length of thread to resist the thrust when the screw is clamped firmly down against the truck side frame.

Nuts on the upper ends of the bolts resist the upward push of the crosshead when the clamp is in action and are removed when it is to be put into place or taken off the truck.

The upper end of the threaded rod has an enlargement through which a hole is bored large enough to receive a crowbar, permitting any desired force to be applied. On the bottom of the screw is a loose disk to prevent slipping when the force is applied.



It Is Easy to Take Out a Semi-Elliptic Spring with This Device

This simple device eliminates an operation which formerly was slow and unpleasant, involving a certain element of danger.

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New Equipment Available

Electric Fork Lift Truck

THE demand for an electric truck that will enable one man to go into the yard or shop and get a 2,500-lb. piece of equipment has led to a recent addition to the Elwell-Parker Electric Company's line of "Lift and Carry" trucks.

This new truck has provision for carrying the load beyond the front axle. The platform, or forks, which supports the load, is arranged so that

New Electric Fork Lift Truck

its lower side will touch the floor if necessary, or it can be stopped at any height between upper and lower limits. These forks may be so shaped at the outer ends as to be inserted beneath a bundle, box, barrel, casting, or any irregular shaped piece, weighing up to 2,500 lb. The length of the arms or forks depends upon the weight carried, since due consideration must be given to the loading of the front axle. Inasmuch as the load handled balances an equal weight of the truck back of the axle, necessarily the pressure imposed on the wheels is very great. A specially heavy axle, with large roller bearings, carries dual 10-in. x 3-in. tired wheels. These wheels, as well as the rear drive wheels, are steerable.

The raising mechanism consists of a separate motor with worm gear reduction attached to a movable platen, supported on the truck frame by means of three rocking links. This electric lift mechanism is assembled as a unit. The propelling unit in this truck consists of a heavy duty motor and controller direct-connected through a flexible coupling to a worm and wheel bevel pinion differential. Drive shafts with chrome vanadium universal joints and clutch plates bolted to the outside of the wheels complete the full floating drive axle.

Improved Stop-Light Signal

THE Nichols-Lintern Company, Cleveland, Ohio, announces a new electric railway stop-light signal for electric railway service. This new signal is designed to meet the demands for a single light system of signaling for low speed and stops. The lantern is arranged with a bracket, so that it can be set at any desired angle and fit the curvature of the dasher of different type cars. The signals displayed are a red indication whenever power is off and a dark or no light indication whenever power is on. The red indication continues regardless of the position of the brake, until the controller is thrown to an "on" position when it dims very perceptibly, and indicates that the car is starting. When the controller reaches the parallel position, the light goes out.

The signal equipment consists of a switch, two resistance units, and the lantern. One resistance unit, together with the switch and light, is connected between the trolley and

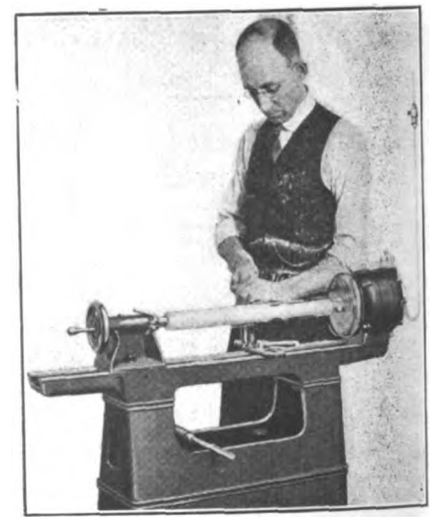
The Bracket Construction Provides for Setting the Lantern at Any Desired Angle

positive side of No. 2 armature on two motor equipments. The remaining signal resistance unit is connected between the negative side of No. 2 armature and ground. The signal lantern is arranged to use a standard 23-watt railway lamp.

Single-Speed Bench Lathe

A SINGLE-SPEED, portable 6-in. bench lathe has recently been placed on the market by J. D. Wallace & Company, Chicago. This machine is a very small electrically driven woodworking lathe designed to do the smaller turning operations which make up a great share of the work in many wood-working shops more quickly and more economically than they can be done on larger machines.

The lathe is intended for work up to 6 in. in diameter. It clears 5 in. over the tool rest and 7 in. on the face plate, with full 24 in. between centers. After extensive experi-



A Small Portable Lathe Which Can Be Adjusted for Any Length Up to 24 In.

mental work the manufacturers have set 3,400 r.p.m. as the best speed for this class of small work.

The machine weighs but 203 lb. and can be moved at will, close to the bench, to get proper light on the work, etc. At the same time it is heavy enough to stand rigidly without vibration. Its height over all is 46 in. and length over all is 40 in. The sub-base is open so that it serves as a convenient holder for tools.

A ⅓-hp. constant-speed General Electric motor is built into the headstock and is entirely inclosed, making it dustproof. It is direct connected to the lathe spindle on ball bearings and it provides ample power for cutting up to the limit of the lathe. It is controlled by a conveniently located switch, and as there are no belts to shift, the safety element is well taken care of.

Standard equipment includes the motor, two tool rests (6 in. and 12 in.), spur center, hand wheel, face plate, 10-ft. lamp cord and plug to attach to electric light socket.

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The News of the Industry

Petition Presented

Virginia Property Seeks Paving Relief in Portsmouth—Operation Is Unprofitable

The Virginia Railway & Power Company, Richmond, has presented a petition to the State Corporation Commission seeking relief from a clause in its Portsmouth franchise requiring the company to pave between its tracks and 2 ft. on each side when the city shall designate. The petition is the outcome of an order by the city of Portsmouth that the company pave a number of streets within a period of ninety days. The order came from J. P. Jervey to Norman Jones, general manager of the Norfolk division, of which Portsmouth is a part. If complied with the order will mean the expenditure of approximately $200,000.

With its request for relief the railway has filed a financial statement for the property in question, showing that the gross earnings of the property from Jan. 1 until July 31, 1923, were $157,091 and the operating expenses $166,292, resulting in a deficit of $9,201, before deduction of $8,235 for taxes and $33,400 for interest, rentals and sinking fund charges. The gross deficit for the period amounted to $50,836. A statement showing that for 1922 gross earnings were only $203,201, while operating expenses were $287,171, and a gross deficit of $155,749 was also filed with the petition.

Alexander Forward, commissioner in charge of transportation regulation in Virginia and under whom the electric railways and bus operations come, stated in commenting on the petition that he believes the document to be unique and nowhere could he find one that has ever been presented to a corporation commission seeking a similar release from franchise requirements.

The petition relates that the company's properties in Portsmouth are unremunerative, that service is maintained at a loss, that it is the amalgamation of several different companies and that some of the lines are constructed so as to be in competition with one another. In part the petition states:

> Your petitioner for many years has tried to make arrangements with the city of Portsmouth with the object of eliminating duplications of service and putting service into operation in territories which are now not adequately served by its lines. These efforts have not been successful, due largely to the fact that the authorities of the city of Portsmouth seek to impose such burdens as that your petitioner is of the belief that successful operation cannot be had at rates which the residents of said territory would be willing to pay.
>
> Your petitioner is now charging and collecting a base fare of 6 cents on its lines in said territory and has authority to charge a base fare of 7 cents. This latter rate has never been placed into effect because the city of Portsmouth licenses jitney buses to traverse territories which your petitioner serves with its street railway system and in some of which your petitioner is required to maintain duplications of service, making in some territories three lines of service, so that your petitioner is greatly hampered in its ability to continue rendering service.

The company holds that the paving required in the principal street on which the company operates is 60 ft. wide and that the center of the street, occupied by the company, does not need paving.

Thomas S. Wheelwright, president of the company, believes that the burden of street paving materially increases the cost of transportation to the rider and in illustrating his point to the writer pointed out the example of the city of Petersburg. He said that Petersburg was the only city in Virginia with a 5-cent fare and with railless cars in operation. Further that it has a 5-cent fare by virtue of the fact that the city does not require the company to pave between its tracks and under its own original (not copied) franchise does not charge the company a gross earnings tax.

Mr. Wheelwright said the entire trouble originated in Richmond many years ago when in the first franchise granted in this country the city required the companies operating the horse cars to pave between their tracks and 2 ft. on each side as the horses used by the cars wore out the street. Other cities followed close on the heels of Richmond, and in writing their first franchises obtained copies of the Richmond document, copying the clause about the pavement until it became universal.

Mr. Wheelwright said the clause objected to was a bad one in any franchise because it was an indefinite obligation and required the company to pave any streets designated by the city. In this way the company cannot know what its obligations are to be during the coming year.

May Abandon Service in Davenport

$1,492,214 Deficit Accumulated in Five and One-Half Years—2,000,000 Fewer Passengers in 1922 in City of 57,000 People than in 1914 with Population of 43,000

AFTER losing money for six years and losing it faster now than at any time since the electric railway transportation situation at Davenport became acute, the Tri-City Railway of Iowa has offered to surrender its franchise and has notified Mayor Mueller that unless some remedial action is taken service must be discontinued.

The city recently turned down the company's offer to reroute its street cars at an expenditure of $400,000. At the time the Council reached its adverse decision the city was told by General Manager R. J. Smith of the traction lines that service would probably be discontinued.

B. J. Denman, president of the company, considers the situation from all angles in a detailed statement, accompanied by financial statements for the past six years, which show that the traction lines in Davenport have been steadily losing money.

A steady decrease in patronage and a rapid increase in the number of automobiles are big factors in the decline of the railway business, it is stated. The heavy charge for paving and taxes are other discouraging factors, Mr. Denman points out.

He suggests that the situation be put before the civic clubs and the city as a whole and that an attempt be made to work out some plan of financial relief. His communication to the Mayor, dated Sept. 4, outlining the situation is as follows:

"It is with deep regret that I am obliged to inform you that the financial situation of the Tri-City Railway is such that unless some plan can be immediately devised to place its operations upon an earning basis it must permanently discontinue its service. The officers of the company have striven with this problem to the very limit of their ability. Notwithstanding their loyal and unceasing efforts, the situation of the company has grown steadily worse. Our own analysis convinces us that the problem can be solved only as a community problem. If a street railway is essential to the welfare of the city, and we believe it is, then its abandonment is a serious community concern and must be so treated. We believe that the united efforts alone of the community will save this railway.

"Though engaged in a public service, it is a business enterprise. Like any other business enterprise, it must pay for everything it receives. It has only one source of revenue. This source of revenue has steadily failed, while its expenses have steadily mounted. No business can permanently withstand such a condition.

"In order that you, and through you the community, may be fully apprised of the seriousness of the situation, we are attaching tables which disclose

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STATEMENT OF TRI-CITY RAILWAY, YEARS 1918 TO 1922, INCLUSIVE, SHOWING ANNUAL DEFICIT OVER RETURN ALLOWED BY CITY APPRAISAL AND AUDIT OF JUNE, 1920

	1918	1919	1920	1921	1922	1st 6 Mos. 1923	Total 5 Yrs. 6 Mos.
Gross earnings	$758,198	$806,268	$959,299	$801,130	$752,415	$388,391	$4,465,702
Operating expenses	737,683	860,227	994,937	845,755	709,131	368,856	2,516,592
Net earnings	$20,514	*$53,959*	*$35,638*	*$44,625*	$43,283	$19,534	*$50,889*
Deduct—Return allowed by city	261,252	260,873	263,372	258,192	265,089	132,544	1,441,324
Deficit	*$240,738*	*$314,832*	*$299,010*	*$302,817*	*$221,805*	*$113,010*	*$1,492,214*
Number of revenue passengers	15,399,603	15,238,451	13,215,382	9,718,203	9,553,579	4,983,970	68,109,188

Note—Italics denote deficit.

vividly the true status of the company. Perhaps I may be pardoned for calling attention to some specific figures. First, it is of interest to know that one of the serious conditions with which the company is confronted is a failure on the part of the public to ride on the cars.

"In the year 1914, when the city had a population of about 43,000, we carried 11,791,000 passengers; in the year 1921, with a population of more than 57,000, we carried only 9,718,000 passengers. In the year 1915 we carried 11,200,000 passengers and in the year 1922 we carried 9,555,000 passengers. From present indications, for the year 1923 we will carry fewer passengers than we did in either of the two preceding years. Here, of course, is a steady and rapid drying up of our source of revenue.

"Thousands of persons have ceased to patronize the street railway and hundreds of these have become in effect active daily competitors of the street railway in that they not only carry themselves to their work in their own automobiles, but also carry as many other persons picked up along the street and at corners as their cars will hold. Thus thousands of the inhabitants of Davenport who were formerly our daily patrons are now our patrons only on the casual occasions when their motors are out of order or weather conditions make it seem undesirable to drive. It is interesting to note that on Sept. 1, 1923, there were 4,000 more automobiles in Davenport and Scott County than there were in 1920.

"The affairs of the company were thoroughly investigated by the Council in 1920, and this was covered in a report submitted in January, 1921. This was not only a complete audit of the books of the company, but included a detailed valuation of the property. The company has not accepted this valuation, considering it entirely too low. Inasmuch as we have no return upon investment whatever, the valuation used is not so important, and in the attached statement we are using the return allowed in the city's audit.

"You will note from this statement that during the five and one-half years covered the losses aggregate the enormous sum of $1,492,214. You will also note that operating expenses were barely met in the years 1918, 1922 and for the first six months of 1923, but that even bare operating expenses were not made by a very large margin during the years 1919, 1920 and 1921, and with the recent wage increase our reports again show the company's failure to make ends meet, to say nothing of any return upon our valuation. In other words, the company is actually paying people to ride on its cars.

"It is the general impression that one-man operation should overcome car difficulties, but it should not be overlooked that trainmen's wages alone are not a controlling element in the cost of operation. Even if this were true, the expense for platform labor with one-man operation at 58½ cents an hour is greater than it was for two-man operation at 28 cents an hour paid in 1913.

"We believe we are operating our system as economically as possible with the present service, as is evident from a comparison of our operating expenses for 1922 (25.2 cents per car-mile, or 29.5 cents including taxes) with the average for 121 urban railways of the country reporting for the year 1922 (32.8 cents per car-mile, or 36.2 cents per car-mile including taxes). Our operating cost is less by 23.1 per cent than the average of street railways of the country, despite the fact that our power consumption is much higher than that of most cities on account of the very numerous and heavy grades.

"A study of the electric railway service furnished will show plainly that there is in Davenport a very large amount of duplicate track. The track in Davenport is far in excess of the city's requirements, as shown by our 1 mile of track to 1,059 persons, compared with Chicago's 1 mile of track to 2,555 persons. Our investment in track, therefore, considered in relation to population, is two and one-half times that of Chicago.

"That our losses, as shown by the statement referred to, cannot continue requires no argument. But, bad as this is, it is not the whole story. With an investment of substantially $4,000,000 in a public service which does not even pay its actual operating expenses, the company, if it remains in business, is confronted with the necessity of spending in the next two years $500,000 of new capital in pavement and replacement of tracks required by new paving. This expenditure will add nothing to the earning ability of the property, and as a business proposition might just as well be written off the company's books the moment it is spent. Were the money placed in a package and dropped into the Mississippi River, its loss could be no more certain or irreparable to the company under present conditions. I think we need not say that this is an impossible business situation.

"The Tri-City Railway is now in default upon its interest payments to the amount of more than $182,000. It has not paid a dividend since the year 1918, though more than one-half of the actual investment is represented by stocks. For the past five years it has been carried solely by its stockholders, who have foregone dividends and paid from their own pockets its bond interest and its actual operating deficits. This they can no longer do, as it is apparent from the constant failure of patronage that no relief is possible without enlightened and prompt public action. A receivership would be of no value for the reason that the company does not earn its operating expenses, and receivers have no funds with which to pay deficits. There is, therefore, no alternative save prompt relief or complete abandonment.

"As a business man, you will not fail to appreciate the reluctance with which we admit our inability to cope with the problems of our own business. Our apology must lie in the fact that under the laws as they now stand, we are not permitted to limit our service to the demand therefor; to fix the charge for that which we sell, or to work out, as other business men may, plans by which our patronage may be increased and our expenses reduced. We must and do submit to public control and regulation, but it is not unfair to suggest that public control places large responsibility upon the public, and when a publicly controlled business has reached the point where it can no longer function, the public must take a hand in its reestablishment. Otherwise the inevitable will occur and the business succumb.

"Another installment of bond interest will soon be in default, and we are, therefore, forced to the conviction that unless some plan for relief can be worked out within a reasonably short time (ninety days, at the most) there is no alternative save to turn the property over to the creditors to obtain what they can from the salvage of the physical properties. In the meantime, it is clear that the company is absolutely unable to proceed with any of improvements now contemplated.

"We, therefore, take the liberty of urging you, as the chief executive and first citizen of Davenport, to lay this matter fully before the city government; the people, and the civic bodies and other organizations interested, to the end that some concerted action may be taken looking to a study of the problem and its possible solution.

"We shall co-operate in every way possible with you and such other persons as may lend their aid. I need not state that our books, records, and all of our operations will be open to any person or persons whom you may wish to have investigate them with a view either of verifying our figures or assisting us in working out a plan under which the street railway may be saved.

"We assure you that our decision to discontinue service has not been reached hastily, but only after full consideration and a complete realization of the sacrifice involved in the abandonment of our investment in this community."

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Court Cases Argued

Decision Reserved on Plea of State for Appointment of Receivers for Public Service Railway

Moves and counter moves of a legal nature have become the order of the day in connection with the cessation of service by the Public Service Railway. Up to the time of the cessation of service by the railway on Aug. 1 the company was operating at an 8-cent cash fare, with four tokens for 30 cents. This rate was established by the court on appeal of the company from the order of the Board of Public Utility Commissioners fixing the cash fare at 7 cents, with one cent for a transfer. At the time, the company was actually seeking a 10-cent cash fare. When the company announced its willingness to operate at a 7-cent fare, providing it were allowed to absorb competing bus lines, the commission filed a motion in the United States District Court asking dismissal of the suit for a fare higher than 7 cents.

Claims Company Wants Public Forced Into Acceptance

The commission charged that the only reason the company is not operating is because it hopes that if it can continue to withhold service, the people will accept terms imposed by the company. The contention of the commission was in short that the railway's plan of settlement involved the placing of the problem of rates upon a new basis and constituted an abandonment of the very remedy the railway sought in its appeal to the Federal Court from the commission's order fixing the fare at 7 cents.

The court denied the board's plea. Judge Rellstab assumed, he said, that if it were not for the strike the company would still be operating. Because the company went into other matters such as jitney competition in suggesting a plan of settlement is no reason, he said, why it should be deprived of the benefits of the testimony taken in the federal rate case.

"If the company were freed of jitney competition," Judge Rellstab said. "there still would remain the questions of rates and values which were bound to come up again."

The court then took up the question of fixing a date for argument on exceptions taken by the Utilities Commission and the Public Service to the report filed by Special Master Haight.

After discussion, Sept. 25, 26 and 27 were set aside for the argument.

The report of Mr. Haight, which in effect justifies the 8-cent fare, is now before Judge Rellstab for approval. Numerous exceptions to the report have been taken in behalf of the Public Utilities Commission and contesting municipalities and by the railway. In general the contention of the commission is that the valuations accepted by Mr. Haight were too high, while the railway company contends they were too low.

On Sept. 12 Frank Bergen, general counsel for the railway, appeared before Chancellor Walker at the State House to show cause why a mandatory injunction should not be issued against the company compelling it to operate its cars, or, in the alternative, why a receiver should not be appointed for the corporation.

He stated that such applications made by Attorney General McCran should not be granted because the strike of the employees was beyond the control of the company, and that actions brought in the Court of Chancery on Sept. 4 by Mr. McCran should first be decided in the Supreme Court.

In its answer the railway declares that it has made and is continuing to make an adjustment with its striking employees, and that every reasonable effort is being made to resume service. Mr. Bergen contended that the strike settlement plan advanced by the railway, in which it offered its employees a 20 per cent increase in wages and proposed a 7-cent fare with 1 cent for a transfer would bring about a resumption of service.

Attorney General McCran, who made the request for the injunction on the alternative receivership, was present at the court hearing on Sept. 12. It was he who at the request of Governor Silzer filed with the court an information in which he set up that the Public Service, a debtor of the several municipalities in which it operates, had failed during August to earn anything toward meeting its debts.

Resumption Object of Court Action

The purpose of the action in Chancery Court was to bring about a speedy resumption of service if that could be accomplished without the necessity of first accepting in full the plan of settlement advanced by the railway. Other legal proceedings have been instituted, but they are of a kind that run on indefinitely. Quo warranto proceedings were started, for instance, and the company must show cause on Sept. 14 in the Supreme Court by what right it occupies the streets with its tracks when it is not giving the service implied under the terms of its franchises.

Many questions of law are involved in the several court proceedings, and little hope is held out for an early decision. It may be that a decision in the so-called Fast Line case, namely, that of the Public Service Railroad, will come early because the law is believed to be more clearly defined than in the case of the Public Service Railway. The decision, when rendered, is appealable to the Court of Errors and Appeals.

Public Service Railway turned over to Director Howe of the Department of Revenue and Finance of Newark on Sept. 10 a check for $290,003 in payment of the special 5 per cent tax on revenue derived from passenger traffic within the city of Newark. This special tax is imposed on the company under an ordinance which dates back to horse car days, permitting the substitution of electricity for horses as a motive power for street cars. Subsequently the State Legislature extended the principle of the Newark idea and imposed a franchise tax of 5 per cent on the company's gross receipts in all municipalities.

The franchise tax, which this year aggregates nearly $1,100,000, although imposed by the state, is payable directly to the communities in which the railway is located and the money is available for local municipal purposes. To this extent the money paid Newark, as well as the other municipalities, is, in effect, a levy upon the street car riders for the purpose of helping to keep down local tax rates.

Since Newark began imposing the special tax in 1894 the car riders have contributed the sum of $4,252,500 toward the defraying of city expenses in Newark alone. The first year the payment was $31,097, and in less than thirty years it has increased nearly tenfold. The check tendered on Sept. 10 exceeded that of ten years ago by more than $120,000 and calls for $90,000 more than was paid five years ago.

Officers' Salaries Increased

Executives of Detroit Municipal Lines Receive Wage Increases Totaling $14,040 a Year

Salary increases for a number of executives and office men employed by the Detroit Department of Street Railways have been announced by the Board of Street Railway Commissioners. They follow closely upon the decision of the arbitration board granting wage increases to the platform employees. It will be recalled that the railway management felt called upon to increase fares on the city lines as a result of the advance to trainmen. The increases granted to thirty-three of the executives and office employees are a part of the added expense to which reference has been made.

The salary boosts granted the employees were reported as ranging from 10 to 25 per cent. The executives affected include the auditor, superintendent of tracks, superintendent of transportation, claims attorney, assistant superintendent of equipment and supervisor of supplies. It is estimated the additional expenses of the department due to the salary increases will be $14,040 a year.

The resolution introduced into the Council by Councilman Kronk, calling on the chairman of the board of arbitration and members of the Board of Street Railway Commissioners to appear before the Council and explain the necessity for a higher rate of fare was shelved temporarily after it had been pointed out that an amendment to the city charter simply requires the Board of Street Railway Commissioners to report its findings to the Council annually and at such other times as the Council may direct. It was contended that the annual report should be all that the Council should ask for unless the report was of an unsatisfactory nature. The annual report is in the hands of the printers.

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On the other hand, it was cited by Councilman Kronk that citizens and taxpayers, through their duly elected representatives in the Council, are assured an insight into the workings of the various departments under a section of the charter which says that one of the powers and duties of the Council shall be to require at any time, by resolution, full and complete information from any officer, board or commission, concerning the conduct of affairs in his or its charge.

The new rate of fare which went into effect following the granting of the wage increase for trainmen is 6 cents for cash fares or nine tickets for 50 cents. The 1-cent charge for transfer still holds as before, making passengers who transfer pay 7 cents to complete their ride.

City Council Orders Plans for Subway System

The City Council of Los Angeles on Sept. 7 adopted a resolution, which was forwarded to the City's Board of Public Utilities and the City Engineer, containing instructions that plans be prepared for a comprehensive subway system for Los Angeles. It is stated that immediately after receipt of the plans by the City Council, steps will be taken for the early construction of the proposed subway system.

It is indefinite whether such a subway system shall be built under bond issue by the city itself or financed by the railway companies. This question is to be decided later.

Director Twining's Remarks Attract Attention

Wide publicity has been given in Philadelphia and in New Jersey to comments on the present transit situation made by William E. Twining, director of the department of city transit in Philadelphia, in a letter to Mayor Moore of that city dated Sept. 4. Mr. Twining's letter to the Mayor accompanied records compiled by his department pertaining to new franchises which have been granted to the Philadelphia Rapid Transit Company during the present city administration.

Mr. Twining pointed out that although the twelve-year period since 1910 shows a slight increase in the operating track of the subsidiaries of the Philadelphia Rapid Transit Company, the records show that since the beginning of the city administration in 1920 there has been an actual decrease of trackage of subsidiaries to the amount of more than 8 miles. He said that this fact, taken in connection with the company's proposal to abandon a large amount of surface track mileage in the business section of the city and to substitute therefor subways and bus lines, may be considered as indicating that the time is not far distant when surface track will be a curiosity and will simply mark one stage in the evolution of city transportation.

Mr. Twining feels that these remarks by him have attracted public attention far beyond their importance. As he sees it surface tracks have reached the point where development of them has stopped. His idea is that the motor bus, partaking of the nature of both the trolley car and the automobile, seems destined to fill a large place in city transportation in the future.

M. O. Advocates Attack Private Operation

At Meeting of Public Ownership League Addresses Favoring Municipal Control of Utilities Were Presented

One hundred delegates from all over the United States attended the convention of the Public Ownership League of America, which was held at Toronto, Sept. 10, 11 and 12, under the presidency of Willis J. Spaulding, Commissioner of Public Works, Springfield, Ill.

President Spaulding asserted that municipalities in the United States are beginning to realize that they will have to act quickly if they are not to find themselves permanently under the control of large private syndicates operating public utilities. It is becoming increasingly difficult, Mr. Spaulding said, for cities to launch their own publicly owned light and power systems.

The secretary of the league, Carl D. Thompson of Chicago, quoted extensively from United States papers and periodicals in an endeavor to show that private enterprise is quickly getting control of the great water-power resources of the States.

Jerome Frank, special corporation counsel of Chicago, stated that Chicago was considering the purchase of its entire street transportation system. The price may be $100,000,000 and a program of improvements and extensions for the next twenty years will be about $400,000,000. The present owners are asking about $240,000,000 for their holdings.

Cornelius Sheehan, commissioner of gas, water and electricity, New York City, in the course of an address on the failure of regulation, severely condemned various financial practices of the private railway interests in New York City and told how the agitation was started to have the city build and operate its own subway system. He said the city was now holding itself in readiness to recover possession of its transit lines, including the subways, in 1925 and 1926 at the expiration of the present franchises.

George Wright of the Toronto Transportation Commission, gave the history of the Toronto street railway system and the improvements made since the city took over the road in September, 1921. In United States cities 42 per cent have fares higher than Toronto. He believed that subways presented a problem in Toronto which would soon have to be faced. Mr. Wright emphasized that the local system was entirely free from political influence, that the citizens were behind the commission, and that the most modern track, rolling stock and carhouses had been built. The system had been declared the finest on the north American continent.

Charles Edward Russell, New York, gave the history of progress of public ownership in Great Britain, predicting that within fifteen years all public utilities there would be municipally owned.

News Notes

Radio Talks Scheduled.—The following McGraw-Hill editors will talk during the month of September from 8:15 to 8:30 from the broadcasting station at Aeolian Hall, New York City: H. C. Parmelee, editor Chemical & Metallurgical Engineering, on Sept. 19 on "The Work of the Chemical Engineer"; E. J. Mehren, editor Engineering News-Record, on Sept. 26 on "What Engineering Is and What It Is Not."

Jitney Violators Fined. — Supreme Court Justice Crasper on Sept. 10 imposed a jail sentence of fifteen days on five jitney operators guilty of operating in the city of Schenectady in the face of the restraining injunction, fined three others in amounts ranging from $50 to $250 and dismissed one case for lack of evidence. Judge Crasper is the fourth Supreme Court Justice in the judicial district to be drawn into the jitney controversy. Judge Crasper signified by his attitude that there would be no further toleration on his part. He said that an order of the Supreme Court must be obeyed or there would be no government. The Schenectady Railway will continue its campaign against jitney operators and violators of the injunction will be brought into court as soon as possible.

D. U. R. Ordered to Tear Up Tracks.—A resolution passed unanimously by the Council of River Rouge directs the Detroit United Railway to tear up its tracks and remove its wires inside the city within ninety days or have it done by the city at the expense of the company. A penalty was fixed at $250 a day for failure to carry out the provisions of the ordinance. This action follows the granting of an injunction to River Rouge by Circuit Judge Theodore J. Richter, enjoining the Detroit United Railway from running cars through the city. The injunction was asked after the company had increased the fare for city rides. Mayor Bresnahan of River Rouge proposes to depend upon bus lines to replace the cars until municipal ownership of the car lines can be effected. The bus fare will continue at the rate of three rides for 10 cents. It is the Mayor's idea to have the company put a price on its lines in River Rouge and if the price is agreeable the city will purchase the lines and lease them to the Detroit Department of Street Railways. This he cites will provide direct through service to the Detroit City Hall.

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Foreign News

German Railways Fail

Unable to Meet a Daily Deficit of 50,000,000,000 Marks, Berlin Railways to Cease Operations

The socialization of the street railway system of Berlin has proved a dismal failure and as a result it was determined to shut down the system on Sept. 7. Before the war the street railway system of Berlin was in private hands, but a year before hostilities began the system was acquired by the municipality. From then on things went from bad to worse. The war began and copper feeders and trolley wires were seized for war purposes. When the war terminated the copper was replaced, but many lines were abandoned and the rolling stock and the track equipment were in great need of repair.

Politics Plays Part

Meanwhile, however, the municipal government fell into the hands of the Socialists, with the result that politics played a most important part in the operation of the street railway system. The working day was reduced to eight hours, the number of departments increased about fivefold and the office force fourfold. Platform men were chosen not because of experience but by political preference. The overmanning of the system, whereby twice as many men were employed as before, was largely attributable to conditions incident to the disbanding of the German army. It was necessary to find work for the officers, and they were given office positions with the municipal railway or acted as inspectors.

The expenses of the street railway system because of this necessarily exceeded peace-time costs, while the income, as measured in marks, remained stationary. The crisis came when the mark began its phenomenal decline. Wages were increased from 40 pfennig (10 cents) an hour to 490,000 marks an hour ($125,000 before the war) but approximately 20 cents at the time, or nearly 25 per cent higher than the dollar-mark rate). Fares were also increased to 100,000 marks, or about a million times the pre-war rate. The increased fare even with the depreciated mark caused the public to boycott the street railways and turn to the elevated roads and subways, with the result that the street railway system began to pile up a deficit of from 50,000,000,000 to 60,000,000,000 marks daily.

The elevated and subways systems of Berlin are operated by a private concern, and it is stipulated that the subway and elevated railway fares must equal the street railway fares. Thus not only were more passengers forced on the elevated and subway lines, but inasmuch as these were always operated at a profit at the regular fare, because the roads were not overmanned and were also kept in better condition, the profits became enormous.

Efforts were made to get the federal transport ministry to advance funds to make up the deficit but without avail, the government itself having very little funds. Arrangements were finally made whereby private individuals, with the assistance of the government, undertook to place the railways on a paying basis. The only possibility of doing this was to curtail the number of employees, and this was best done by discharging the whole force. Two weeks notice was therefore given to every employee that on Sept. 7 his services would no longer be required. The plan was to stop the entire street railway system on that day, possibly for a week or only for a day.

The new company to be formed will then hire men according to their ability, will make a new contract for electricity supply at a better rate than that now obtaining and will discard non-profitable routes and map out new ones. The old cars will have to be used as no funds are available for new ones, but they will be kept in better repair. It is hoped that possibly the same company which operates the elevated and subway lines can be induced to take over the surface lines also.

Throughout Germany, particularly in the smaller cities, street railway service had been abandoned altogether and people have taken to walking again or, when they can afford it, employ bicycles.

Electrification Will Come Up for Discussion

During this month the matter of pushing the electrification program of the Swiss Federal Railroads will come up for discussion. Although it is believed but not proved that electric operation is cheaper in Switzerland than steam, carrying on the electrification program will increase, it is said, the debt charge, which is already a heavy burden.

French After Greek State Railways

It is rumored in Paris that a French company is in pourparlers with the Greek government for the taking over of the state operated Greek railway lines and electrifying them. The Compagnie de Construction des Batignolles has already had a hand in the construction of a considerable kilometrage of line in Greece and is said to be interested in the operation by an all-embracing French company which shall take the lines over from the Greek government authorities, who appear to have made a mess of them.

Halfpenny Fares in Glasgow

The Glasgow Corporation Tramways Committee on Aug. 1 carried a motion by fourteen votes to nine in favor of restoring halfpenny fares for short journeys. The decision now has to come before the Town Council for confirmation or rejection. The halfpenny fare was started when the corporation took over the tramway system from the old tramway company in 1894 and subsequently the distance given for this fare was doubled. In 1920, owing to increased working expenses, the halfpenny fare was abolished, but twelve tickets for the shorter distance could be bought for 9d.

Manchester Prefers Trams

The Town Council of Manchester has rejected by a large majority a motion to the effect that, having regard to the great congestion of traffic in the center of the city, the Tramways Committee should be instructed to discontinue the running of cars in Market Street and to replace them by buses, and to consider the desirability of substituting buses for tramcars in other congested streets.

Reconstruction of London Underground Stations

Further particulars are now available on the rebuilding plans for two important stations of the London Underground electric railways. The growth of traffic at the important center, Piccadilly Circus, has made the construction of a new station imperative. In 1907, which was the first complete year of the station being open for traffic, the number of passengers using it was 1,500,000. In 1922 the number using it was 18,000,000. The new station will be 15 ft. below the street level of the Circus. It will be elliptical in shape, with a large circulating area, from which separate escalators will connect with the Baker Street & Waterloo Railway and the Great Northern & Piccadilly Railway, which cross one another (at different levels) at this point. In all there will be six escalators, a record for any one station, and three will feed each of the two railways. The center escalator in each group will be reversible, so that during the busy hours two in each group can be run in either the upward or downward direction. The new station will embody every form of time-saving device. A broad subway under the Circus, encircling the booking hall, will be a feature. The subway will be available for the general public for crossing the Circus in safety. In this and in other respects the scheme resembles that which has been in successful operation for a number of years at the Bank of England, where three underground railway stations are embraced in the arrangements.

In regard to the reconstruction of Westminster Station, matters are further advanced, and it is hoped that the work will be completed by October.

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Financial and Corporate

Reorganization Before Commission

Trustees Who Purchased the Key Route Properties Under Foreclosure Seek Approval of Financing Plan

Hugh Goodfellow, Warren Olney and W. I. Brobeck, as trustees, and the Key System Transit Company, East Oakland Railway, Oakland & Haywards Railroad and Key System Securities Company have applied to the California Railroad Commission for authority to transfer and acquire the property formerly belonging to the San Francisco-Oakland Terminal Railways and to issue securities in conformity with the plan of reorganization as submitted in detail to the commission. This is one of the final moves in connection with the reorganization, to which reference has been made previously in the ELECTRIC RAILWAY JOURNAL.

The application recites that the trustees on July 17, 1923, purchased at judicial sale under a decree of foreclosure all the properties of the San Francisco-Oakland Terminal Railways, consisting of interurban railway and ferry system, commonly known as the Key Route or the Key System, and the street railway system operated between the cities on the east side of the bay.

OWNERS DEPOSIT BONDS

It is stated that the owners of more than 97 per cent of the face value of all of the outstanding bonds have deposited their bonds under the plan of reorganization submitted to the commission. The property was purchased at foreclosure on a bid of $10,000,000, of which $398,165 was in cash and $9,601,834 by credit, indorsed pro rata upon the bonds so deposited; that the sum of $283,561 was paid as the pro rata share of the bondholders who had not deposited their bonds as aforesaid, and the sum of $114,603 was paid to meet the expenses of the foreclosure proceedings and sale in accordance with the terms of the foreclosure decree.

The total capitalization against the properties prior to foreclosure was $48,879,000, it is stated, represented by eleven bond issues totaling $16,401,000, three issues of equipment bonds and notes totaling $703,000, three classes of stock totaling, in par value, $28,175,000, and notes totaling $3,600,000 issued by two subsidiary companies. Interest unpaid upon bonds deposited in the reorganization plan amounted to $3,226,490 July 1, 1923.

It is proposed to reduce the capitalization against the properties to approximately $28,237,500, divided as follows: First mortgage bonds, $2,500,000; refunding bonds, $9,416,000; preferred stock, $12,829,000; common stock issued pro rata to holders of preferred stock, $3,262,500; common stock issued to holders of dividend note, $250,000.

It is estimated that the yearly bond interest charges under the reorganization plan will not be in excess of $800,000, whereas the net earnings of the properties, after paying taxes, have averaged approximately $1,800,000 a year for the past three years.

Floating indebtedness of the San Francisco-Oakland Terminal Railways as of June 30, 1923, was as follows: Audited vouchers for current accounts payable, $248,265; audited payrolls, $124,648; miscellaneous operating items, $64,196; prior mortgages on real estate, $22,500; notes due banks, $69,500; money due the Realty Syndicate for two pieces of real estate, $119,206. It is proposed to pay this floating indebtedness in full. The reorganization committee states that it refused to recognize the validity of six non-interest bearing notes aggregating $357,924 representing amounts payable on dividends declared by the company but not actually paid.

A settlement upon the claims of said notes has been arranged whereby all the notes, other than the one pledged as security for the so-called Halsey note, are to be surrendered and canceled in consideration of the issuance to the holders thereof of $250,000, par value, of common stock of the new corporation.

It is proposed to organize four corporations in consummating the plan of reorganization as follows: Key System Securities Company, authorized capital stock $2,600,000; East Oakland Railway, authorized capital stock $250,000; Oakland & Haywards Railway, authorized capital stock $250,000, and Key System Transit Company, authorized capital stock $17,750,000.

It is proposed that the Key System Transit Company shall serve as the principal company which shall own directly or indirectly, and shall operate, the properties of the San Francisco-Oakland Terminal Railways purchased at foreclosure sale of aforesaid trustees. This company will own and hold all the stock, except qualifying directors' shares of the three subsidiary companies, and will lease and operate the properties of the two, which are to acquire operating railroad properties, namely, East Oakland Railway and Oakland & Haywards Railway. The trustees will convey to the Key System Transit Company all properties acquired by them at the foreclosure sale, except such properties as are to be transferred to subsidiary companies.

Authorization of the Railroad Commission is asked by the trustees to carry out the terms of the reorganization plan through the transfer of property, the issuance of the proposed authorized capital stock and to issue bonds in the sum of $229,000 in exchange for bonds of Twenty-third Avenue Electric Railway 6 per cent bond issue, the issuance of bonds in the sum of $236,000 in exchange for bonds of Oakland, San Leandro & Haywards Electric Railway first mortgage 6 per cent bond issue, in addition to issues heretofore outlined including first mortgage bonds of $10,000,000 and general refunding bonds of $20,000,000.

Stock Selling Campaign Nets Good Results

Results of a most gratifying nature were obtained in the stock selling campaign among employees of the Illinois Power & Light Corporation which began on Aug. 13 and ended two weeks later. According to figures made public at the close of the campaign by E. Paul Young, head of the investment department of the corporation, more than 2,600 employees bought stock during the two weeks it was offered, bringing the total number of shareholders in the company up to 3,000, out of 5,550 workers employed.

The stock is first preferred 7 per cent cumulative at $95 a share. Much of it was purchased by employees under a specially arranged partial payment plan. Six hundred workers on the interurban division of the Illinois Power & Light Corporation alone bought more than $100,000, par value, of the stock.

Surplus of $23,086 in Barcelona

According to the eighth annual report of the board of directors the Barcelona Traction, Light & Power Company, Ltd., for the year ended Dec. 31, 1922, the company earned a surplus of $23,086. The revenue was $2,575,466 and the expenses, including administration and general reorganization and issue expenses, amounted to $340,241. After interest payments on various bonds a balance of $738,359 remained available for interest on first mortgage bonds. The amount of interest paid on these first mortgage bonds was $715,273, which left a surplus balance of $23,086. This compares with a deficit for the period ended Dec. 31, 1921, amounting to $156,872 and a deficit of $179,390 for the year 1920.

The report states that the operating results of the tramways company showed an increase in gross earnings of 7.69 per cent and in net earnings of 14.10 per cent over those of the previous year.

During the year a bus company secured a concession and began operation, while the tramways company itself is introducing buses on certain routes.

Referring to taxation, the report makes mention of the fact that a very heavy and unexpected impost was made upon the railway companies. Further, that the companies had appealed to the courts and that the case was pending.

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Final Step Taken in Brooklyn Reorganization

Representatives of the Brooklyn Rapid Transit Company, now operating as the Brooklyn-Manhattan Transit Corporation, have asked the Transit Commission for its approval on the five mortgages that cover the property. These mortgages as presented to the Transit Commission mark the final step in the reorganization of the B. R. T.

The mortgages are simply a formal step in the reorganization necessary to protect the interests of certain security holders, and were prepared according to the plan made public on March 15, 1923. The approval by the commission of these mortgages will be followed at once by a notice by the Brooklyn-Manhattan Transit Corporation calling for all claims in the Malbone tunnel disaster, which involve approximately $2,000 000. The majority of these claims have been liquidated, and it is said by representatives of the company that they will be paid in cash when the date has been set for payment. According to the present indications the claims will all be paid off before the end of September.

The second move on the part of the corporation, once the mortgages have been approved, will be to set a day for the exchange of the certificates of deposit, representing securities that have been surrendered to the reorganization committee, for the new stocks and bonds of the Brooklyn-Manhattan Transit Corporation. This is also expected to be accomplished before the end of September.

Approximately 85 per cent of the stock of the Brooklyn Rapid Transit Company has been deposited under the reorganization plan and on the majority of these shares the three installments totaling $35 a share have been paid according to the plan.

Among the projects that the plan, which will be closed by the approval of the commission on Thursday, proposed to accomplish through a reorganization are the following:

The funding into long term 6 per cent bonds of more than $60,000,000 of short term obligations, most of which carry 7 per cent interest.

The payment in part and the adjustment of the balance of the accumulated arrears of interest, amounting to more than $27,000,000, on the bonded debt of the system so as to permit the resumption of payments of current interest.

The payment in cash of the principal amount of the tort claims for personal injuries, as allowed, estimated at approximately $2,200,000.

The adjustment of the claims of the general contractor creditors, as allowed, estimated at approximately $1,600,000.

The payment of receiver's certificates and other claims against the property aggregating more than $12,000,000.

Seattle Shows Profit in July

An audit for the month of July, completed recently, shows that the Seattle Municipal Railway made a profit of approximately $13,000 for the thirty-one days over all expenses, including depreciation, interest and bond redemption. The net income for July was $83,265, or $3,000 more than for the same period in 1922. An allowance of $70.250 for bond redemption is not made in that figure.

Economies in operating expenses were largely responsible for the good showing in July this year. According to Superintendent D. W. Henderson, the cost per car-mile in July, 1922, was 29.47 cents, while in the same month this year it was 28 cents. Gross receipts during July were $543,591, an increase of $4,777 over July, 1922. Operating expenses, including depreciation, but not interest and bond redemption, increased $4,000, due to increase in the number of car-miles operated this year as compared with last year.

The number of passengers carried in July, 1923, increased 8,312 over July of last year. The heavy falling off in car riding, as the result of an increase in fare from 5 cents to 8½ cents, affected the standing of the lines, for although the lines carried 654,490 fewer passengers in July than in May, when the 5-cent fare was in effect, the revenue increased from $373,000 in May to $543,591 in July.

Final Argument in Denver Case Oct. 8

The controversy between the city of Denver and the Denver Tramway over fares has entered upon the final stage. The city and the tramway went into court on March 12, the city seeking to have the 8-cent fare granted by Federal Judge Lewis set aside and either a 6-cent or 5-cent fare instituted. The franchise specifies a 5-cent fare. Both sides closed for the present on Sept. 7, Henry A. Dubbs, special master in chancery, having informed the attorneys to get down to business and the law. The oral arguments were set for the week commencing Oct. 8. The case will then be taken under advisement and a decision probably rendered before the new year.

The financial statement of the tramway for the first seven months of 1923 shows net income of $117,351, which is $144,379 less than the same period for 1922.

Guarantee by Holding Company Saves Investors

An investor in the Jersey Central Traction Company concerned about the recent discontinuance of service and the proposed scrapping of the road recently asked the American Investors' Service what was the best procedure for a bondholder of the line to pursue. The answer of the paper is a striking commentary on the value of a security with a strong guarantee behind it, the guarantee of a holding company controlling widely diversified properties. The answer of the paper to the inquiry was as follows:

The Jersey Central Traction 5s are guaranteed for principal and interest by the American Electric Power Company, successor of the American Railways and the 6s (American Railways-Jersey Central Traction collateral trust 6s, due 1947) are secured by the stock of the Jersey Central Company, and are a direct obligation of the American Railways.

It would seem as long as the American Railways paid interest on these securities that there would not have to be any definite position taken on the bonds, as the assets of the Jersey Central Traction Company are of little value. It could not be said that the company had taken away anything from the security, and in fact the only security the bonds have had is their affiliation with the American Electric Power Company.

We think holders of these bonds should consider themselves very well off to have their interest paid and principal provided for at maturity, as it can readily be seen that if it were an independent property there would be considerable loss, if not a total loss, facing the holders. We are officially informed that the company will make no disposition of the bonds except to let them run to maturity.

CONDENSED STATEMENT OF DENVER TRAMWAY DEC. 24, 1920, TO JULY 31, 1923

	Accumulative Dec. 24, '20, to Dec. 31, '22	January	February	March	April	May	June	July	Accumulative Dec. 24, '20, to July 31, '23
Operating revenue:									
Transportation	$9,515,930	$402,023	$363,014	$407,929	$378,117	$394,318	$381,646	$384,835	$12,227,815
Rental, power, etc.	312,437	12,740	12,319	13,718	16,120	16,092	14,813	15,585	413,825
Total operating revenue	9,838,367	414,763	375,333	421,697	394,237	410,410	396,459	400,421	12,641,640
Operating expenses:									
Way and structures	1,362,033	45,799	48,052	47,670	48,189	47,132	53,047	55,425	1,707,346
Equipment	920,855	37,924	34,869	43,405	34,900	33,051	34,979	28,251	1,169,504
Power	724,400	35,365	29,376	32,286	29,670	29,712	28,262	28,325	937,378
Conducting transportation	2,863,785	118,464	109,747	118,721	112,990	118,253	113,598	117,576	3,673,135
General and misc.	694,463	27,856	36,276	41,303	40,100	47,059	36,517	37,665	961,175
Total operating expense	6,365,437	265,409	259,320	283,384	265,849	275,207	266,443	267,510	8,448,558
Net operating revenue	3,262,930	149,355	116,013	138,263	128,388	135,203	130,016	132,911	4,193,082
Miscellaneous income	23,679	1,095	1,159	1,509	865	820	851	1,062	31,041
Gross income, less operating expense	3,286,609	150,450	117,172	139,772	129,253	136,023	130,867	133,973	4,224,123
Deductions:									
Taxes	757,166	32,117	32,117	32,117	32,117	32,117	32,117	32,117	981,983
Franchise payments	121,210	5,000	5,000	5,000	5,000	5,000	5,000	5,000	156,210
Interest on debts	1,960,204	79,675	79,675	79,675	80,757	80,306	80,126	80,126	2,520,543
Total deductions	2,838,580	116,792	116,792	116,792	112,874	117,423	117,243	117,243	3,658,736
Net income	$448,029	$33,658	$380	$22,980	$11,379	$18,600	$13,624	$16,730	$565,387

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Initial Illinois Power & Light Dividend—I.T.S. Common Pays

The Illinois Power & Light Company, Chicago, declared initial quarterly dividends of 1¾ per cent on the 7 per cent cumulative preferred and 1½ per cent on the 6 per cent cumulative preferred stock, both payable Oct. 1 to stock of record Sept. 15. The company has made application to list its 7 per cent cumulative preferred stock on the Montreal Stock Exchange. There is $20,000,000 of this issue authorized.

At the same time the Illinois Traction Company, now affiliated with the Illinois Power & Light Company, in addition to declaring the regular quarterly dividend of 1½ per cent on the 6 per cent cumulative preferred stock, also declared a dividend of 50 cents a share on the common stock, payable Oct. 15. This is the first dividend on the common stock since 1918.

Commission Fixes Utilities' Valuation

The Missouri State Tax Commission on Aug. 30 recommended that the valuation of all railroads and public utilities in Missouri be assessed for 1923 taxes at $385,632,258, an increase of $2,369,025 over the value finally fixed by the State Board of Equalization last year. Of the St. Louis utilities decreases were ordered in the assessments of the United Railways and the Terminal Railroad Association. For St. Louis alone the United Railways' value was fixed at $44,085,208 compared with $44,267,889 last year. The Terminal's properties were valued at $13,093,698 against $13,763,898 last year.

The total value of all of the properties in Missouri, including railroads, public utilities, land and personal properties, is $4,361,609,835. The $385,632,258 valuation of railroads and other public utilities is made up as follows: Steam roads, $274,506,562; street and electric interurbans, $66,008,581; bridges, $6,969,964; telegraph, $6,423,497, and telephones, $31,743,664.

Right to Issue Ten-Year Bonds Sought.—The Washington Railway & Electric Company, Washington, D. C., has asked the Utilities Commission for authority to issue $2,496,000 of 6 per cent ten-year bonds dated Nov. 5, under a $10,000,000 general mortgage. Part of the issue would be used to retire other bonds of the company.

Auction Sales in New York.—At the public auction rooms in New York on Sept. 12 there were sold $1,000 Augusta-Aiken Railway & Electric Corporation 5 per cent sinking fund bonds, due December, 1935; decrease, 1923, and subsequent coupons attached; also detached coupons due June and December, 1922, and June 1923, for $25 each; $150 Augusta-Aiken Railway & Electric Corporation 5 per cent bond, due June, 1924; $510 lot.

May Abandon Service. — Losing steadily, the car service of Anderson may be abandoned, according to Harry A. Orr, manager of the system. For the first five months of this year the loss has been $7,051. This is not including depreciation, overhead, taxes and bonded interest. The system is operated by the Southern Public Utilities Company, a subsidiary of the Southern Power Company.

Net Operating Income $341,228.—The gross earnings of the Chicago Surface Lines for July were $4,746,503 and the operating expenses were $3,650 024. The net operating income was $341,228. The wages included in the operating expenses are only the wages already paid. Under the award of the board of arbitration, made on July 20, 1923, back pay from June 1 to July 31, 1923, was to be computed and paid in August, 1923.

Extra Common Dividend Declared.—The United Light & Railways Company, Grand Rapids, Mich., has declared an extra dividend of three-quarters of 1 per cent on the common stock in addition to the regular quarterly dividend of 1¼ per cent, both payable Nov. 1 to stock of record Oct. 15. Regular quarterly dividends of 1½ per cent on the first preferred and of 1¾ per cent on the participating preferred were also declared, both payable Oct. 1 to stock of record Sept. 15.

Will Pay Liquid Dividend. — The Union Trust Company of Cleveland is sending out notices to holders of the $800,000 first mortgage 5 per cent bonds of the New York & North Shore Traction Company, issued April 1, 1914, and to holders of certificates of deposit under bondholders' agreement that funds are at hand to pay a liquid dividend at the rate of $50 on each $1,000 face amount of all bonds outstanding under the first mortgage specified above. The bonds must have attached coupons matured April 1, 1919, and thereafter, and must be forwarded to the Union Trust Company at Cleveland.

Another Payment Declared on Income Bonds.—The directors of the Third Avenue Railway, New York, N. Y., have declared the regular semi-annual interest of 2½ per cent on adjacent mortgage income 5 per cent bonds and one-half of 1 per cent on account of accumulated interest, both payable Oct. 1. On April 1, in addition to the regular 2½ per cent then due, one-half of 1 per cent was paid on account of accumulated interest, making total payments 6¾ per cent in the fiscal year ended June 30. Accumulated interest now totals 20¼ per cent. After a lapse of more than four years interest payments on these bonds were resumed April 1, 1922, when 1¼ per cent was paid.

Seeks to Abandon Service. — The Pennsylvania-New Jersey Railway on Sept. 6 asked the Public Service Commission for permission to abandon its service in the territory between Bristol and Doylestown, Pa. J. F. Morris, vice-president of the company, said that the company was now working under a $10,000 deficit and faced a $30,000 payment for paving. Residents of the territory not having automobiles entered a protest against the company's proposal. Mr. Morris said a bus line is to be established between the two points if the electric railway is discontinued. The commission reserved decision. The road is 26 miles long. It was built about thirty years ago at a cost of $250,000.

Will Bring Suit to Recover Taxes.—The Middlesex County Board of Freeholders has instructed Solicitor Richardson to bring suit against the Jersey Central Traction Company to recover $1,080 due the county in franchise taxes. The franchise tax covers a period of six years, at $180 per annum. William Hitchcock, who was general manager of the company, requested the board to accept $650. The traction company ceased to operate some weeks ago. The company has paid no franchise tax to the county for twenty years. A bill was first rendered the company for the twenty years, but it was found the company would escape taxation for fourteen years through the statute of limitations, but that it would have to pay for six years.

Capital Stock Increased.—An increase of $3,000 000 of the capital stock of the Wisconsin Traction, Light, Heat & Power Company, operating street and interurban lines, electric light and power plants and gas plants in Appleton, Neenah, Menasha and many other communities in the Fox River Valley, is announced, the change in the articles of incorporation having already been filed. The original capitalization of the company up to the increase was $1,000,000. A controlling interest in the property was acquired recently by the North American Company, which also controls the Milwaukee Electric Railway & Light Company. John I. Beggs, president of the company, says that funds to be raised by the sale of the additional stock will be used to make needed improvements in and additions to the services which the company is supplying.

Large Operating Revenue.—The report of the Third Avenue Railway, New York, N. Y., for the fiscal year ended June 30, 1923, shows an operating revenue of $14,406,784, against $14,141,412 in 1922. The surplus for the year was $301,275, after allowing for taxes, sinking fund, interest on funded debt, including interest on adjustment mortgage income 5 per cent bonds. This figure is compared with $207,474 for the same period a year ago. The interest revenue derived from cash and investments was $287,348, against $261,537 in 1922. The directors declared a 3 per cent interest payment on adjustment mortgage income 5 per cent bonds, which makes a total payment of 6 per cent out of earnings for the fiscal year ended June 30, 5 per cent regular and 1 per cent on account of accumulated interest. This compares with the payment of 5 per cent from earnings in the preceding year. Interest payments on the bonds were resumed April 1, 1922, after a lapse of more than four years.

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Traffic and Transportation

Beeler Report May Be Modified

An effort will be made in the near future to modify the Beeler report with regard to changes recommended therein in the matter of the rearrangement of the electric railway tracks on the neutral ground in Canal Street, New Orleans. This decision was reached after a conference had with Commissioner Paul H. Maloney of the department of Public Utilities, Commissioner Stanley Ray of the Department of Public Safety, Superintendent Earl of the Sewerage & Water Board, representatives of the Public Service, Inc., and a committee that appeared in behalf of the merchants and property owners of Canal Street.

The Canal Street merchants' delegation expressed itself as dissatisfied with the promised relief of traffic congestion in Canal Street, and insisted upon the adoption of some plan that would improve present conditions. It would take two and a half years under the Beeler plan with ordinary procedure, it was said by the spokesman of the delegation, Leonard B. Kieffer, to solve the problem, by which time, he predicted, improvement in the traffic conditions would be well-nigh impossible.

Commissioner Ray, on behalf of the city, declared that while there were some parts of the Beeler report which he was not quite convinced should be adopted, it was imperative that the widening of the gage of the belt lines that traverse Canal Street should be carried out, and that would take up considerable time, together with the widening of the Canal Street roadway and the narrowing of the neutral ground to a two-track width. These changes, he said, would involve rearrangement of the sewerage and drainage pipe, about which the Sewerage & Water Board would have to be consulted before any permanent work could be done.

It was decided, at the suggestion of Commissioner Maloney, that a joint meeting of all parties interested be held in the near future so that some plan of action could be adopted looking to permanent relief. Superintendent Earl, Commissioners Ray and Maloney and Superintendent Paterson of the Public Service, Inc., were named by the Commission Council to the committee.

Middle-Block Stops to Continue in Salt Lake

As a result of a unanimous vote of the City Commissioners of Salt Lake City cars will continue to make stops in the middle of the blocks. The city was requested by the Public Utilities Commission of Utah to act on the question.

This decision marks the end of a campaign to have instituted a new scheme of having cars stop only on corners. The question found its way to the Public Utilities Commission with the request that that body take action. The commission referred the matter to the City Commission, as only Sa't Lake City was involved, and the commission considered it of no importance to the remainder of the state.

The principal reason advanced by the public safety officials for recommending the retention of the system in vogue was that Salt Lake City blocks are longer than most blocks in the business districts of larger cities. Arguments used by the opponents of the half-way stops contended that it was unsafe and caused many accidents. Answering this argument the proponents considered it much safer for a car to slow down at the half-block signals.

Ten-Cent Fare in Superior

Fares in Superior, Wis., will be rearranged as well as raised from a 6-cent cash fare and six tickets for 35 cents to a 10-cent cash fare and five tickets for 30 cents following the recent action of members of the advisory council and the City Commission who voted almost unanimously to accept a proposal submitted to that body by the Duluth Street Railway. This ends for the time being the fare rate controversy which has existed for some time between the city and the company.

Other proposals besides the fare question include the acceptance of eliminating all railroad crossing flagging at crossings where flagmen or gates are provided and the curtailment and sterner regulation of local jitney traffic to the advantage of the city, which traffic has made serious inroads in the operation and revenues of the traction company. Without this increase in fares the company would have been forced to give decreased service or go out of business.

Financial figures submitted by the company show that from Sept. 1, 1921, to Aug. 31, 1922, the first twelve months of the 6-cent fare in Superior, the net earnings were only $18,000. The same figures practically prevailed at the end of the second year, which closed the first of this month. The net loss to the company during the past year has been approximately $90,000 per year, because of jitney competition as well as the interest on the large bonded indebtedness which the operating profit has been wholly inadequate to meet.

The new agreement as reached may not be permanent, but displays an earnest desire on the part of the city to help the company out of the rut of its financial difficulties. Should either party to the agreement find it unsatisfactory after trial they may appeal to the State Railroad Commission for a new adjustment.

Supervisors Check Headways in Los Angeles

A revised system of supervision of car lines which includes checking of time to assure even headway and riding supervision over the lines has been introduced by the Los Angeles Railway.

Practically all lines of the system run through the downtown district and serve opposite parts of the city. Supervising points for both ends of all lines have been selected where a man can watch one end of two or three lines. Both ends of line combinations are protected from 6 a.m. to 7 p.m. This requires nineteen day supervisors. The night service is handled by eleven men, who stay on duty until 2 a.m.

The day supervisors are instructed to remain at the strategic points during the morning rush hour service and to devote their attention to keeping cars on even headway unless called away by an emergency. After 9 a.m. the supervisor is expected to use his discretion in leaving his post and riding over the parts of the lines under his jurisdiction. This gives him a chance to work with individual trainmen who need assistance and to observe infractions of rules, as well as to maintain adequate service through the midday.

The day supervisor must return to his checking point by 3:30 p.m., when the afternoon tripper service starts. The night men relieve the day men at 4 and 5 p.m. The night man then remains on the supervising point, giving his full attention to headways, until after the evening rush travel is over. The day supervisor who is thus relieved then rides his lines until he is due off at 6 or 7 p.m. This gives both riding supervision and a check of headway during the busiest part of the day.

A new type of time book has been supplied to the supervisors so that by glancing at the train run number, shown on the front of the car, and at his book a supervisor can tell immediately if the car is on time. The system is being handled with thirty men and three chief district supervisors. Every supervisor has a day off each week.

Supervisors are instructed to keep in close touch with conditions on all parts of the system through the emergency telephone board, each point of supervision being in direct telephone communication with the exchange board. A part of the instructions to supervisors reads as follows:

> Do not tell any trainman to go across and get his orders from the other supervisor. A vacillating policy leaves a bad impression of your ability with the man involved. Dispose of his case on the spot.

Two and a Half Cents for School Children

The Seattle & Rainier Valley Railway, Seattle, has filed a fare schedule with the Department of Public Works granting a fare of 2½ cents, forty tickets for $1, for school children, effective Sept. 4. This is the same rate paid on the Seattle Municipal Railway lines.

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Proposal to Link Bus and Railway in New York City

The New York Transit Commission on Sept. 12 fixed Sept. 25 as the day for a public hearing upon the application of the Manhattan Bus Corporation for a certificate of convenience and necessity to insure continued bus operation over the crosstown routes at Seventy-ninth, Eighty-sixth and Ninety-sixth Streets, Manhattan. These routes are now operated under city supervision. They are among those which are at present not covered by legal permits and are threatened with stoppage by a recent decision of the Court of Appeals. The company has an application pending before the Board of Estimate for a franchise for the routes. While the Transit Commission can hold the hearing as to the certificate of convenience and necessity, it cannot issue such certificate or the complementary permission to operate until the company has a franchise.

An unusual feature of the application is that the bus company proposes, under an agreement with the New York & Harlem Railroad, which owns and operates the Fourth Avenue trolley lines and the Eighty-sixth Street crosstown trolley, to issue and accept transfers to and from the Fourth Avenue line wherever intersected by the bus lines, good anywhere between the Post Office and 135th Street. This would mean that for a single fare passengers of the Fourth and Madison Avenue line would be transported crosstown at a number of points in the Yorkville section of upper Manhattan.

Wants Extension of Six-Cent Fare Zone

Extension of the 6 cent fare to the western limits of Huntington, W. Va., so as to include Westmoreland, recently annexed to the city of Huntington, has been requested in a petition to the Public Service Commission drafted by City Attorney C. W. Strickling. Under the terms of a former order granted by the Public Service Commission the Ohio Valley Electric Railway was permitted to charge a 6-cent fare in all parts of the incorporated limits of the city. That order was issued before Westmoreland was annexed to the city, so that the company has continued to collect a second fare beyond the old western corporation line at the Four Pole Bridge. The petition of the city attorney requests the commission to construe its former order so as to include all of Westmoreland in the 6-cent zone, and if it will not admit of that construction, to order the company to extend the zone to the new western corporation limit.

A delegation from the new Tenth Ward recently requested the commissioners to take necessary steps to obtain a 6-cent fare for the entire district. Mayor Chapman informed officials of the company of the request, but W. R. Power, general manager of the company, replied in a letter that the extension would be disastrous to the Huntington-Ashland interurban line. On further requests of residents the commissioners of Huntington authorized the city solicitor to take the case before the Public Service Commission.

Hearing Will Dispose of Fare in Spartanburg

A hearing was scheduled for Sept. 12 in Columbia on the petition of the South Carolina Gas & Electric Company for a 5-cent increase in fares on the railway and bus systems in Spartanburg. This is another step in the railway problem of that city, which has remained unsolved now for several months.

The city filed on Aug. 24 with the Supreme Court of South Carolina a demurrer to the returns that have been filed with that court by the railway company. It is the contention of the city that the returns shown by the company are insufficient and that the company has been amassing larger profits than at any time in its history. The city denies "the operation of the street railway would, if efficiently managed and managed without a view solely to being able to show a loss, necessarily result in a loss."

Employees Asked to Help

In carrying out further its plan for soliciting constructive criticism from its patrons and employees, President George M. Alexander of the Monongahela-West Penn Public Service Company has recently addressed a personally signed letter to the 1,300 employees of the company in which he asks for helpful suggestions. The appeal in part follows:

> You come in daily touch with things some of us probably never see; you meet people that some of us scarcely ever meet. I know you see things done, you probably do things for the company in your work, that in your opinion ought to be done differently; you see where work could be better done or more cheaply done; you see where the company could save money, where it could give better service.
>
> Now, we want your help and your suggestions. If your friends or your neighbors give you any suggestions regarding our operations, pass them on to us. Each suggestion will have the most careful attention and consideration.
>
> As a basis to work from in connection with these suggestions, suppose each day we devote five minutes to thinking of a better way of doing the job given us to do.
>
> I feel that this is a big family working together for the growth of this property, that we are all personally interested in the success of our company and its reputation with the people we serve and throughout the territory in which we operate, and real growth, real success and real good will can only be brought about by our working together.

Grants Jitney Licenses.—The City Council of Boston has voted to grant three jitney licenses to the Norfolk & Bristol Bus Company to operate buses in Hyde Park as feeders to the Boston Elevated.

Applies to Operate One-Man Cars.—The Eastern Wisconsin Electric Company has asked permission of the Wisconsin Railroad Commission to operate one-man interurban cars over its Fond du Lac-Oshkosh-Neenah division.

Wants Five-Cent Fare Extended.—The Puget Sound International Railway & Power Company, Everett, Wash., has applied to the Department of Public Works for permission to extend the 5-cent fare in Everett until Nov. 30. The 5-cent fare has been effective in Everett for nearly a year.

Considers Bus Operation.—The New Jersey & Pennsylvania Traction Company is said to be considering the advisability of abandoning its line and substituting buses. This action will be taken if the company is compelled to expend $30,000 for street pavement in Morrisville, Pa.

Freight Service to Be Reduced.—Owing to the falling off in freight traffic, the Olean, Bradford & Salamanca Railway, in Bradford, Pa., will reduce its freight service, so that freight cars will run only three days a week. This service will be maintained until a greater resumption of traffic justifies the six-day schedule now in force. This reduction in freight car service is another step in the retrenchment program of the railway, which is cutting its operating expenses to a minimum in order to allow a greater amount to be applied annually to improvements to the system.

Refuses Bus Permits.—Since the General Assembly last spring placed motor buses under the Virginia Corporation Commission that body has consistently refused to grant a permit to operate bus lines in direct competition with intercity electric railway transportation and in its action has had the backing of the municipalities of Virginia affected by such decision. Several requests for permits to operate between Virginia cities in competition with established electric lines have been rejected by the Corporation Commission. In explaining the action of the commission, Major Alexander Forward stated that the commission is not committed to this policy but that circumstances have so far not justified issuance of permits for such competition.

Will Start Bus Service.—The Northern Texas Traction Company, Fort Worth, Tex., has announced that it will start a bus service to Riverside, an addition to the city of Fort Worth that is now without railway service, and will remain without service until the extension of the traction company's line into that section can be built. George H. Clifford, vice-president and general manager of the traction company, said the company would place several buses in service on the regular jitney lines into Riverside and would charge a 7-cent fare with privilege of transfer to the railway at the present terminus of the line. The traction company decided to place the motor buses in service when the City Commission passed an ordinance stopping the operation of jitneys into Riverside. The jitneys had been operating for some time and had been charging a 10-cent fare.

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Personal Items

Mr. McCants, Manager

New Operating Executive at San Francisco Entered Service There in 1906

Melnotte McCants, whose appointment as general manager of the Market Street Railway, San Francisco, was referred to in the Sept. 1 issue of the ELECTRIC RAILWAY JOURNAL, is a native of Spartanburg, S. C. He entered the employment of the leading railroad of that district—the Southern—as a clerk. In addition to mastering his regular duties, he took up the study of stenography at night school; and it was his proficiency in this line that brought him to the United Railroads, the predecessor of the Market Street Railway, in 1906 as stenographer in the president's office.

Melnotte McCants

In 1910 he was appointed chief clerk to the general manager. In March, 1918, he became assistant to the general manager. In August, 1919, he was promoted to assistant general manager. And now comes his elevation of a few weeks ago.

He has been very active in affairs of the American Electric Railway Association and his services have been sought by the various committees of the association such as the committee on education, the committee on merchandising transportation, etc.

As a citizen, his help has been of great value in numerous community projects and he is in constant demand in this regard. He is a prominent member of the Rotary Club. Among the rank and file of the company at San Francisco Mr. McCants has established himself as a broad-minded official, absolutely impartial in his decisions. His appointment to the post of general manager affords a striking illustration that preachment and practice are synonymous in meaning on the Market Street Railway, for employees entering the service of the company are reminded at the inception of the term of their employment that "the highest position in the gift of the company is open to the qualified employee."

H. L. Doherty Elected to American Light & Traction Board

Henry L. Doherty, president of the Cities Service Company, the Doherty Operating Company and other corporations, has been elected a director and member of the executive committee of the American Light & Traction Company, New York, owning all the common stock of seventeen public utilities in various parts of the United States, most of them gas light companies.

Changes in Citizens Traction Company

The following changes have been made in the personnel of the Citizens Traction Company, Oil City, Pa.: John E. Zimmerman is now president, replacing Joseph Seep. Mr. Zimmerman was formerly secretary, and in that capacity has been succeeded by C. A. McClure. V. A. Redfield, who was general superintendent, is now general manager.

Mr. Cummings Made Assistant to Chairman

Fred A. Cummings, since 1919 public relations representative of the Eastern Massachusetts Street Railway, Boston, Mass., has been appointed to the position of assistant to the chairman of the public trustees. He was formerly a special writer on the Boston *Globe* and before that was a member of the staff of the Lynn *Item*. As recently as last July the Boston *Herald* paid Mr. Cummings a backhanded compliment by saying that "when the new era of street railway management arrived on the Eastern Massachusetts Street Railway under public control five years ago the men selected to rehabilitate the property looked around for a man who had spent his years finding fault with the system and they naturally turned to Cummings."

Fred Cummings knew the state of the public mind then and he knows it now. His work as the representative of the company on the board of arbitration which recently heard the complaint of the men for more money is just one instance that shows this. Mr. Cummings has the courage of his convictions. It was this quality that made him successful as a newspaper man and it is this quality that has made for his success with the railway. The intuitive writer in the *Herald* before mentioned said of Mr. Cummings in respect to this quality in him:

"By experience he knows when a complaint is justified, and if he advises the trustees to change their methods they generally follow his advice. He also knows, however, when the road is in the right, and he does not hesitate to jump on the local politician who seeks to excuse his own shortcomings by telling the people the Eastern Massachusetts is responsible for all civic ills."

In short, Fred Cummings knows when and how to be militant. His newspaper training has taught him discrimination.

Mr. Pettengill to Manage Ohio Interurban

I. W. Pettengill, electrical engineer, formerly with the Cincinnati Screw Company, Loveland, Ohio, has become secretary and general manager of the Cincinnati, Milford & Blanchester Traction Company. J. P. Peurrung will continue as president of the interurban company, but Mr. Pettengill will be in active charge of operations. Mr. Pettengill was graduated from Brown University. He was at one time connected with the Western Electric Company. The Cincinnati, Milford & Blanchester Company, better known as the "Kroger Line," was one of the first traction companies, if not the first, in the United States to operate one-man cars in interurban service. The company operates 37 miles of line and serves Woodland and Kroger Hills Parks.

I. W. Pettengill

H. W. Kidwell Joins National Railway Appliance Company

H. W. Kidwell has resigned as electrical engineer of the Washington & Old Dominion Railway, an interurban line running from Washington to Bluemont, Va., effective Oct. 1, to become Southern representative of the National Railway Appliance Company, New York. His headquarters will be in Washington. Mr. Kidwell entered the employ of the Washington & Old Dominion more than eleven years ago as electrical foreman. Subsequently he as advanced to assistant electrical engineer and then to chief electrical

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engineer, with supervision of overhead lines, track bonding, power and equipment.

New Engineering Firm

The Buchanan & Layng Corporation has been organized to specialize on traffic surveys for electric railways, schedules, and all phases of equipment maintenance. It has opened offices at 49 Wall Street, New York.

C. B. Buchanan, the president, was for many years vice-president and general manager in charge of operation of the Virginia Railway & Power Company, which serves Richmond, Norfolk and Petersburg with light, power and electric railway service. He was a pioneer operator of the trackless trolley and directed its early development. Mr. Buchanan entered the electric railway field as treasurer and auditor of the Memphis & Raleigh Springs Railroad, Memphis, Tenn., in 1891. When this property was merged with others in Memphis two years later, he resigned to construct and operate railways and lighting plants in Mississippi, later managing the railway and lighting plants at Meridian, Miss. He joined the Richmond Passenger & Power Company and Richmond & Petersburg Electric Railway Company, predecessors of the Virginia Railway & Power Company, in 1901, subsequently being promoted to the position of general manager, to which he was appointed in July, 1911. He resigned from this position on Sept. 27, 1921, to engage in consulting business.

J. F. Layng, the vice-president, has for the past several years devoted his time to consultation work, being engaged principally by large operating systems. His electric railway experience began in 1889 when he went with the Federal Street & Pleasant Valley Street Railway of Allegheny, Pa. Soon thereafter he entered the service of the Pittsburgh & Birmingham Traction Company in its shops, working on car equipment. In 1891 he went with the Westinghouse Electric & Manufacturing Company, taking the apprenticeship course and working in practically all departments.

He remained with the Westinghouse company until 1910, when he was appointed engineer with the Maryland Electric Railway at Annapolis, resigning from this position in 1912 to become engineer in the railway and traction engineering department of the General Electric Company.

During the war Mr. Layng directed the electric railway fuel saving campaign over the entire United States for the United States Fuel Administration at Washington. It was due to his efforts that the skip-stop system was so generally used at that time.

Mr. Layng is a specialist on schedules, traffic problems, equipment selection and equipment maintenance. His work has brought him into direct contact with all the large transportation systems in this country. He has also made a number of reports of steam railway electrifications.

Edwin M. Walker Goes to Schenectady

Excellent Operating and Public Relations Record of Indiana Executive Results in Call to New York State

The coming president of the Schenectady Railway is Edwin M. Walker. As general manager, since the close of 1917, of the Terre Haute division of the Terre Haute, Indanapolis & Eastern Traction Company Mr. Walker became a national figure in the industry. Good work in the management of the Union Electric Company, Dubuque, Iowa, had brought the call to Terre Haute, but it was in the great mining center of Indiana that Mr. Walker got the first big opportunity to show his mettle.

The automobile, the jitney and the increased unit fare were playing havoc with electric railways in practically every medium-sized city of the country

E. M. Walker

when Mr. Walker went to Terre Haute. To a man of common mold nothing would have been easier than to seek through council action stricter parking regulations, jitney suppression and higher fares, but Mr. Walker preferred better and shorter roads to the two-fold objective of pleased customers and pleased stockholders. His bold way of using the safety car is one of the most encouraging chapters in transport history. No car-for-car substitution for him, but a 60 per cent increase in service. Nor was there any exchange of new cars for the promise of a higher fare. He took the chance that increased revenue would come from more rides at the good old nickel, and won so handily that the money for the second lot of safeties came from local capital. Almost anybody would be satisfied to stop at a 5-cent fare, but not Walker. In May, 1922, he added the weekly pass so that his wholesale customers could enjoy an average fare of 3⅛ cents. Still customers and revenue increased. A study of Terre Haute figures shows that car riding has jumped from 120 rides per inhabitant in 1918 to 258 in 1923. The graph hound will find the full story in the ELECTRIC RAILWAY JOURNAL for Aug. 25, 1923. Jitneys have been very nearly crowded out of the picture by the sheer force of economic laws. Latterly, Mr. Walker has also made things hot for interurban jitneys through the sale of 100-mile strips at pre-war prices.

A Briton born (Worksop, 1875) and a graduate of fine old Williams, Edwin M. Walker takes the broad cultural and humanitarian interest in affairs that must be a large factor in the success of a public utility executive. Those who know him best have reason to expect that he will gather fresh and bigger laurels in his new work. His election as president of the Schenectady Railway took place at a recent meeting of the board of directors, and is effective Oct. 1, 1923.

R. J. Seigfried is superintendent of the Bethlehem Transit Company. In this capacity he replaces W. H. Garner.

John Faulkner has succeeded W. B. French as treasurer of the Turner Railroad, Turner, Me.

Hugh Scott has succeeded H. N. Beckett as secretary and treasurer of the Cumberland & Westernport Electric Railway, Baltimore, Md.

Arthur L. Davis, formerly electrical engineer of the Bangor Railway & Electric Company, is now chief engineer, replacing Phifer Smith.

Henry G. Bradlee is now president of the Paducah Electric Company and Norman W. Mumford has been added as vice-president. L. Vernis Smith is assistant treasurer.

Tom P. Walker has succeeded P. I. Robinson as local manager of the Baton Rouge Electric Company. Edward Godchaux and Norman M. Mumford have replaced Samuel W. Weis and Donald C. Jewett as vice-presidents.

W. E. Wood, vice-president and general manager of the Houston Electric Company, has been appointed chairman of the fourth district Texas Public Service Information Bureau, according to an announcement by George McQuaid, in charge of the bureau, which maintains headquarters at Dallas.

Hudson R. Biery, purchasing agent for the Union Traction Company for the last four years, has tendered his resignation to become assistant to Charles L. Henry, president of the Indianapolis & Cincinnati Traction Company. Mr. Biery will move to Indianapolis to assume his new position.

Mark T. McKee of Detroit, assistant to the president of the American Short Line Association, has been named vice-president of the Salt Lake & Utah Railroad, known as the Orem electric line. In his executive capacity with the Short Line Association Mr. McKee has gained a national acquaintance among the operators of the smaller railroads of the country. Mr. McKee fills a place on the official roster of the company made vacant by the resignation of Ross Beason nearly a year ago. His headquarters will be in Salt Lake City.

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Obituary

G. G. Mulhern

George G. Mulhern, one of the pioneer street railway men, died in Cleveland on Sept. 7. Mr. Mulhern was identified with the railway system of Cleveland from the time the first line was built until 1904. He became driver of a bob-tailed horse car in 1862. In the course of time the late Mark A. Hanna became interested in the railway lines in Cleveland, and recognizing Mr. Mulhern's capacity for handling men successfully, advanced him through the ranks until he became superintendent. He continued in that capacity with the Cleveland Railway under Senator Hanna as president for a number of years and following the consolidation of the Cleveland City Railway and the Cleveland Electric Railway he was appointed general superintendent of the consolidated system. George Mulhern was always a bit brusque in his manner, but he was easy to approach and had the capacity for dealing out discipline in a manner that left not the slightest trace of resentment in its wake. He was elected sheriff of Cuyahoga County and served one term commencing in 1910. From 1912 to 1916 he was adviser to Peter Witt, then street railway commissioner at Cleveland. Since 1916 he had been in the contracting business, a considerable part of his work being done for the Cleveland Railway in connection with paving carried out by that company. Mr. Mulhern was born in Cornwall, Canada, on Feb. 7, 1843. He is survived by his wife and one daughter.

J. L. Hale, for ten years chief dispatcher of the Winona Interurban Railway, Warsaw, Ind., lost his life on Sept. 4 in Big Chapman Lake while trying to save two of his companions.

Mitchell B. Perkins of Beverly, N. J., former state Senator and one time superintendent of the old Riverside Traction Company, which was later taken over by the Public Service Railway, died on Aug. 27. He was one of the organizers of the Camden & Trenton Traction Company and the Riverside Traction Company, running between Trenton and Camden.

Langdon Gibson, noted explorer, died Sept. 5 at Criehaven, Me. He was a native of Boston and was fifty-eight years of age. Mr. Gibson, up to two years ago, was production manager of the General Electric Company, Schenectady Works. He had been associated with that concern for thirty-one years and was well known throughout the industrial world. He was a man of great activity and vigor, being one of the few members of the Stanton expedition successfully completing the expedition through the Grand Canyon of the Colorado River in 1889. He gained added fame through his accompanying Admiral Peary's second northern expedition to explore the northern coast of Greenland.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Copper at 13 Cents

The market for copper is again in the doldrums. The price is slightly more than 13 cents, a figure at which production of the raw metal is unprofitable to the mining companies. Last spring, with the reduction in the amount of the accumulated supply of the yellow metal then on hand, the price began to soar and on March 15 the quotation was 17 to 17½ cents. The prospects then were that the price would probably go much higher. Purchases were stimulated as the selling figure began to climb, but authorities writing upon the outlook for the market for the metal marshalled strong arguments at that time to indicate a probable continued advance in prices. As a matter of fact, there was no mistaking the tendency of the price movement at that time, but the producers appear not to have judged accurately the extent of the buying movement as regards the extent of the prospective consumption.

About two years ago the stock of copper in the United States was estimated at 1,000,000,000 lb., but by the first of this year it has been greatly reduced. The tendency of the price to climb early in the spring stimulated the buying movement and became at one time so pronounced that production was in turn stimulated again and by early summer there was a return to the condition of overproduction. At present production is estimated to be at the rate of 2,200,000,000 lb. a year. This compares with a pre-war average of less than 1,500,000,000 lb. Thus the present is distinctly a buyer's market.

For the producer the prospects immediately ahead are none too bright, but the economic tendency of the industry is toward stability through the medium of larger economic units combining producer and consumer as in the case of the Anaconda-American Brass affiliation and the Lake Superior-Calumet & Hecla consolidation. Consumers may profit temporarily as regards price by conditions such as exist at present in the copper and the oil industries, but in the end the market gradually works itself around to a level that affords the producer a profit.

Hungary Making Electric Railway Equipment

Orders for sixty electric railway cars for the city of Amsterdam, Netherlands, are reported to have been received by the Ganz Danubius Company, one of the largest machine factories of Hungary. This company, according to the United States Commerce Report of Sept. 3, is at present engaged also in the work of repairing railway cars which belong to the Hungarian State Railway, but which have been awarded to Jugoslavia by the peace treaty. Extensive orders are said also to have been received by the company from Rumania, Poland and Italy.

Pull-offs Available

The Department of Street Railways of the City of Detroit recently placed an order for 5,000 single-curve pull-offs and an equal number of double-curve pull-offs, both of drop-forged steel and made by the Drew Electric & Manufacturing Company. In making quotations it appeared that 10,000 double-curve forms would have cost only $70 per hundred, as against $77.75 per hundred for 5,000 double-curve pull-offs. A similar reduction from $46.10 per hundred where only 5,000 were on order to $40 per hundred if 10,000 had been ordered would be possible with the single-curve pull-offs.

There is, therefore, an unusual opportunity for any one wishing to secure low price on drop-forged pull-offs to get them at this time. A full description of this device is given on page 411, this issue. It is believed that the dies are good for at least 10,000 pieces. This is a good example of a case where the pooling of orders for die-requiring materials would be a great help.

Moreover, the drop-forged pull-offs are much cheaper than those made of malleable iron. H. M. Gould, electrical engineer for the Department of Street Railways, estimates that the latter would cost about $101.50 per hundred for double-curve pull-offs and $63 per hundred for the single-curve pull-offs. A saving of from $15 to $30 per hundred is, therefore, effected by the use of the drop-forged article.

Metal, Coal and Material Prices

Metals—New York	Sept. 11, 1923
Copper, electrolytic, cents per lb	13 75
Copper wire base, cents per lb	16 125
Lead, cents per lb	6 80
Zinc, cents per lb	6 52
Tin, Straits, cents per lb	42.125
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.075
Somerset mine run, Boston, net tons	2 50
Pittsburgh mine run, Pittsburgh, net tons	2 30
Franklin, Ill., screenings, Chicago, net tons	1.75
Central, Ill., screenings, Chicago, net tons	1.325
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$7 00
Weatherproof wire base, N. Y., cents per lb.	18 75
Cement, Chicago net prices, without bags	$2 20
Linseed oil (5-bbl. lots), N. Y., per gal	$0 93
White lead, in oil (100-lb. keg), N. Y., cents per lb	11.375
Turpentine, (bbl. lots), N.Y., per gal	$0.99

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Rolling Stock

Intercity Terminal Railway, North Little Rock, Ark., has purchased six sixteen-passenger buses.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., has purchased twenty-five safety cars from the F. B. Cutter Company, 50 Church Street, New York. Ten will be placed in Terre Haute and fifteen in Richmond, Ind.

Virginia Railway & Power Company, Richmond, Va., has just received twenty new safety cars which were ordered from the J. G. Brill Company on June 15. The specifications of these cars follow:

Type of car	Birney
Seating capacity	32
Total weight	16,500 lb.
Length over all	28 ft. ½ in.
Truck wheelbase	8 ft. 0 in.
Width over all	7 ft. 8 in.
Height, rail to trolley base	10 ft. 8 in.
Body	Steel
Interior trim	Birch
Headlining	Agasote
Roof	Arch
Air brakes	G.E. C.P. 27
Armature bearings	Sleeve
Car signal system	Faraday
Car trimmings	Cherry
Conduits and junction boxes	Brill
Control	K-10
Curtain fixtures	Curtain Supply Company
Curtain material	Pantasote
Designation signs	Hunter
Door operating mechanism	Safety Car Equipment
Fare boxes	Johnson
Fenders or wheelguards	H. B. Life Guard
Gears and pinion	G.E.
Hand brakes	Brill
Heater equipment	Consolidated
Headlights	O. B. Company
Journal bearings	Sleeve
Journal boxes	Brill
Lightning arresters	G.E. Company
Motors, type and number	G.E. 264
Paint varnish or enamel	Enamel
Registers	International
Sanders	O. B. Company
Sash fixtures	Pech
Seats	Brill Waylo
Seating material	Slat
Slack adjuster	Brill
Springs	Brill
Trolley catchers or retrievers	O. B. Company
Trolley base	O. B. Company
Trolley wheels or shoes	Wheels
Trucks	Brills
Ventilators	Brill
Wheels (type and size)	26 in. cast iron

Special devices, etc.—Doors open inwardly; seat on one side, longitudinal, grab handle on front corner post.

Track and Roadway

Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis., will raise its tracks on Racine Street in Neenah between Broad and Third Streets.

Des Moines City Railway has started the Crocker Street extension. It is expected that this 2¼ mile line, which will cost more than $160,000, will be completed by the first of the year. The line will be double tracked a good portion of the way.

Portland Railway, Light & Power Company, Portland, Ore., is completing the work of reconstructing car tracks on Holladay Avenue from Union to Larrabee Street, at a cost of $15,000. The work includes repaving and laying new rails.

Baton Rouge Electric Company has now pending before the Commission Council application for a franchise which will give a car service to the Standard Oil Refinery plant and to the suburban town of Istrouma and other sections not now served by an electric railway. The contemplated extensions are estimated to cost $80,000.

Northern Texas Traction Company, Fort Worth, Tex., announces that it is planning to double track the entire line between Dallas and Fort Worth. Work will be started in the near future on a 9-mile stretch, according to V. W. Berry, general superintendent. When this stretch is double-tracked there will remain only a few miles of single track, Mr. Berry said, as about one-half of the line is now double tracked. Completion of this program will enable the company to increase the number of cars in operation on the line and to speed up service.

Professional Notes

Hammer & Schwarz, consulting engineers, have changed their business address to 55 John Street, New York City.

George B. Nichols, consulting engineer, 300 Madison Avenue, New York City, and the **Terrell Croft Engineering Company,** of which Terrell Croft is directing engineer, of 6600 Delmar Boulevard, University City, St. Louis, have effected an affiliation whereby the experience and resources of each organization will be available to the clients of the other. Mr. Nichols will act as the principal for projects east of Illinois, whereas the Croft organization will so act for projects west of that state. The combination will specialize in mechanical and electrical engineering for power and industrial plants, institutions and buildings, as have the component companies in the past.

H. P. Hevenor, consulting engineer, formerly connected with Dwight P. Robinson & Company, Inc., has recently opened personal offices at Suite 601, 110 East Forty-second Street, New York City. Mr. Hevenor was educated in Philadelphia and has had eighteen years' experience in the design and construction of track. He started with William Wharton, Jr. & Company, manufacturers of special trackwork, and later was employed by the Brooklyn Rapid Transit Company, as track specialist and assistant engineer. He then went to Chicago with the Buda Company, in charge of the manufacture of special trackwork, and later spent five years in the office of the chief engineer of the New York, New Haven & Hartford Railroad. In 1916 Mr. Hevenor entered private practice, under the firm name of Engel & Hevenor, engineers and contractors, making a specialty of track construction, during which time he installed all the track on the Seventh Avenue branch of the New York subway. He has also built track for a number of other properties, including the Third Avenue Railway, New York City; the Eighth & Ninth Avenue Railroad, New York City; the Trenton & Mercer County Traction Company, the Capital Traction Company, Washington, D. C.; Newport News & Hampton Railway, Gas & Electric Company, Delaware, Lackawanna & Western Railroad, New York, New Haven & Hartford Railroad and the Connecticut Company, and for the past year has been retained by Dwight P. Robinson & Company, Inc., in a consulting capacity.

Trade Notes

National Railway Appliance Company of New York, N. Y., has been appointed the New York, New Jersey and New England agent of the Yellow Coach Manufacturing Company of Chicago for the distribution of city and intercity buses.

Consolidated Car Heating Company, Albany, N. Y., has announced the acquisition of the patents, equipment, good will and other assets of the Automatic Ventilator Company of New York City and also that it is prepared to fill orders for all types of automatic ventilators heretofore supplied by that company.

New Advertising Literature

Heine Boiler Company, St. Louis has issued a pamphlet drawing attention to the necessity for keeping boiler tubes clean.

Johns-Pratt Company, Hartford, Conn., has issued a folder stressing the importance of safety as the primary responsibility of the central station.

Uehling Instrument Company, Paterson, N. J., has just issued a leaflet showing in diagrammatic form the simplicity in operation of its CO_2 recorder and indicator.

Crescent Truck Company, Lebanon, Pa., has issued a descriptive and illustrated booklet entitled "Electric Industrial Trucks and Tractors." Various types of storage battery trucks suitable for use in the railway shop or warehouse are described.

Edward G. Herbert, Ltd., Manchester, England, has issued a circular describing the pendulum hardness tester, a description of which was given in the ELECTRIC RAILWAY JOURNAL for May 26, 1923, page 896. Reprints have also been made of an article on some recent developments in hardness testing which appeared in the *London Engineer* for June 29, 1923.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued a new catalog covering line material and porcelain insulators. The catalog is supplementary to the company's large supply catalog and has been issued for the convenience of purchasers of these two allied lines of materials. It is a 200-page publication of convenient size, is fully illustrated and contains a complete description of all the company's line material and porcelain insulators.

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New York, Saturday, September 22, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 12

Public Service Starts the Cars

SINCE last Wednesday the Public Service Railway has been working night and day to clear the tracks of dirt and asphalt, get men back on the job and resume operation. But this is being done under conditions as of July 31, when the cars were put in the barns, except that wages are 20 per cent higher. This procedure came with the compliance of the company with a mandatory injunction of the Chancellor, the highest judicial officer of the state, directing the company to start operations not later than Monday, Sept. 24. The Chancellor's opinion was a strong statement of the equity of the matter, though it is believed by many that the injunction could have been successfully contested. He maintained that the company was under obligation to provide service regardless of loss or profit and announced that in the event the company did not obey the order he would consider receivership proceedings on Tuesday. Chief Justice Gummere earlier said that while it is true that the company has an obligation to fulfill to the public, the public also has an obligation to the company, and that there is no way legally that any company can be compelled to continue giving service at a loss.

But for various reasons the company chose to obey the Chancellor's order rather than carry the case to the United States Supreme Court. Suffice it to say that no progress was being made. Politics had so gotten into the situation that it appeared impossible to get any general approval of the company's settlement plan. Several of the more important communities had called off negotiations altogether. Of course, one advantage of complying with the order is that the company is meeting the demand of many of the cities to resume operation and talk settlement plans afterward.

If nothing else has been gained to date by the shutdown, two facts have been pretty well established in most of the communities of the state. People now know that they must have the trolleys. And they know that they cannot have good bus service when supplied by an irresponsible bus organization.

The buses have shown their value and also their limitations. They have not been able to handle the peak loads. The crowding has been intolerable. People all over the state, in numbers, have been saying they would gladly pay a 10-cent fare if the railway would resume operation. Even the bus men are glad, in a way, that the cars will soon be running, for they have been sorely pressed. The bus men who were operating before the shutdown have made but little if any more profit since the strike than before, because the excessive loading and the necessity to keep running continuously have told heavily on the physical condition of their buses. Moreover, they have suffered serious losses of individual income because the outsiders called in for emergency operation have taken their share out of the bus pool but have not made proper turn-in to it, and because they were operating just about as many buses before the strike as could make any money on a 5-cent fare. This last is one important reason why bus service was not expanded more than it was.

To attempt to indicate what is ahead in the situation would be speculation, as the picture in Jersey is changing almost momentarily. But further developments in the next few weeks will be watched with interest. It is to be hoped, of course, that with the experience of the last seven weeks in mind the public of New Jersey will be disposed to see to it that public officials give the railway a fair hearing and a fair operating basis. New Jersey is bound to be a center of transportation interest for some time to come.

Things Look Different in the Calm Light of Facts

THE conclusions of the Grand Jury directed to investigate the causes of the very bad accident on the Fifth Avenue elevated of the Brooklyn-Manhattan Transit Company in June, when two cars fell off the structure, have been rendered, and no one has been found to be guilty of criminal negligence in the matter. Although "an exhaustive study of the case was made from every conceivable angle" the jury evidently found no evidences of neglect in the maintenance of either structure or cars, because no charge of that nature is mentioned in the report.

This is especially interesting in view of the charges freely flung at the railway officials and transit commissioners by Mayor Hylan immediately following the accident. He said the guard timbers were rotten, the structure defective, etc., and that the Transit Commission knew these conditions prevailed. Such accusations would be made in the heat of excitement only by one predisposed to flay those upon whom the burden of responsibility fell. Of course every one knows Mayor Hylan's attitude in this direction, but few would wish to believe that any man would seek to further his political aims by trying to capitalize such a disaster. Things looked very different to those charged with fixing responsibility for the accident after all evidence and information had been marshalled to calm unbiased view.

The fact is that cases where cars on any of the elevated lines have left the structure in an accident are very rare. In the entire history of New York's elevated roads, extending back over forty years, there is only one previous case involving a passenger train, so far as the writer of this editorial can recall, and only one case in Chicago.

The finding of the jury, published in the news columns of this issue, contains suggestions for further safeguarding elevated railway operation. Of course, the company will go to the practical limit in taking new measures, in the light of this experience, to avoid possibility of recurrence of such an accident in the future.

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Sweep Out the Operating Cobwebs

IT IS a truism that almost any outsider with some practical knowledge of electric railways can go over a property and find one thing after another which deserves correction, if not elimination. This does not mean, necessarily, that the operating staff is incompetent. It does, however, point to the common human failing of letting the cobwebs of tradition gather in the more remote corners of the job.

In checking over a large property recently, route by route, one group of investigators found a surprising number of such cobwebs in the form of derails and safety stops. These derails and stops had doubtless been established for some good reason decades ago. Perhaps it was the desire to placate a local authority after an accident, or it may be that the practice dated back to a period when there was some railroad or important highway crossing which no longer existed. Whatever it was that gave reason for the stop had disappeared. But the years went on. The original municipal and railway officials resigned or retired. Highways were regraded and paved. Hand-brake cars were followed by air-brake cars. Streets were better lighted, signals were installed, and so forth. Yet apparently it had seemed to be no one's job to question the continued validity of these stop regulations which had been established beyond the memory of the current staff, although unbroken compliance with these regulations slowed down schedules and annoyed the patron.

Here was clear proof for the need of a periodical checking up on all practices. It may be added that the larger the property, the more likely will such a housecleaning be required, for it is on the large property especially that the employee down the line feels too remote from the management to initiate a questioning of long-established custom.

Regular Appropriations for Advertising

ADVERTISING for traffic and use of advertising space for general public relations purposes are coming more and more to be considered regular parts of the business activities of an electric railway. Not many companies have as yet put this on a systematic basis, however, whereby a consistent, steady program of reaching prospective customers and the general public with sales and good will discussion is carried out. In other words, few railways have reached the point of setting aside a percentage of their gross revenue, as most other businesses do, for advertising expense. Yet this, logically, will be the procedure ultimately. Advertisers in the mercantile and most other lines have learned that spasmodic advertising is not nearly so effective as the regular, periodic, consistent program—though it must be a program that is attractive, interesting and informative.

If one admits the wisdom of this manner of approaching the task, the question then comes up as to what is a proper allowance for advertising. The answer is that we do not know, yet. It is a matter to be determined by experience, but the main thing is to set aside a definite percentage, however small, and make a start on a consistent program. If the first guess proves to be worth while, then the percentage can be increased periodically, as long as it proves profitable.

One prominent city and suburban railway executive who has given this matter much thought considers 1 per cent of the gross not too large an amount. One of the fastest growing interurban roads in the country is expending approximately 3 per cent of its gross for advertising. Another interurban with less opportunity for building new traffic is spending 1½ per cent. One of the rapid transit railroads is spending one-half of 1 per cent. And so it goes. The main thing is to get out after traffic by advertising, by traffic agents, by every known means of selling. But do it consistently and effectively. And the more intensely the better.

M. O. Proponents Short on Constructive Ideas

ADVOCATES of public ownership of utilities are certainly as biased and unfair in their views as they claim the privately owned utility men are. This was especially evident in the proceedings of the conference of the Public Ownership League of America held in Toronto Sept. 10 to 13. A considerable part of the program was taken up by speakers whose main purpose seemed to be denunciation of the private utilities as the basis of fostering municipal ownership doctrines.

In fact, the reports of the conference do not indicate that a great amount of discussion of a constructive nature took place. The same old ground was gone over again, and the speakers reiterated the familiar arguments as to why private operation is a failure and municipal operation is—or ought to be—such a success.

It does no good to keep reciting, as one speaker did again, the familiar formula, "The story of the transit situation in the city of New York might properly be described as the history of a crime." From this sentence one can guess the rest of his talk.

One speaker did make some observations worth noting. He said, "In many cities the people have not dared to expand their public activities because of dishonesty in politics." He emphasized that the one thing that will ruin the policy of public ownership of public utilities is the expediency of politics—"the craving of mediocre men who desire to get their snouts into the political nose bag or to feed at the political trough."

Honest administration of utilities is the very foundation of success, as in any business. The crook or grafter has no place in management, whether public or private. But the man who is responsible to the private owners of a property, and whose acts are subject to review by a competent board and also by representatives of the public, does not and cannot have the opportunities before him for mulcting the public that are presented to public officials in control of m.o. utilities, who, while telling what great things are being accomplished, may actually be running the thing into the ground. And the public is vulnerable because it has no competence to judge results for itself.

Another point made was that "the inability of the public to see the value of paying high salaries for highly technical positions is a menace to public ownership. Men of marked ability must man publicly owned utilities, for efficient and effective management and supervision of public utilities is as necessary as that provided to operate utilities privately owned."

This last is a lesson that unfortunately has not been too well learned by private utilities, particularly referring to department heads and principal assistants. The success of any utility, public or private, depends on the intelligence and the integrity of the men who manage and operate it, more than on the method of control.

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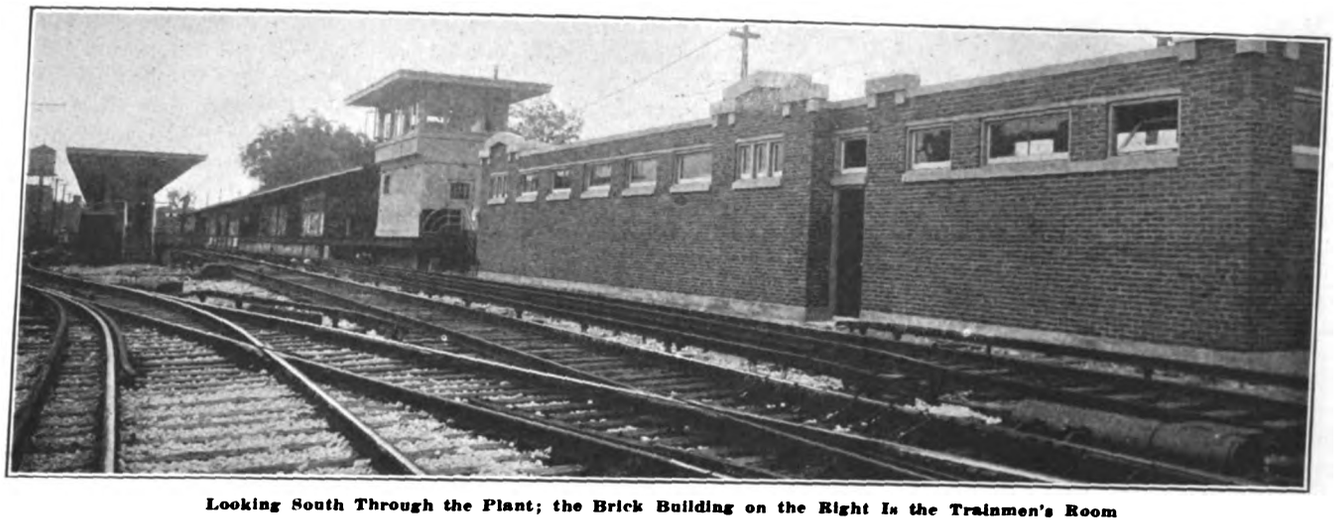
Chicago "L" Interlocking Plant Speeds Train Movements

New Electro-Pneumatic Interlocking Plant at Howard Street Embodies the Latest Design for Rapid and Flexible Switching—One Towerman Has Control of All Train Movements at Point Where There Is Considerable Train Make-up and Other Main-Line Activity—Operating Features Are Described



Looking South Through the Plant; the Brick Building on the Right Is the Trainmen's Room

SERVING a four-track main line which converges into a two-track main and a two-track yard lead, the new electro-pneumatic interlocking plant at Howard Street on the Chicago Elevated handles 580 train movements a day. Howard Street is the north city limit of Chicago, and besides being the city fare limit there is a storage yard of 140 cars capacity from which the majority of the north-side trains are dispatched for the rush hours.

The right-of-way from the city to this point has a four-track line, the last 7.8 miles being over the new rock ballast roadbed recently opened, as described in the ELECTRIC RAILWAY JOURNAL of March 10, 1923. North of Howard Street through Evanston to Wilmette the two-track right-of-way is of similar construction, but with overhead conductor, instead of the third rail which is used in the city. Howard Street is, therefore, the logical point for making up trains, adding to city-bound trains, cutting off cars from outbound trains, collecting fares, and changing from third rail shoe to overhead trolley or vice versa. It is also at this point that freight handled during the night is switched from the freight track to the northbound main line.

Each of these features was a factor in determining the design and capacity of the plant. A two-island station with four "pockets" facilitates collection of the fares. Accessibility to all station pockets from either the four-track main, the two-track main or the yard leads formed the real need for a plant of this type. With "cuts" and "adds," "put-outs" and "lay-ups," relay switching and main-line movement, this plant is one of the busiest spots on the system during the rush periods. A gauntlet track in the west pocket which serves the heavy freight industries connects into each end of the plant, making a five-track system through the plant. Third rail is used as the power conductor, and this adds to the complication of the layout. Insulators, inclines, special ties, feeder and jumper cables had to be provided for this phase of the plant.

ASSEMBLING THE PLANT

As a result of the high degree of co-operation and co-ordination between the various departments concerned the assembly of the parts was carried out with little difficulty. The track special work is of 90-lb. A.S.C.E. rail. It was reassembled on the job, while the third rail of 80-lb. section was placed on insulators in anticipation of power requirements. The assembly of the movements, targets and interlocking work proceeded with uniform rapidity. Each of the various parts of the signal assembly came marked with the name and number of the switch of which it was a member. Trackwork was delivered in the same convenient form, which facilitated assembly. Some complication was added, due to the slight grade and curve met at the yard entrance.

The signal system is the electro-pneumatically operated three-wire type, air being used to actuate the movements, with electricity as the controlling element.

Permanency was the important feature in the construction of the plant. The tower is of fireproof construction throughout; the framing is of steel channels, cross-braced and covered with metal lath. Concrete stucco has been placed on the lath and a finish of fine granite applied to the stucco. The overhang on the second floor enlarges the operator's room to give ample space, while clearance is provided beneath for trains on either side. A feature of the tower is the specially designed type of folding windows, any section or pair of which may be moved laterally to a corner or side

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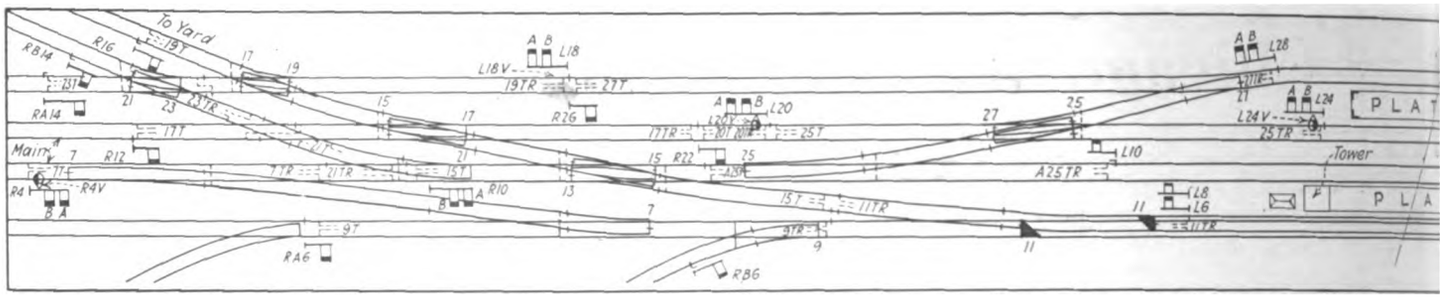
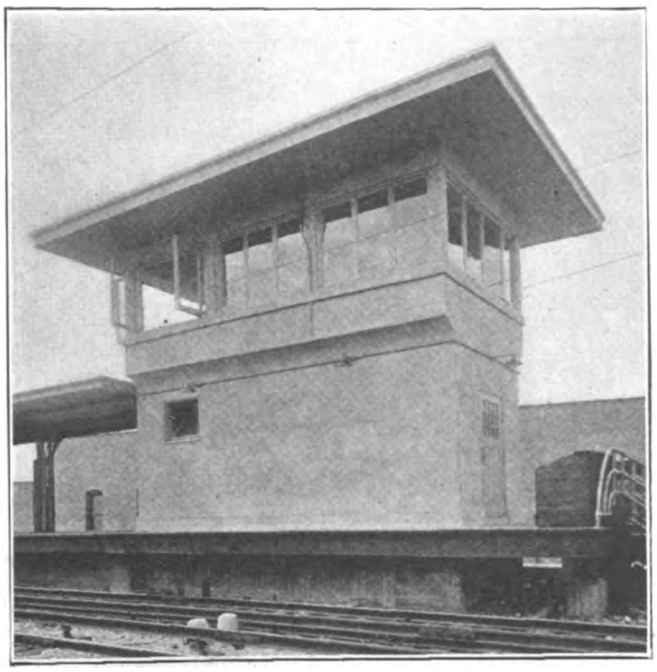


The Complete Layout of the Interlocking Plant Is Shown in the Diagram. All Train Movements



The Tower Is Designed to Give Train Clearance

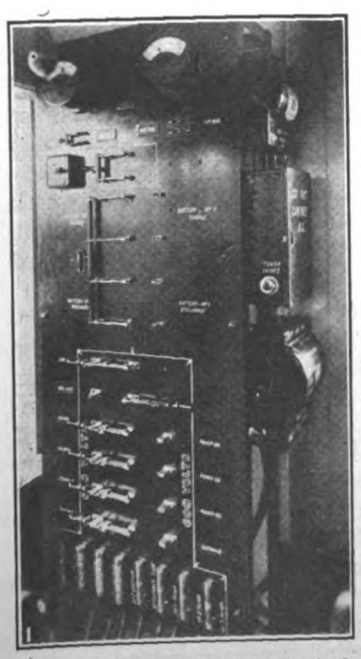
post. The operator is thus afforded a clear view in any of three directions, while the generous overhang of the eaves shades the vision.

The main operator's room contains the interlocking machine, which is located in such a position that a clear view of the tracks is had in all directions. An illuminated track diagram mounted above it repeats the actual setting of each track switch and signal, changing automatically as the levers of the interlocking machine are moved. A telephone, a clock and an air gage are mounted on the track diagram frame directly in front of the operator's position. A lavatory is provided in a section of the room 3 ft. below the level of the main floor, so as not to obscure the vision.

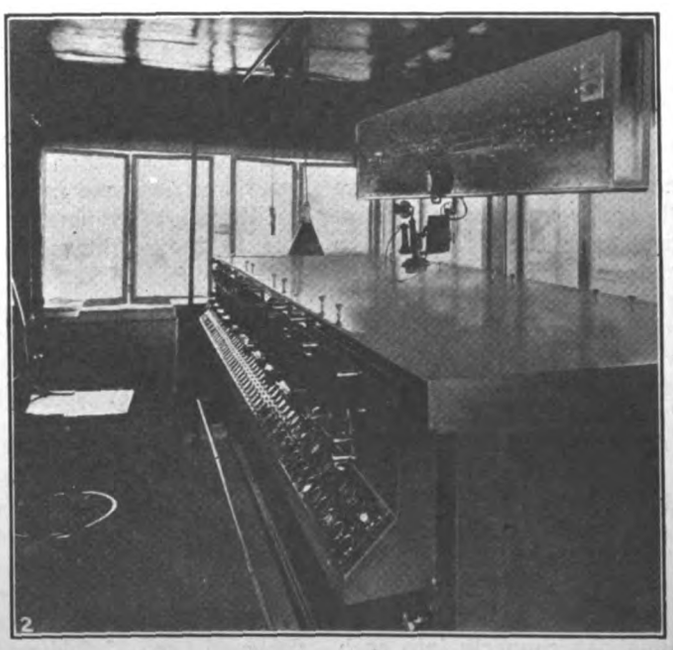
Switchboard Mounted in Convenient Position

The switchboard controlling the electrical connections is in such a position that the operator may read the meters and throw the switches without moving a great distance from his normal position before the machine. Mounted on the panel are a d.c. ammeter and d.c. voltmeter, low-voltage battery switches, 600-volt d.c. compressor and governor switches, and a complete set of fuses protecting the 600-volt lines. An a.c. cutout cabinet and "Square D" switches are mounted on the right edge of the panel. These switches control the alternating current, which is obtained from two separate outside sources, thus providing for protection in case of failure of either supply.

Air compressors, governors, relay cabinets and meters are located on the first floor of the tower, while the battery room and maintainer's supply locker are located in the basement. Here duplicate sets of 140 amp.-hr. batteries are located, which supply current for the control of switch and signal apparatus. Three air compressors supply air at the rate of 114 cu.ft. per second for the operation of the plant. Governors con-



No. 1. The Switchboard Controls the Alternating Current, the 600-Volt Direct Current, and the Storage Battery Circuits.



No. 2. The Operator's Position Is Arranged for Clear Vision, with the Illuminated Track Diagram Above the Machine.

No. 3. Section of Relay Cabinet, Showing Relay and Terminal Racks. There Are Eighteen Similar Sections.

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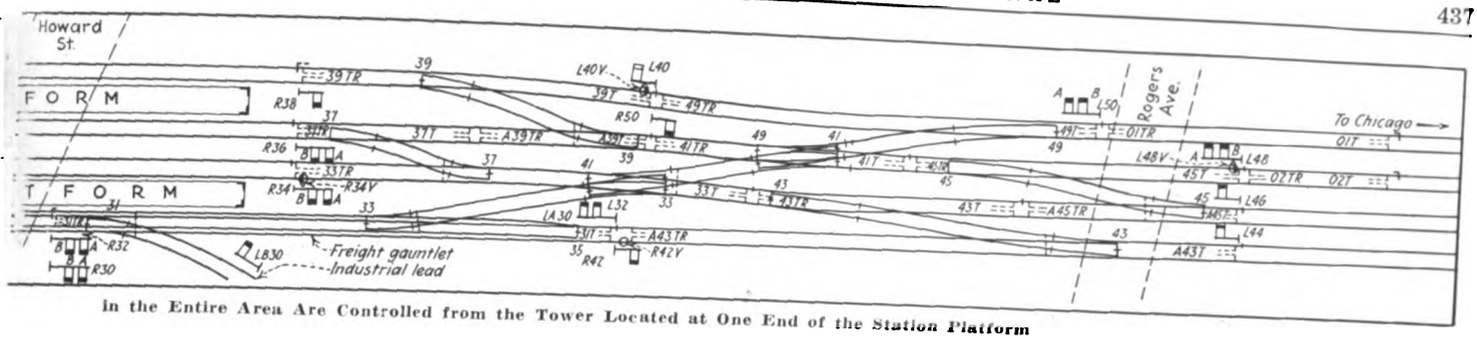


In the Entire Area Are Controlled from the Tower Located at One End of the Station Platform

trol the action of these pumps so that a minimum pressure of 70 lb. and a maximum pressure of 85 lb. is assured. Cooling coils and drainage tanks are inserted in the air line outside of the tower.

The relay cabinet consists of eighteen sections of racks similar to the one illustrated. Terminal racks are hinged so as to be more accessible. Compactness with ample room is the feature of the design. Flexible stranded wire of ample length is used for the relay connections to allow the relays to be lifted up and out of the case for inspection. Wires from the relays to the machine and the track diagram are carried in a metal frame. Below the relay cabinet is a series of 6-in. chutes which carry the wires to the large distributing manhole located under the tower.

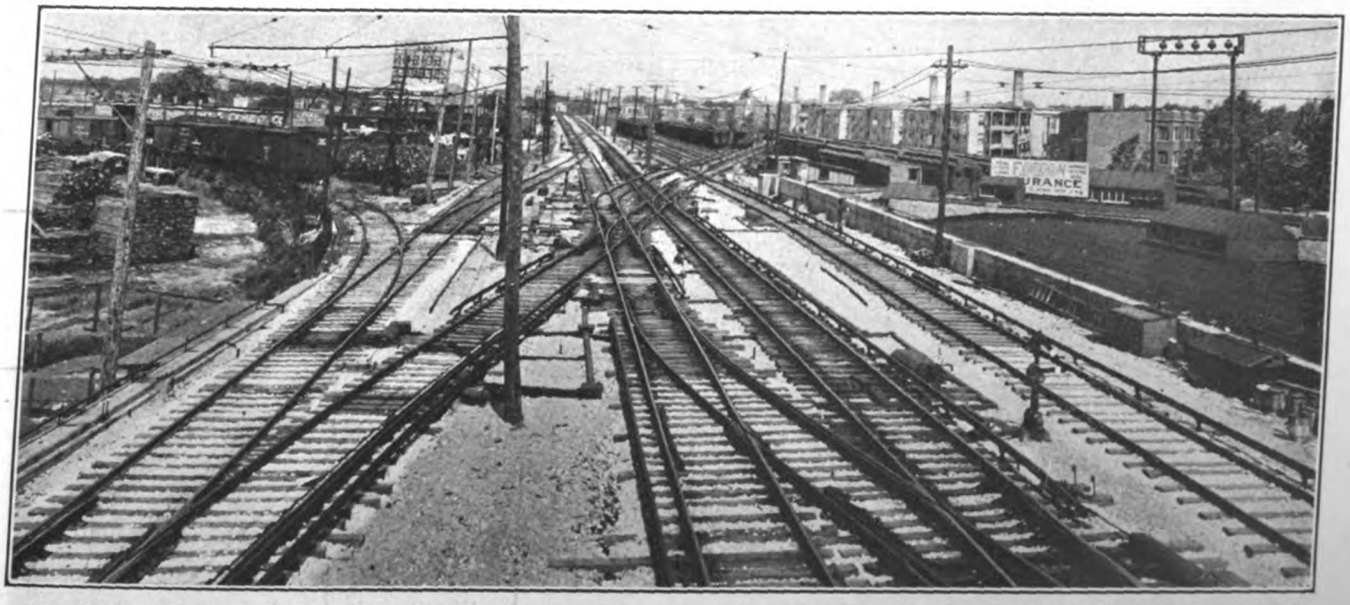
Exterior Wiring Is in Conduit

Twenty ready-built concrete manholes located throughout the plant serve as distributing centers for the wires to the various movements. Vitrified clay conduit of 4-in. x 4-in. duct is used to connect the manholes with each other and the tower manhole, while wood trunking serves as a protection to the wires interconnecting the individual switch movements and manholes. Complete protection for every wire from the machine to its terminus at the movement is thus assured. Multiple conductor cable with braided covering is used throughout.

Extra heavy galvanized 2-in. pipe is used for the main air line, with drainage tanks set in concrete containers placed at intervals throughout the line. Where the air line is apt to come in contact with ground it is wrapped with burlap and pitch, preventing electrolysis to a large extent. Emergency air lines are run to bypass any break or leak in the main air line, which has been provided with cutout valves so arranged that such a damaged section may be cut out without interference with the rest of the plant.

This Type of Dwarf Signal Is Used Throughout the Plant

The switch movements have adjustable lock areas and 5-in. diameter cylinders, and are equipped with cutout valves, so that after a switch movement is com-



This View of the North End of Plant Shows a Portion of the System Controlled, Including the Two-Track Main and Yard Lead

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pleted the air pressure is cut off automatically. However, should the switch point open up, the air valve will again cut in the air pressure, throwing the switch to the proper position and locking it. This action saves air, and provides a safety feature as well.

Indication boxes are of the pole changer type and embody the polarized signal selection and switch control. This system of interlocking insures the closure and locking of all switch points in a "line-up" before the governing signals can be cleared. If a switch point opens up or is out of adjustment, the signal and trip governing that line-up would go to "stop" position automatically. Detector bars are not used on this installation, a.c. track circuits actuating track control relays taking their place. When a train is over a switch the track relay is de-energized and the lever controlling the switch is locked in position, until the train has passed out of the limits of that track circuit. Indication lights on the machine located immediately beneath the operator's levers, as well as the track diagram lights, afford an additional check on the operator. Under each switch lever on the machine is an electric light indicator which shows green when the track circuit controlling the lever is unoccupied. The track diagram previously referred to is a conventional layout of the plant with different colored paint representing the various track circuits. A small lamp controlled by the track circuit relay is mounted on the diagram at the center of each circuit, and is illuminated when that particular circuit is clear.

Protection Afforded Against Wrong Movements

The towerman or operator may follow the movement of all trains through his plant, note the positions of the switches by indication lever lights, and the positions of the trains by the track diagram. Should he attempt to move the wrong lever at such a time the mechanical machine lock would prevent him.

The machine proper has fifty-one levers mounted on the front of the case, which is locked and the key placed under seal. In case of trouble in the machine, the seal is broken and the case unlocked. A report of an unusual occurrence of this kind is sent to the dispatcher. At each end of the machine is a push button which operates whistles at either end of the plant, calling the maintainer to a telephone. A system of whistle signals is also used to call trains from the yards. Immediately in front of the operator, overhanging the machine, is a pair of cords with handles which operate a siren whistle located on the outside of the tower. Should an emergency arise, the whistle is blown as a signal for all trains within hearing to come to an emergency stop. This same order applies over the entire system through interlocking plants. No derails are used on the main tracks, a track trip being used to bring the train to an emergency stop. When the trip is in "stop" position and a train passes over, the trip valve on the train air-line is opened, setting the brakes to emergency.

Since the plant was put in service many flexible train movements have been made possible, all of which aid traffic. For example, a southbound elevated train makes a station stop and collectors enter the cars to collect fares for the city zone. Another "L" train follows into the other southbound station pocket. The track diagram indicates the approach of a North Shore train going south. To speed up traffic, the towerman lines up the northbound main for reverse traffic operation, and runs the North Shore train around the two "L" trains. Much time is saved daily in this way by using "line-ups," which were impossible with the old plant operated by five switchmen, and more flexible and safer operation is obtained at far less cost.

An Idea for Off-the-Car Peak Power Load

Suggestion for Applying the Heater Load to Valleys in the Motor Curve and Cutting It Off During Maximum Acceleration Period

By J. A. Horton
New York, N. Y.

Of the total energy used by an electrically propelled, electrically heated car during an average winter trip, from 20 to 35 per cent is dissipated by the heaters. The percentage depends upon the active heater capacity, upon the existing heating regulations, upon the weight of the car and upon the efficiency with which the car is handled. The explanation of the high ratio is, of course, that the heating load represents a constant demand on the energy source, while the propelling load is intermittent with periods of stopping and of coasting.

In order to maintain a certain temperature in a car of given inside volume, operated under given conditions of schedule, traffic and heat regulations, the expenditure of a certain amount of electric energy is unavoidable, although its magnitude may be minimized by striving for conditions favorable to electric heating —such conditions, for example, as are established by adopting thermostatic control and by enforcing wise regulations in regard to ventilation and opening of doors.

Ordinarily, the heating load is superimposed upon the motor load, raising every point of the total energy curve by an amount exactly equal to the heating load and making no distinction between peaks and valleys of the starting, running and stopping cycles. Thus, the heater loads, as ordinarily disposed, raise the load peak of every car and tend to raise the power station load peaks.

This suggests the idea that the opening and closing of the heater circuits be governed, to a certain extent, by operation of a series relay dependent for action upon the motor current and so adjusted as to keep the heater circuits open during all periods of acceleration. Under this condition the heater current would be subtracted from the present peak current of every car operating cycle. The heater energy consumption per car would be decreased a little, but not enough to reduce materially the effectiveness of the heaters. It is conceivable that the relay might be adjusted to close the heater circuit only after the accelerating period had passed and the cycle had extended well into the motor curve. By keeping the heater load off the motor load peak, the holding of the maximum heater current to a minimum value would become a matter of less moment. Indeed, a larger value of heating current, in conjunction with thermostatic control, might even be considered an advantage in that the greater current would enable the heaters to heat the car to the cut-off temperature more promptly.

Simultaneous with decreasing the current peak demand per car, there would be a tendency toward improving line voltage conditions, especially in congested

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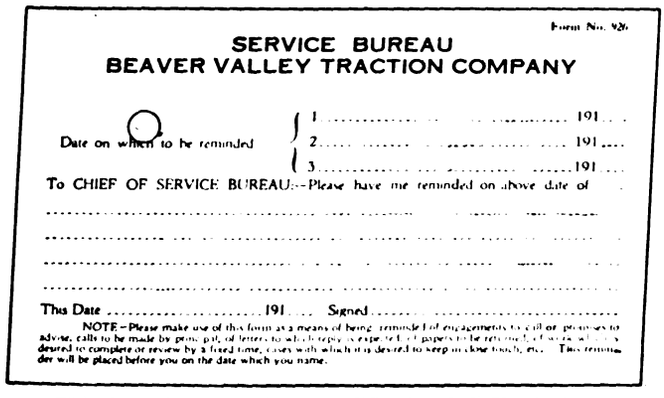
localities, and toward stabilizing rotary-converter adjustments of power factor. The greatest effect, however, would be the direct one upon the prime-mover stand-by capacity necessary in providing for station load peaks. Take, for example, a road operating a schedule of 100 cars, each of which might consume 10 amp. heating current. The total steady drain due to the heaters would be 1,000 amp., which, at a voltage of 600, would be more than 600 kw. A 600-kw. generator with its turbine and auxiliaries would cost much more than would the devices required to transpose the heater load off the power peaks of the 100 cars, and the figures become more impressive as the number of cars is increased. A 2,000 car schedule, for example, imposes upon any existing station loads—peaks and valleys alike—a heater current of 20,000 amp., or 12,000 kw.

The modern trend is toward light cars because they absorb less energy by reason of less dead weight to be hauled. It takes just as much energy, if not more, to heat a light car as it does to heat a heavy one, under like conditions. Therefore as the ideal light-weight car gradually becomes realized, of more moment is the relatively larger consumption of the heaters, as well as their relatively greater influence upon load peaks. Thermostatic control has accomplished the feat of supplying heat only as needed. Let the relay contribute its part toward maximum efficiency and minimum peak ascendency.

Novel Call-Up File

AS A MEANS of insuring that engagements will be kept, a novel method has been installed at the offices of the Beaver Valley Traction Company, New Brighton, Pa., by W. H. Boyce, general manager. When any individual has made an engagement for a specific date, or has any topic about which he should take action, he fills out the necessary information upon the 3-in.x 5-in. card shown in the illustration. This form is placed in the outgoing mail basket and no further attention need be paid by the executive. These cards are kept by the service bureau, which is a consolidation of all


Form No. 926

SERVICE BUREAU
BEAVER VALLEY TRACTION COMPANY

Date on which to be reminded
1 ..... 191...
2 ..... 191...
3 ..... 191...

To CHIEF OF SERVICE BUREAU:—Please have me reminded on above date of

This Date ..... 191... Signed .....

NOTE—Please make use of this form as a means of being reminded of engagements to call or promises to advise, calls to be made by principal, of letters to which reply is expected, of papers to be returned, of work which is desired to complete or review by a fixed time, cases with which it is desired to keep in close touch, etc. This reminder will be placed before you on the date which you name.

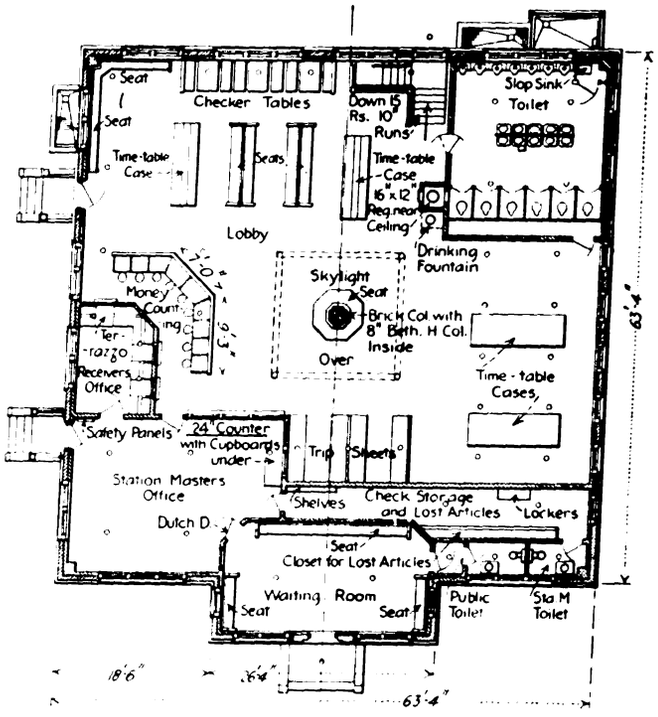
This Card Is the Basis of an Effective Call-Up System

the clerical and stenographic forces at the company's office, being filed under their respective dates. The head of the service bureau reminds each person on the date of the proposed engagement, merely by placing the card on his desk. In case the engagement is not completed, or supplementary action must be taken, this is noted upon the second or third lines provided on the card, which is then returned to the service bureau.

Attractive Division Headquarters at Medford

Recently Erected by the Boston Elevated Railway at a Cost of About Fifty Thousand Dollars —Plenty of Room for Men

THE accompanying illustrations show the very attractive division headquarters building, recently completed in Medford, Mass., by the Boston Elevated Railway. It adjoins the Salem Street carhouse of the surface division of the company and contains a waiting room for passengers, the station master's office and



Plan of Ground Floor of Lobby Building, Medford

accommodations for the platform men and other employees operating out of the Salem Street carhouse.

The building is one story in height but with a commodious and well-lighted basement, which contains a shower bath and dressing room as well as the heating plant of the building. During the summer, when this heating plant is not in service, hot water for the shower bath is provided by a gas heater which automatically furnishes the required supply. The rest of the basement is occupied by lockers.

The building is approximately square, being 63 ft. 4 in. over all in both front and side dimensions.

The waiting room is in the front of the building and the station master's office to the left with a separate entrance, but with a door connecting with the waiting room. Both of these rooms have toilet facilities. The check, storage and lost articles department adjoins the station master's department, but there is a window opening into the public waiting room. It is well provided with shelves and cupboards for the storage of articles.

The receiver's office adjoins the station master's office but also has window openings into the employees' lobby. Directly in front of these openings is a money counting table with nine compartments, where the conductors make up their money and records. Also adjoining the

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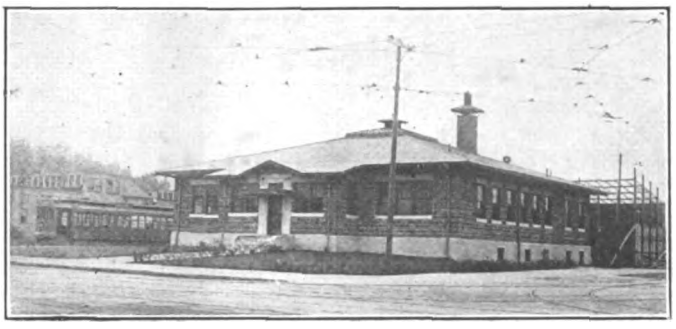
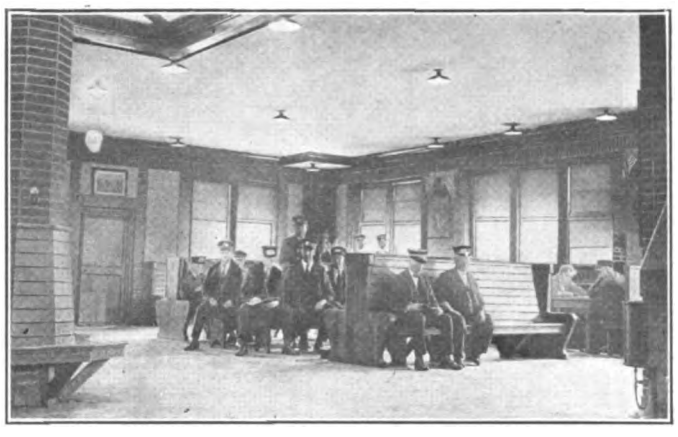
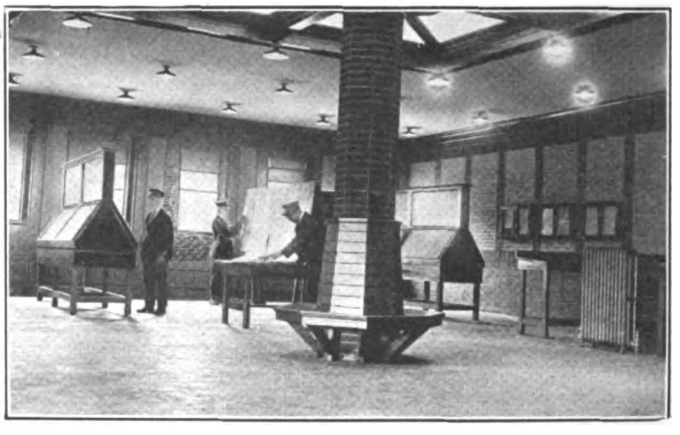


These Division Headquarters Have a Pleasing Exterior. There Is Plenty of Room for the Men to Study the Run Sheets and Wait Between Runs

station master's office are the counters for making up trip sheets.

The remainder of the lobby floor, which is light and spacious, is taken up with seats, time-table cases, a row of checker tables and a toilet room. Daylight lighting is from a rotunda and large side windows, and the artificial lighting is supplied by ceiling lights and reflectors.

The interior finish of the walls is attractive, being yellow brick paneled by dark red bricks. The woodwork is of North Carolina pine, the center pillar being cased with dark red brick. The floors are of red top concrete, with a floor hardener incorporated.

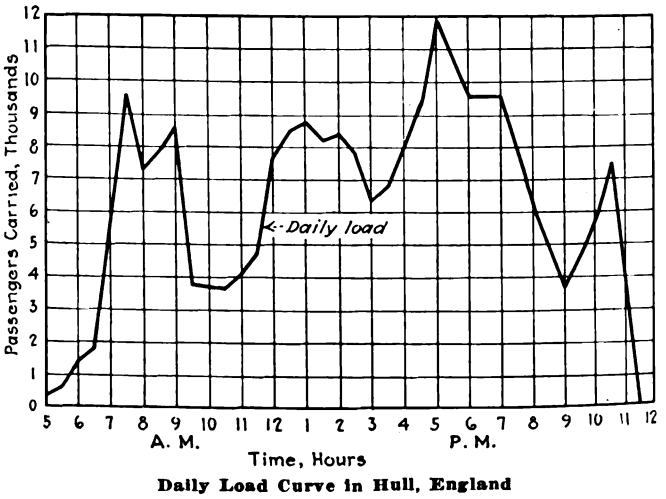
The foundations and first story girders are of reinforced concrete, above which the building is of brick with tapestry tile facing of dark maroon and light colors. The building has concrete lintels and a slate roof. Its cost, erected, was about $50,000.

The area containing this lobby building and adjoining carhouse and storage tracks is inclosed by a chain link fabric fence, 7 ft. high. This fence is made up of No. 6 wire in a 2-in. mesh and is supported on 2½-in. pipe posts and 3-in. pipe corner posts, set in concrete. At the top of the mesh wire there is a 1⅝-in pipe top rail, and above this will be five strands of barbed wire, carried on extension arms. This construction makes a practically impenetrable barrier against mischievous persons.

Mid-day Travel in England

THE accompanying characteristic daily load curve of the tramways of Hull, England, appeared in a paper on "Tramways from a Traffic Point of View," presented by E. S. Rayner before the Institute of Transport of Great Britain at a recent meeting held by that organization.

Mr. Rayner explained that this curve may be taken as typical of the tramways in the larger cities in England outside of London. The peaks represent approximately 50 per cent of the total passengers carried, and the load factor, i.e., the mean load, referred to the maximum load is 54 per cent. The morning peak equals 18 per cent of the total peak load, the mid-day peak is 25 per cent of the total peak load, and the



Daily Load Curve in Hull, England

afternoon peak is 46 per cent of the total peak load. The rides per capita of population per year in Hull are 213. London has only two peaks, a morning and an afternoon.

In spite of the extension of bus lines, the speaker did not feel discouraged about the tramway situation and pointed out a continual increase in the traffic in Great Britain, as shown by the following figures:

		Increase
1900	1,065,374,347	.....
1914	3,301,814,820	2,236,440,473
1922	4,256,268,692	954,453,872

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Improvements Possible in Subway Construction and Operation

A Continuous Platform Between Two Tracks Instead of Side Station Platforms Is Suggested—With This Construction Station Stops Can Be Changed to Suit Altered Conditions, and Other Advantages Are Obtained —The Merits of Skip Stops for Local Subway Service Are Also Set Forth

By Philip Sachs
Assistant Engineer New York Transit Commission

ONE of the principal shortcomings of the present system of subway design is its lack of elasticity, caused by the fact that the subway stations are fixed as to location and length of platforms. The original subway in New York was designed to accommodate eight-car express trains and five-car locals. The platforms have since been lengthened to accommodate ten-car expresses and six-car locals. We could well stand another increase in train length, and it is hard to tell when the limit will be reached, but each such step is costly and wasteful. The train length is an important factor in determining the spacing of stations. Some stations are only four blocks apart now. In the case of a five-car train, for which the line was originally designed, the train occupied 25 per cent of the distance between stations. A ten-car train would occupy 50 per cent of the distance. This condition tends to choke up the line, increase the train headway and reduce the efficiency of operation.

A subway is built not as a temporary expediency, but for permanent use, and to be of real utility it should conform to the life of the city, or that section of it which it traverses. This cannot be said of the present system, which is destined to remain in its original shape for all time. Some sections of the city, like Washington Heights and the Grand Central zone, have undergone tremendous development since the completion of the original subway, yet the station locations are the same now as they were then.

To overcome these objections and gain other advantages, it is proposed to provide a continuous station platform for the entire length of line. It can be shown that this improvement will involve little or no additional cost when a subway is constructed. A certain type of structure of the New York City subway system will be used as a basis.

Local stations average eight blocks apart and are about two blocks long. The platforms then occupy 25 per cent of the length of line. Since there are two platforms to a station, each about 12 ft. wide, to make these continuous would involve an enlargement of the present cross-section by the width of two platforms for 75 per cent of the length of line. However, if we stagger the uptown and downtown stations and place them end to end on an island platform instead of alongside of each other, they would occupy 50 per cent of the length of line, and if made continuous would only leave 50 per cent of one platform to be accounted for, or an average width of 6 ft. This can be accounted for as follows:

Fig. 1 is a standard cross-section for a certain type of two-track structure between stations and shows that the distance from center line of track to inside face to wall is 7 ft. 3 in. Wherever there is no duct bench on the side, the corresponding distance is 6 ft. By placing the ducts underneath the platform, we would, therefore, gain 1 ft. 3 in. on a side, or a total of 2 ft. 6 in. Inasmuch as this duct bench extends between

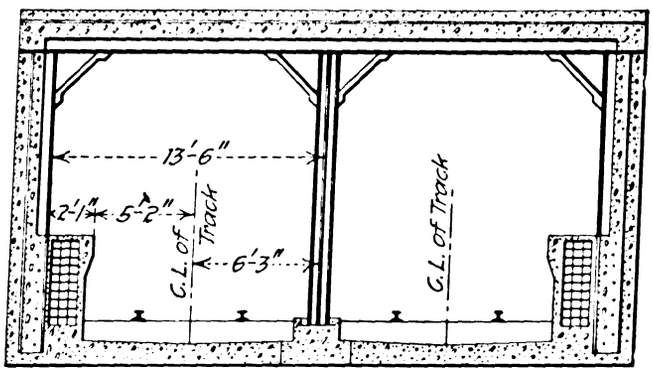

Fig. 1—Typical Cross-Section of a Two-Track Subway

stations only, the average saving is 2 ft. 6 in. x 0.75, or 1 ft. 10½ in.

Referring to the same figure, it will be seen that the distance from center line of track to center of center column is 6 ft. 3 in. The corresponding standard distance to edge of platform is 4 ft. 9½ in. Through a center platform, we therefore save twice the difference between the above two figures, or 2 ft. 11 in. Adding to this figure 1 ft. 10½ in., we arrive at a total of 4 ft. 9½ in.

In other words, by averaging the width of the present structure at stations and between stations and placing the ducts in the center, we get a uniform structure of constant cross-section, with a center platform substantially 12 ft. wide, which compares favorably with platforms of any station on the existing lines. It is important to bear in mind that any portion of this platform is to serve only one set of trains, that is, either uptown or downtown, and that no portion of it will be shared laterally by two trains. In other words, if we have a station at Forty-second Street, the uptown trains will stop between Forty-second and Forty-fourth Streets, while the downtown trains will stop between Forty-second and Fortieth Streets.

Suitable entrances may be provided through overhead mezzanines. Four-foot stairways placed at frequent intervals would serve the purpose.

The extra depth of structure made necessary to pro-

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vide room for overhead entrances may be utilized to provide a continuous mezzanine without additional expense, for once the street is excavated to proper depth, it would be just as expensive to backfill the trench as to provide a mezzanine in the space. A portion of this mezzanine may be utilized for special purposes, such as stores, storage or some pipe structures.

In Fig. 2 is given a cross-section of the proposed construction with a mezzanine. The bents are about 5 ft. centers, center columns 15 ft. apart, and longitudinal girders 25 ft. long, involving a cantilever of 5 ft. on each side, and a space of 5 ft. between girders for the purpose of permitting subsurface structures to pass through.

Actual estimates of cost cannot be made until a complete design has been prepared. But the writer is confident that a structure like this, including a continuous mezzanine, can be built for the same amount of money that it would take to build a structure similar to the present type.

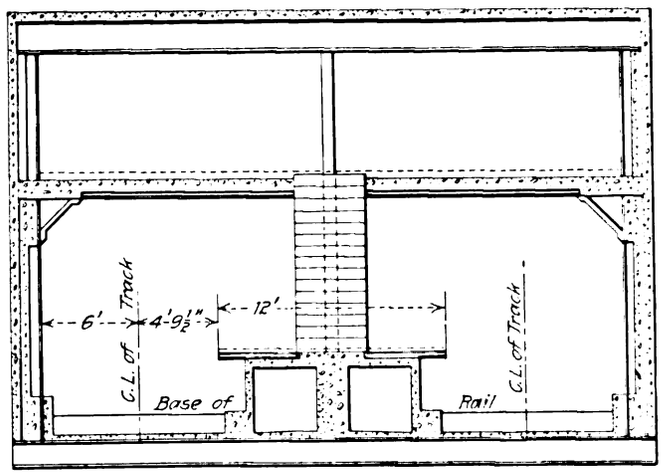

Fig. 2—Cross-Section of Proposed Design with Continuous Center Platform Serving Both Tracks

In Fig. 3 is shown a plan of a four-track local-express system. It will be noted that the local tracks are inside, with a continuous platform between them, while the express tracks are on the outside with intermittent side platforms. This arrangement does away with the elaborate approaches and curved tracks of the present. At the same time, it provides the express platforms with much of the flexibility possessed by the local platform. Under the new system the transfer between uptown and downtown local lines would be facilitated, but the transfer between express and local trains would have to be by walking through the mezzanine. This, however, should hardly be regarded as a disadvantage. By imposing a slight obstacle upon the transfer facilities, we would materially reduce the volume of transfers and thus get a better distribution of traffic, and a fuller utilization of the local tracks.

With entrances and exits every other block, we could increase the distance between stations two blocks without increasing the average length of walk, for, when stations are ten blocks apart, the distance between their extreme entrances is only eight blocks. As a result of increasing the distance between stations, it may be found practical to employ a higher maximum speed, which, of course, would be reflected in the schedule speed. The reduction in the number of stops between 25 per cent and 50 per cent would further produce a material increase in the schedule speed. This would tend to reduce the advantage of the expresses and increase the popularity and patronage of the locals.

Stations, of course, could be located anywhere, but great care should be exercised in fixing these locations with a view to operating conditions rather than local considerations, and a firm policy should be adopted to adhere to these locations and not to be swayed by the clamor of local or real estate interests for stations. This, of course, applies to any other system as well.

From an operating standpoint, stations should be located as far apart as possible, and the spacing should be as uniform as possible. A uniform spacing of stations for given districts, based upon volume of traffic, tends to equalize station congestion throughout the line and prevents extreme congestion at isolated points, which under the present system is apt to undermine the efficiency of the entire line. A policy like this is really essential for the smooth, efficient and economic operation of trains. It would also discourage agitation for new stations, for a new station would mean a relocation of every station in the district and perhaps on the entire line, which, of course, should not be done except at rare intervals and for good reasons.

The safety features of this plan also should not be overlooked. With a continuous platform, accidents to passengers due to fires on trains could be entirely avoided, for the moment a fire is noted the train would be brought to a standstill and the passengers let out.

This type of structure will inject elasticity and flexibility into a transportation system. Starting with a five-car train when a line is completed, we will gradually increase the train length until it reaches ten cars in say five years. By this time the line may be ripe for a general readjustment of stations. All stations will be pushed further apart on account of the longer trains now in use. If an error was made in the original location of a station, we shall have an opportunity of correcting it. If a section has undergone unusual development, it will receive special attention. We may then proceed to increase the train length, if there is a demand for it, until the practical limit has been reached.

Skip Stop Operation Another Saving

The present local-express system while highly desirable in some respects is equally objectionable in others. The express trains can transport traffic more quickly and cheaply than locals, but their popularity tends to defeat the very advantage that makes them popular. Practically 100 per cent of the local passengers change for the express trains at express stations, and the crowding and congestion caused by it are responsible for most of the delays and breakdowns, which result in lower schedule speed and increased headways.

Another shortcoming of the system is the unequal distribution of traffic between the expresses and locals. The local trains can hardly be regarded as an independent system. Their function is mainly to feed the expresses, and an observation of conditions at many points of the line will show that while the expresses are over-congested the locals are half empty. As a result, while we have four tracks, from the standpoint of capacity we have hardly more than two.

To overcome these and many other objections, it is proposed to operate local trains on the basis of alternate trains making alternate stops. In other words, every train will stop at one station and skip the next one, while the following train will reverse the process. By bringing the stations somewhat closer together than

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they are spaced now, and providing them with end entrances, the maximum walk to and from the stations will not be increased; at the same time the schedule speed would be improved to such an extent as to compare favorably with the speed of the local-express of the present.

At the same time, the train headway will be materially reduced, for while one train is stopping at a station, the train behind, instead of having to wait outside the station for the first train to pull out, will stop several blocks back at another station, and when it will reach the station in question will find a clear road.

The train headway is composed of two elements—(1) running headway and (2) station headway. The running headway is the time interval between two consecutive trains moving on one track in the same direction; the station headway is the additional loss of time due to stopping at stations. It can be proved that under the most exacting requirements of the block signals, running headway can be kept down to one minute with absolute safety. The station headway, however, imposes a loss of another minute as follows:

Acceleration	14.0 second
Retardation	9.2 second
Station stop	30.0 seconds
Miscellaneous	6.8 seconds
Total	60.0 seconds

The reduction of this station headway has been the aim of operating engineers for many years, but in spite of much effort and the introduction of many devices, including time control signals, the working headway is still two minutes, the same as it was many years ago, although the theoretical headway is supposed to be about a minute and a half. By adopting the method of operation here proposed, we would cut down the station headway at least in two, for while one train is stopping at a station, only the train immediately back of it will be delayed to the extent of the station stop. The third train reaching the station will only have to be separated by one running headway from the second one. In other words, the time interval between two alternate trains will be equal to two running headways, plus one station headway, and the average headway between two consecutive trains will be one running headway and half a station headway.

The operation of this system is shown on the diagram, Fig. 4. On this diagram, horizontal dimensions represent distances and vertical dimensions time. Each horizontal space represents 250 ft., or one block, and each vertical space represents twenty seconds. Stations are indicated by heavy lines on the bottom of the diagram. The curves represent train performances, and are based upon the following assumptions:

Maximum speed	35 miles per hour
Acceleration	1.25 miles per hour per second
Retardation	1.9 miles per hour per second
Station stop	30 seconds
Length of train	500 feet

Trains as well as stations are designated *A*-1, *A*-2. *B*-1, *B*-2, etc. *A* trains will stop at *A* stations, and *B* trains at *B* stations. In practice they will similarly be designated.

It will be noticed from these curves that the time interval between any two alternate curves is three minutes, or an average headway of a minute and a half.

This method of operation will furnish us with the equivalent of a reservoir station without its objectionable features of turnouts, short radii curves, elaborate station approaches and extra tracks. Like a reservoir station this method of operation will reduce the influence of station stops upon headway.

An analysis of the effects of this method of operation upon the various functions of the railroad follows:

Signal System—Although local tracks on the present system are not protected by signals throughout their length, the increased capacity of the proposed system as well as the higher speed employed will make such protection indispensable. A signal system has therefore been laid out which is shown diagrammatically on the upper portion of the drawing, Fig. 4, and which conforms in essence to all requirements of a standard block signal system. The length of overlap was taken as 500 ft., and is equivalent to the braking distance and an excess of about 10 per cent. The vertical lines

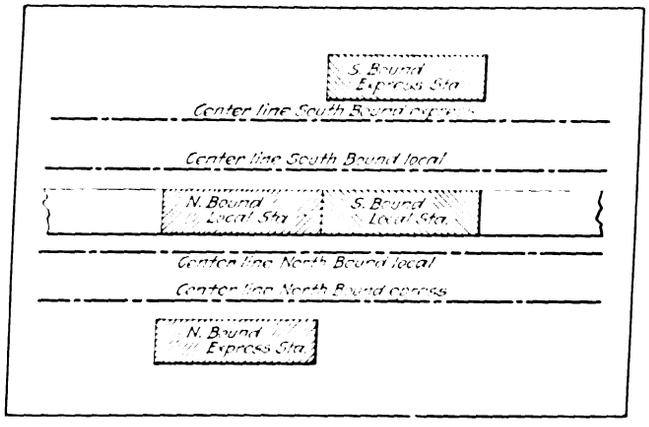

Fig. 3—Proposed Arrangement of Local and Express Platforms at Express Stop

on the line *A*-2 represent the signals set up by the moving train, i.e., the danger signals are shown by solid lines and the caution signals by dotted lines.

It will be seen that at any point there are two danger signals and one caution signal separating two moving trains, and that there is an interval of ten seconds or more between the forward end of a moving train and the nearest caution signal ahead. An examination of these curves will also show that we can have a standard block signal system on local tracks that will operate with perfect freedom, without the constraint that is now felt at express stations, without reducing the block length at stations and without having to resort to the time control signals.

It would also be possible to lay out a signal system at random with nothing but the braking length to be guided by and then lay out stations where we choose and still be able to maintain a ninety-second headway. Similarly, we shall be able to relocate a station without having to change the signal system.

Capacity—On the present system ten-car express trains and six-car locals are being operated, making a total of sixteen cars. At two-minute headway, the capacity of this system would be 16 × 30 = 480 cars per hour.

However, not all the locals are operated full. In fact, it is maintained by traffic experts that the locals are useless as far as capacity goes, that they merely serve as feeders for the expresses and carry no independent traffic to speak of. An assumption, then, that the effective capacity of the locals is 50 per cent of the nominal

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should be regarded as conservative. On this basis we have ten express cars and three effective locals, or a total of thirteen cars, and the capacity corresponding to it—10 × 40 = 400 cars per hour. In other words, this method of operation would give us a four-track capacity on two tracks.

Furthermore, this capacity merely represents the initial capacity of a highly elastic system, which can be expanded by increasing the train length to the maximum feasible limit.

Schedule Speed—Three factors will combine to raise

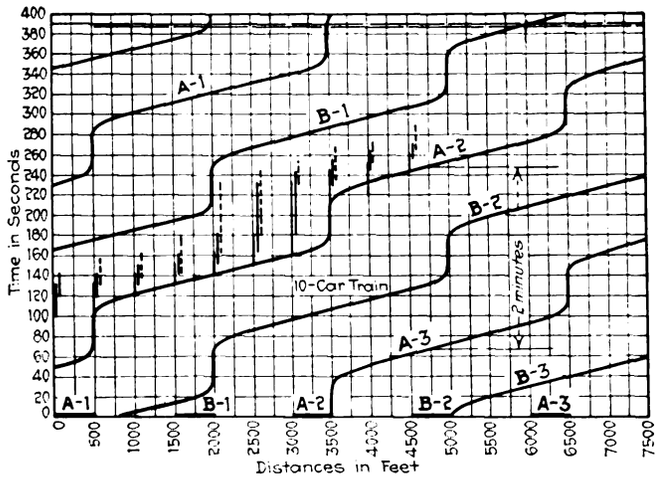

Fig. 4—Distance-Time Graph Showing Alternate Stop Plan of Operation with Signal System for Ten-Car Trains

the schedule speed of this system as compared with that of the locals of the present system: (1) The elimination of the express station will remove the most important cause for delays, congestion and high headway; (2) the increased distance between stops and block-signal protection will make a higher maximum speed possible; (3) the reduction in the number of stops.

As a result of these, the schedule speed of the proposed system should compare favorably with the local-express speed of the present system for a great majority of cases, and will show but a small loss when compared with express speed.

Power Consumption—As is well known, acceleration constitutes the principal drain upon the power supply, and in the case under consideration, amounts to about 75 per cent of the total. By reducing the number of steps about 40 per cent, we would reduce the power consumption 30 per cent.

Another source of economy in the power supply will become apparent from an examination of the curves on Fig. 4. It will be noticed that any train on leaving a station will be 1,500 ft. from the nearest danger signal, or forward end of nearest train. Inasmuch as the train ahead is moving at full speed at the same time as the train in question is accelerating, the distance between them will continually increase until the next station is reached. If one train is for some reason delayed at a station it will maintain a caution signal at the next station back. That means that there will be no reason for any train stopping between stations as a result of traffic congestion and a motorman upon receiving a clear signal will be sure to find a clear road to the next station, except for motor troubles or causes other than traffic congestion. The combined saving as a result of these two features should amount to at least 40 per cent.

As a result of a reduction in the power consumption of 40 per cent, the required power plant capacity will correspondingly be reduced.

Other Operating Expenses—Substantial economies will also be effected in the cost of rolling stock, maintenance of way and equipment, and operating expenses.

CONCLUSION

While the two improvements suggested in this paper are to a certain extent independent of each other, with distinct advantages for each, it is only through a combination of the two that the greatest benefits, leading to a solution of the transportation problem, will result.

Removable Posts for Safety Zone

A NEW type of safety zone is being given a trial in the national capital by the Washington Railway & Electric Company. One installation has been made at the southwest corner of Fourteenth and F Streets, N. W., flanking the east side of the Willard Hotel, and three others are planned to make the experiment complete under different traffic conditions.

As shown in the illustration, three 6-in. iron posts are used, placed 25 ft. apart, imbedded 2 ft. in concrete and projecting 4 ft. above the street level. The posts are painted white with black stripes, to attract the attention of vehicular traffic in the daytime, and oil-burning lamps with red globes are placed on top at night. White lines painted on the pavement also mark the zone.

No chains are used to connect the posts, as practice in Washington indicates that the potential danger of loose end chains in accidents increases the import of the collision or accident.

The metal posts are solidly imbedded to withstand impacts with vehicles, yet are removable so as to permit the passage of parades or other mass formations.

In the brief period of its operation, it has been shown that the new system serves its purpose of keeping vehicular traffic away from those about to board or alight from street cars, and also allows easier entrance and exit than if inclosed with a fence or railing.

Striped Iron Posts for Safety Zone in Washington

Washington now has five systems of safety zones—the simple painted rectangle, the painted rectangle with warning lights fixed slightly above the pavement at the corners, the permanent concrete raised platform, the removable wooden platform and this new system.

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Setting Standards for Pull-Ins

In Nashville, Tenn., Pull-Ins Have Been Reduced Nearly Two-Thirds in Two Years—One Factor in This Has Been the Use of Competition for Good Records Among Inspectors

CONVINCED that careful inspection is an important element in improving service, J. J. Connors, carhouse foreman Nashville Railway & Light Company, has devised a simple, effective plan for stimulating competition among inspectors. The fundamental idea is to convince the inspectors of the importance of their jobs and to encourage them to do their best by setting certain reasonable standards of performance. This keeps alive a desirable and interesting spirit of rivalry to obtain the best records, the same spirit which impels a man to strive for excellence in any line of work or sport.

RATING OF VARIOUS EMPLOYEES FOR FIRST THREE MONTHS OF 1923 ON BASIS OF BOGIES SHOWN IN FIG. 1

	Per Cent Rating		
	March	April	May
General inspector	58	100	100
Motor inspector	62½	100	100
Controller man	23	62	42
Carpenter	50	100	100
Motor oiler	70	66⅔	100
Truck workers, Team 1	100	100	100
Truck workers, Team 2	100	100	100
Brakeman	100	100	100
Night shed	80	77	100

In the Nashville carhouse the day work is subdivided among a motor inspector, a controller man, two carpenters, a motor oiler, four truck workers and a brakeman. A general inspector supervises the work. At night a small force inspects all parts of the car.

As a basis for the competition a standard or bogey was set for each man or team of two men. This was done by studying the records of pull-ins and their causes. The standards were set in conference with the inspectors and were agreed to by them as reasonable. The records indicated that ten pull-ins per month due to faults in general inspection is entirely creditable, hence it was decided that the general inspector would be rated as 100 per cent efficient if he had this number or less. The corresponding allowances for the other men are shown in the accompanying chart, which is a sample of those which are posted on the carhouse bulletin board and revised from day to day. The pull-ins, of course, are only those chargeable to inspection, as it would not be fair to rate a man on failures over which he has no control.

Interest centers in the chart reproduced in Fig. 1. The graphical record furnishes an excellent check on the whole pull-in situation. The ratings of the men for three months are shown for comparison in an accompanying table. Another bulletin shows a month's record of pull-ins, subdivided into those chargeable to the carhouse and those chargeable to other departments. Listed also are trifling defects which are not charged to any department. In fact, many of these latter do not involve actually bringing a car into the house. It is the custom on this property to send out a man in a light motor truck to repair minor defects on cars at

COMPARISON OF CAR CHANGES, 1920 AND 1922

1920	Number of Changes	1922	Number of Changes
January	*	January	273
February	953	February	212
March	927	March	243
April	780	April	255
May	625	May	257
June	697	June	219
July	626	July	199
August	*	August	172
September	1,050	September	135
October	901	October	140
November	741	November	150
December	553	December	202
Total	7,853	Total	2,457
Average per day	25.8	Average per day	6.4

*No records available for January and August, 1920.

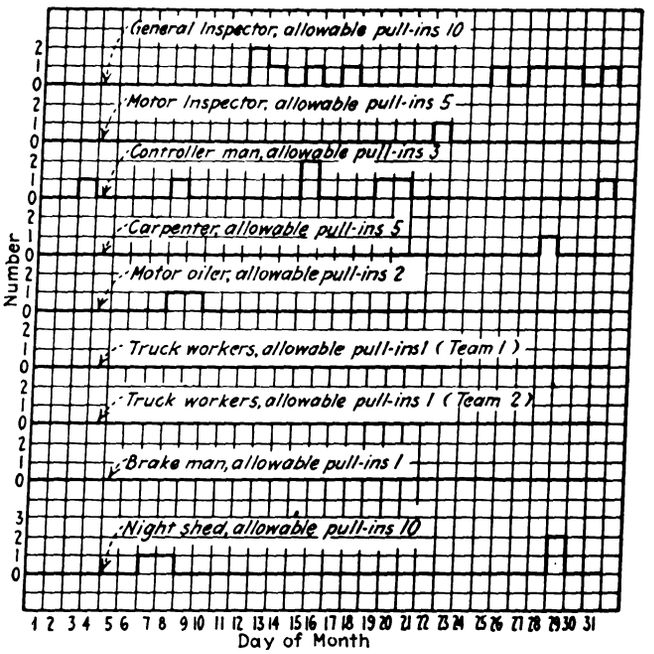

Fig. 1—Daily Pull-In Records for May, 1923, Showing Defects Chargeable to the Several Carhouse Employees

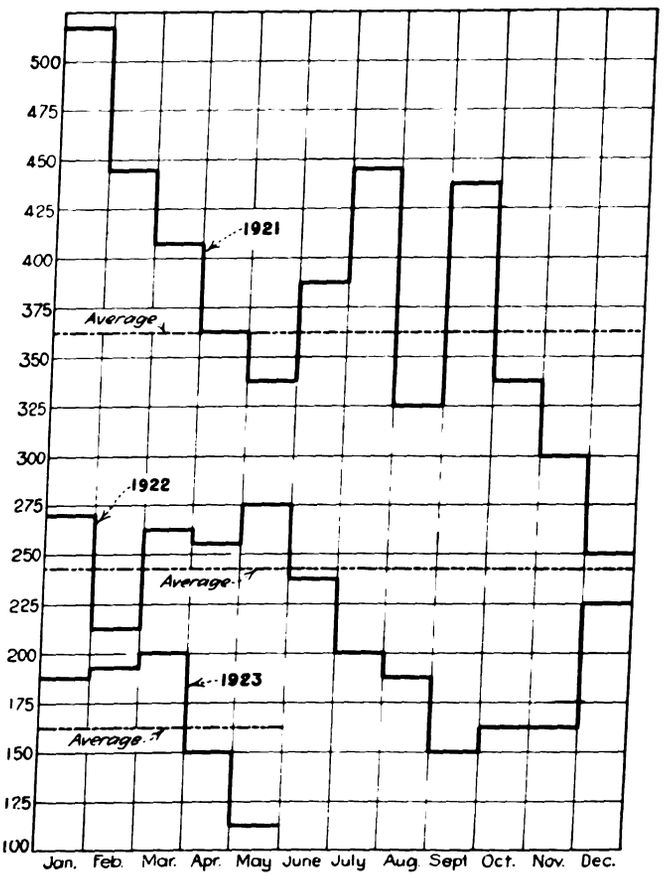

Fig. 2—This Chart Indicates How Pull-Ins Are Being Brought Under Control in Nashville

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terminals or other points. Less time is required for making the repair, in many cases, than if cars were exchanged by the crew, involving movement to and from the carhouse, reading registers, etc.

INSPECTION CARD

CAR NO. **DATE** 19

Each employe must sign name opposite defect remedied by him.

This card must be turned in to master mechanic when inspection is completed.

Motors

Rheostats

Circuit Breakers

Journals

Gears & Pinions

Final Inspector

Fig. 3—Inspection Card Used at Nashville (4½ x 11 In.)

Form T-78 100M 7-7-22

NASHVILLE RAILWAY AND LIGHT CO.

CAR TAG No.

CAR No.

Arrived at Car Barn M.

Name 19

The following repairs were completed M.

Date 19

Signed

Nature of trouble reported by

Was as follows

Car No. is repaired as stated above and ready for service.

Signed

Barn Foreman

NASHVILLE RAILWAY AND LIGHT CO.

CAR TAG No.

LINE

CAR No.

Time Reported M. 19

Nature of trouble reported

Reported by

Received by

Was Reported Telephone

Written Verbal

Reported by MOTORMAN CONDUCTOR

Fig. 4—Car Tags Used in Connection with Inspection Work

Fig. 2 is a chart of monthly averages of pull-ins covering several years, which illustrates the remarkable way in which the pull-ins have been brought under control. Constantly before the men, it furnishes an extra stimulus to endeavor. It is reproduced here principally to show the results of systematic attention to inspection and light overhaul. In a report recently prepared by H. A. Davis, superintendent of railway, the statement was made that in 1922 the total number of car changes was 2,457, or 6.4 per day. He compared this with the record for only ten months of 1920, which was a total of 7,853 car changes, or 25.8 per day. The detailed comparison is given in the accompanying table.

On this property the cars are inspected on a mileage basis, the older cars being inspected every 600 miles, later cars every 800 miles and the most up-to-date cars every 1,000 miles. Figs. 3 and 4 show forms used regularly in connection with the inspection work.

Treated Lignite Has Qualities of Anthracite

CONSTRUCTION of an oven that turns lignite into a substance with similar heating properties to anthracite coal has resulted from experiments conducted by the Bureau of Mines. As a result of the discovery lignite char should be available in the Northwest in hard-coal famines that may occur in the future.

Of the nation's coal resources, it is estimated that nearly one-third is lignite. Of this the greater part is in North and South Dakota and Montana, a territory with a rigorous winter climate, and which annually imports large tonnages of anthracite and bituminous coal with an average railway haul of 1,000 miles. Lignite takes fire quickly from spontaneous combustion, so that its safe storage in even small quantities is exceedingly difficult. It does not "coke," in the sense that bituminous coal cokes, but rather crumbles when being carbonized or when thrown into the fire, and this gives rise to difficulties in firing and substantial loss, as unburned fuel, through the grate bars.

As a result of the experimental work of the Bureau of Mines, a carbonizing oven, which has every indication of being a practical, commercial oven, was designed, constructed, and operated. Quantities of the oven's product, known as lignite char, were later tested and found to possess heating properties very similar to those of anthracite coal. Experiments have been conducted also looking toward the development of suitable grates for the utilization of lignite char.

CARHOUSE PULL-IN REPORT FOR MAY, 1923, NASHVILLE RAILWAY & LIGHT COMPANY

Pull-ins Chargeable to Carhouse	
Defect	Failures
Air	8
Air governor	3
Brakes adjusted	3
Brake rods broke	2
Controllers	7
Rheostats	7
Circuit breakers	2
Motors (miscellaneous)	1
Armature bearings	3
Brush-holders	2
Motor wires	10
Trolleys	2
Car wiring	4
Fenders	1
Total	55

Pull-ins Not Chargeable to Carhouse	
Defect	Failures
Armatures grounded	17
Armatures flat commutator	1
Armature cord	1
Armature wire	1
Armature broken connection	2
Fields grounded	8
Field wires off in case	5
Air motor armatures grounded	3
Safety type air failures	2
Rheostat broken in accident	1
Broken axles	2
Fenders broken by obstructions on track	1
Derailments	5
Struck by automobile	2
Split switch	2
Struck by lightning	1
Journal box burst	1
Found O.K.	1
Total	56

Defects Repaired Without Charge	
Air fuses blown	2
Air brushes reported	2
Brakes (Sylvan Park)	1
Controller fingers	2
Motor (miscellaneous) port lids	2
Motor wire taped	1
Call bells	1
Trolley oiled	1
Trolleys replaced	2
Journals oiled	3
Derailment	5
Roof leaking	1
Total	23
Total pull-ins	111
Average per day	3.5
Chargeable to carhouse	55
Average per day	1.7

(*Signed*) J. J. CONNORS.

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Door Lock for Side-Entrance Cars

Hudson & Manhattan Railroad, After Trial Use on Twenty-five Cars, Is Installing on All Doors Air-Operated Locks of a New Type Together with Indicators Which Show the Door Positions by Means of Colored Lights

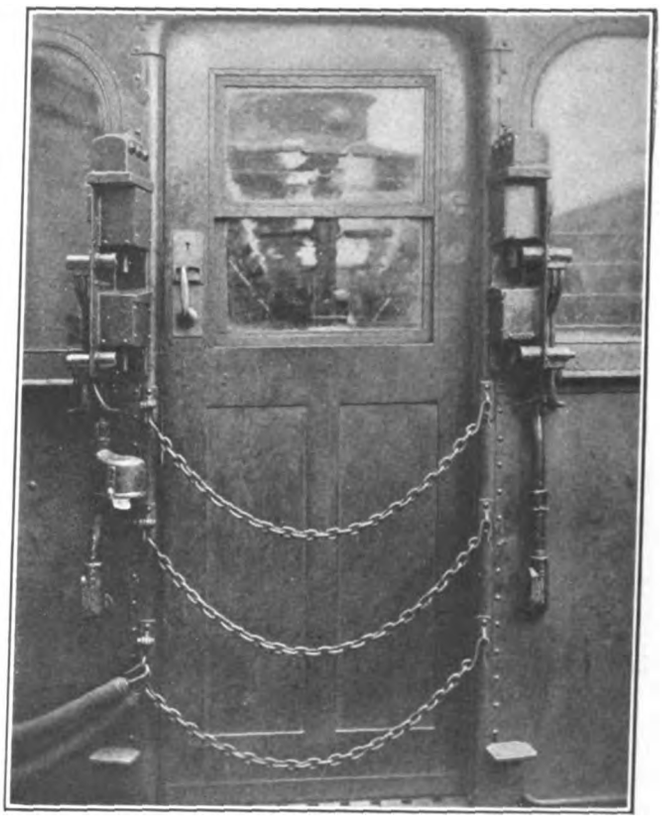
A DEVICE by which the doors of a center- and end-entrance car are automatically locked in the closed position while the car is in motion, but can be released for opening when the car reaches a station, has been worked out for the cars of the Hudson & Manhattan Railroad. In fact, it has been in use on twenty-five cars of that system for about a year, with such satisfactory results that all of the cars are being equipped with the system. Signal lights at the end of each car show to the train guard whether the doors which he controls are closed and locked or not, a red light indicating that they are not locked, and a green light that they are locked. At the same time a light signal in the motorman's cab shows the motorman when all train doors are locked, and, in consequence, whether he can proceed or not. The device is used in connection with pneumatic door-operating mechanisms of the National Pneumatic Company, with which the doors of the Hudson & Manhattan are equipped, and the new door lock will be placed on the market by the National Pneumatic Company.

To understand the operation of the system it should be understood that on the Hudson & Manhattan Railroad there is a train guard between each pair of cars. The trainman between the last two cars of a train operates the end-side doors adjacent to his position and the center-side doors of the rear and next to the rear cars. All other trainmen operate the end-side doors adjacent to their position and the side-center door of the forward car to their position. On each side of the vestibule at each end of each car are two electric switches which control the valves of the door engines on the side of the car on which they are located. The upper switch operates the end-side door and the lower switch the center-side door, although by multiple-circuit arrangement the center-side door is so connected up that that door can be opened from either end of the car, depending upon the direction the car is traveling and which trainman is to operate it.

Signals Show Position of Door Lock to Train Guard

The new door lock is operated by a pneumatic push button, whose position is adjoining the electric door switch, as shown in the illustration of the switch box. Above the switch box are signal lights indicating to the trainman whether the doors under his control are closed and locked. They consist of three lights, red, yellow and green. Of these, red is used for "open door" and green for "locked door" on all cars in the train except the first one, which, for reasons which will be set forth later, uses red and yellow as the significant colors.

A diagram of the air and electric connections of the door-operating and lock mechanism on the car is presented herewith. In this drawing the standard door operating mechanism wiring is shown on the outside and the additional connections for the lock and signal mechanism on the inside of the chart. The heavy lines show the storage-battery feeds used with the door-operating mechanism and the light lines the control lines.



End of Car Showing Signal Box and Locking Push Button

An examination of this chart will show that the lock push button for the center door can be operated from either end of the car. Pressure on the push button admits air to the plunger marked in the diagram, "piston operating lock." If one center-door push button is used, the other end push button is blocked by a ball check at the center door, which, as shown in the chart, admits air from the left-hand push button and not from the right-hand one. To release the lock, a push movement is required, and to open the door mechanism a pull of the switch. This makes it impossible for a person falling or pressing against either or both control mechanisms to open the door. To close the door, no manipulation of the lock push button is necessary, the lock automatically snapping into place as the door takes the closed position. This gives unhampered control to the trainman through the mechanism operating switch shown for quick control of the door, that is to say, it may be reversed to prevent the door striking passengers rushing through the entrance when the door is closing.

To follow the action from this point, it is necessary to refer now to the door lock actuated by the piston operating lock, when the pneumatic push button is operated. This is shown in the smaller drawing on page 449. It consists essentially of a hinged catch, with a roller on the end, as shown as 1, which normally holds the door closed.

When air is admitted to the cylinder 2 the piston

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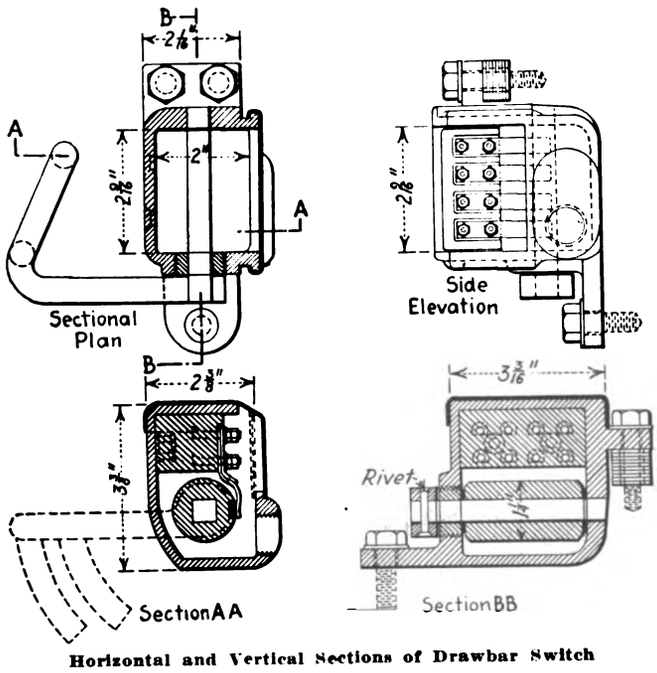


Horizontal and Vertical Sections of Drawbar Switch

raises the locking lever 3, which permits the catch to be pushed back by the opening door. When the door is closed by the door-control switch, the catch automatically slips behind it, holding it fast.

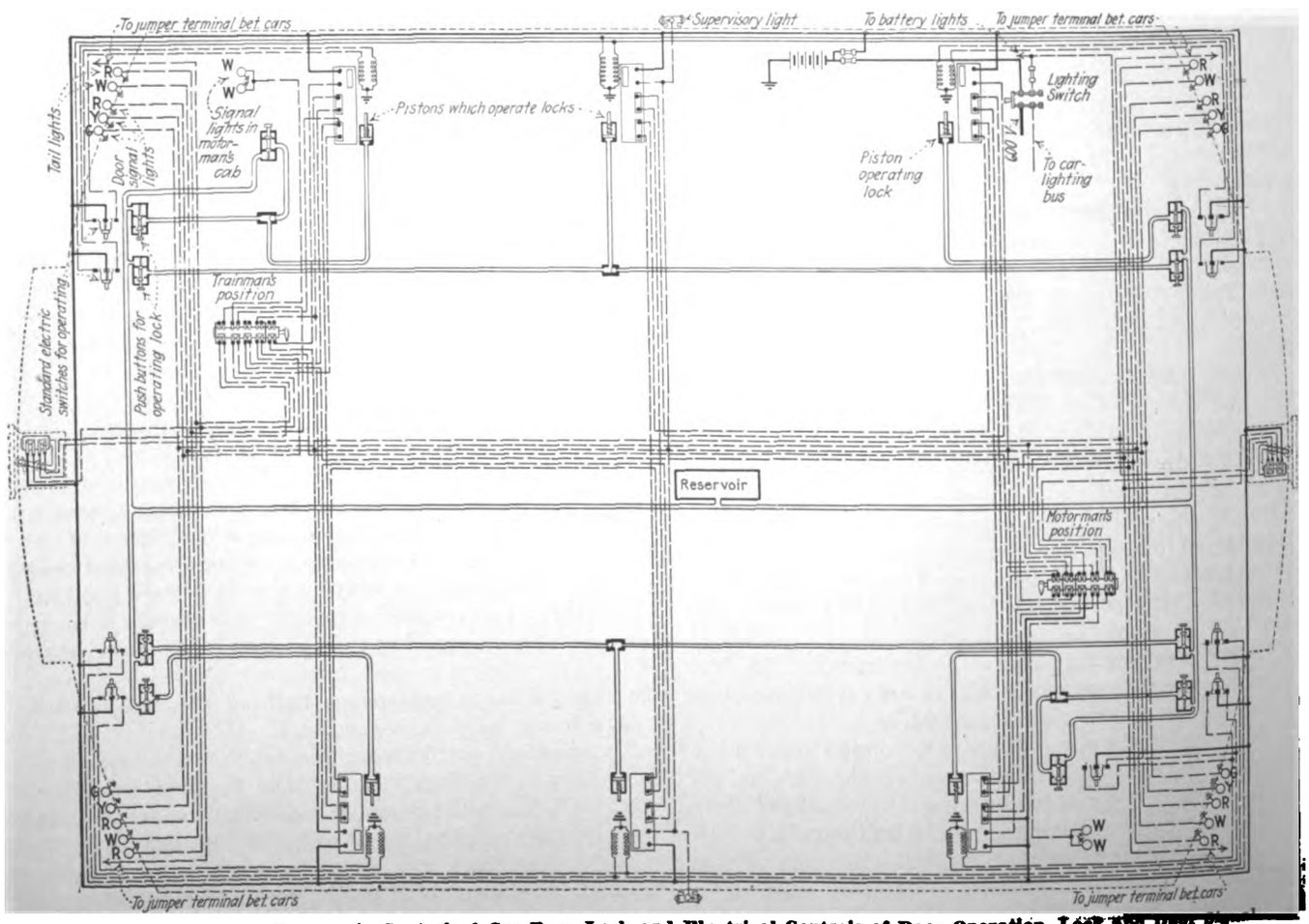
To operate the signal lights and so inform the trainman whether the doors controlled by him are locked or not, the locking lever 3 carries at its outer end a Bakelite contact-making device. By this device, when the lever is at its upper position or when the door catch is out, the contact for the green light is made, and when the lever is at its lower position, corresponding to an open door, the contact for the red light is made.

Different Arrangement Is Used for First Car

The system as described is for all cars except the front car of the train. Here a distinctively different arrangement is desirable because the front right-hand door of the front car forms part of the motorman's cab and often has to be opened part way or entirely for the convenience of the motorman. Hence, by means of the drum switch shown, this door can be cut out of the circuit, but when it is so cut out, the yellow lamp trainman's signal circuit is cut in instead of the green. In this way, the trainmen are obliged to distinguish as regards signals from the first car of the train and the other cars, and the instructions are that all trainmen are to proceed only on green signal except the conductor on the forward car, who shall proceed on yellow signal only.

Signals to Motorman

In addition to the signal lights described, another independent circuit indicates to the motorman when all doors in the train are locked. Electric marker lights at each end of the train are cut in or out by the drawbar switch, shown in the wiring diagram. This drawbar switch is located on top of the drawbar and has a projecting pivoted arm so arranged that the switch cannot be closed when the drawbar to which it is attached is coupled. But at each end of the train, where there is an uncoupled drawbar condition, the switch will close, thereby feeding energy to the electric tail lamps, also energy from the rear end of the train through all doors



Wiring Diagram for Pneumatic Control of Car-Door Lock and Electrical Controls of Door Operation, Lock and Door Signal Indications, Motorman's Indication and Tail-Light Aspects

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in series connection to the motorman's cab indication circuit.

This drawbar connection is shown in detail in the small drawing on page 448. The pivoted arm making the connection has two curved fingers which slide into the drawbar pinholes when there are no coupling pins in place, but these fingers cannot do so if there is a coupling pin in the drawbar. The hub of this contact arm has a drum switch by which the electrical connections are made.

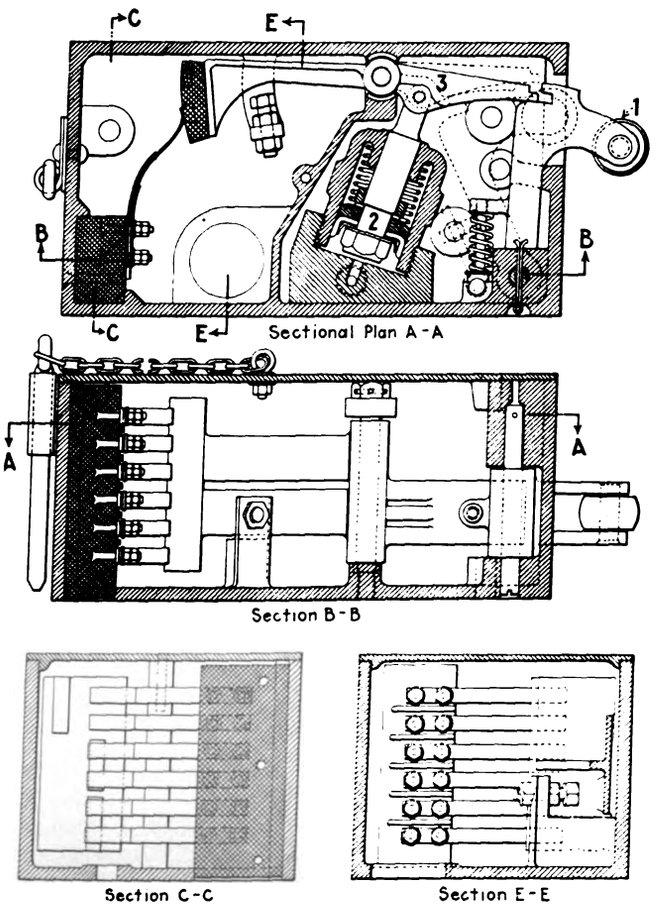
Drum Switches and Platform Guard Signals

Reference has been made to the drum switches shown in the large diagram, marked in one case "trainman's position" and in the other case "motorman's position." There is a switch of this kind located at each end of each car. All switches in the train are set at trainman's position except the one adjacent to the motorman's cab, which is set at motorman's position.

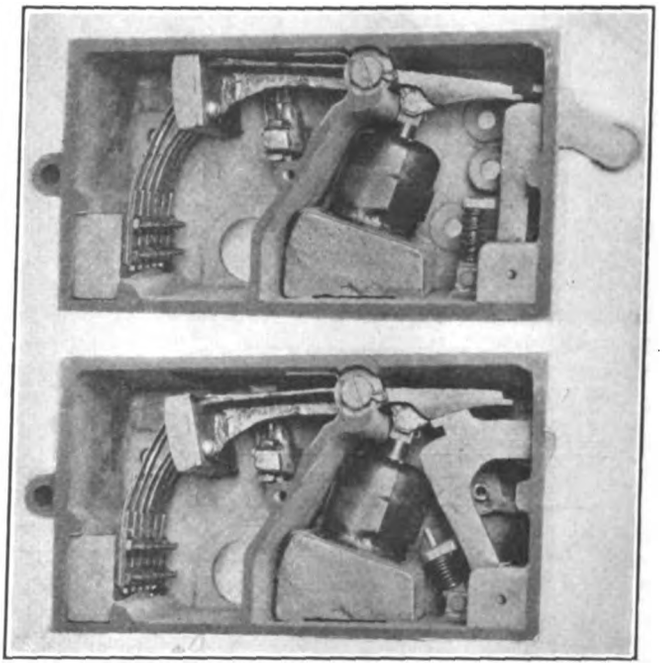
The entire selection of the trainman's indication, motorman's cab indication, red markers to the rear end and white markers to the forward end of the train is through these drum switches, and all circuits are so arranged that should either a trainman or motorman fail to set his switches in the proper position, no green or clear signal indication will be received at his position by a trainman or by the motorman in his cab.

The motorman's lights, marked *WW*, consist of two lamps in multiple, for safety in case one should burn out, and are connected only when the drum switch is in "motorman's position." These lights burn only when all doors of the train are closed and locked.

In addition to the circuits already described, there is



Plan and Sections of Locking Device



Looking Down on the Locking Device. At Top, in Locked Position; at Bottom, in Unlocked Position

a circuit on each car connecting with what is known as a "supervisory light," shown in the upper center of the large diagram. This lamp is on the outside of the car, alongside the center door, and lights up only when the doors of that car are open. The purpose of this light is to enable the platform men easily to determine which doors of a train are not closed, when it is time for a train to start. They can then see which trainman is having difficulty in getting his doors closed, either because of the door sticking, slowly-moving passengers or other causes. If necessary, he can then hasten to that point to correct the trouble.

Mechanical Data

The case housing the vestibule signals, the door switch and the door lock switch measures 22 in. high by 6 in. wide by 7 in. deep; that is to say, it is but slightly larger than the former case holding the door switch only. The lights and sockets throughout are standard automobile equipment, so that no special equipment is required in these particulars.

Improvement in Transit Conditions Is Urged

THE Georgia Railway & Power Company is giving a good deal of attention in its car card and other advertising to traffic problems. Here are the way some of the recent posters read:

"Obey the traffic laws, park right, signal right, drive right, walk right and remember the other fellow's rights."

"Obey the traffic laws. Be sure you are allowed to park and then see that both right-hand wheels are against the curb."

"You are on the jury. The solution of Atlanta's transportation problem, present and future, is now in the hands of a jury consisting of the City Council and the public. You are invited to study it impartially and reach a verdict solely in the public interest. Let's solve Atlanta's transportation problem now."

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How "Safety Sam" Reduced Accidents

Union Traction Company of Indiana Has Original Plan for Conducting Safety Work—Not a Fatal Accident to a Passenger in Over Four Years

SAFETY activities on the Union Traction Company of Indiana center in the office of the safety engineer, Ross E. Luellen. For publicity purposes he is known locally as "Safety Sam," impersonating a good-natured traffic officer with a vein of homely humor and a desire to reduce accidents. Safety Sam supplies copyrighted material to sixteen newspapers published in localities on the I.U.T. system, and also to other papers in different parts of the country. This material, supplied weekly, comprises a weekly sermonette and a "Safety Sam Says" item for each weekday. A cut of Safety Sam is used to attract attention of the reader.

This plan has been in use for a considerable time, and the general familiarity of the I.U.T. patrons with the traffic officer and his sayings furnishes a background for talks which the safety engineer delivers on request before local Kiwanis and Rotary Clubs, schools and other civic organizations. In such talks, which are of a semi-humorous nature, the safety message is delivered in such form that the local papers publish reports in considerable detail. A daily circulation of 100,000 or more thus is secured for the messages of Safety Sam in the territory of the I.U.T. without cost for newspaper space.

In addition to the Safety Sam activities, the safety idea is promulgated by means of posters, blotters, advertisements in the company's time-tables, and a monthly publication, the *Union Traction Safety Magazine.*

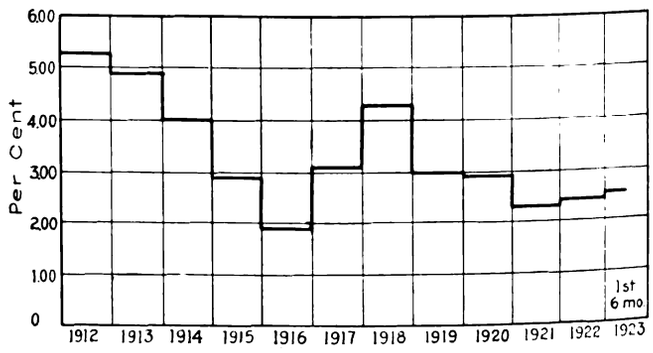
The magazine, which is edited by the safety engineer, is now in its ninth volume. It is a medium of exchange for information about employees, and of course keeps them posted on accident records. These are summarized monthly, the data for the five interurbans and the four city terminals being segregated. Car-miles, number of accidents and car-miles per accident for the current and preceding months are tabulated.

While the field of the safety engineer primarily is to deal with the public in the safety work, he has certain responsibilities in assisting the department heads in their safety work with the employees. He also organizes all general activities of a safety character. One of these is a semi-annual banquet tendered by the company to all members of the safety committee. These banquets are regularly attended by high state officials and other public men who appreciate the opportunity thus to come in touch with representative electric railway employees.

The safety committees date back to 1912, when one was appointed at each of the five interurban terminals, and a general safety board, consisting of the heads of departments, was formed. These committees handled all safety work until 1920, when Mr. Luellen, formerly a claim agent of the company, was appointed safety engineer. Under his leadership the safety committees were continued, but the administration of the work was put in the hands of one man appointed safety agent at each terminal, whose duties are to receive suggestions from committee members and see that they receive appropriate attention.

The safety engineer acts as secretary of the general safety board, which meets monthly to consider plans for furthering safety on the property. He also works directly with individual employees who give suggestions, and discusses safety with groups of employees, emphasizing the value of carefulness, thoughtfulness and foresight in doing their work.

New men, after having been tried out as students and passing the usual tests for employment, undergo



How the Vehicle Collisions Have Been Reduced Relative to the Vehicle Registration

S...on ... her own family and that her husband.

Safety Sam Says

People in th' sleep o' death are now bein' wakened an' revived by heart injections; wonder if they won't finally find something t' inject into th' brains of auto drivers that'll waken 'em t' th' necessity o' usin' some care at every rail crossin'?

Camp opens, equipment will be in the best condition.

tuted during the day against Davis by his wife, Carrie Davis.

Safety Sam's Sermonette

It's funny these life insurance companies don't get up some new questions for us t' answer when we go t' let th' doctor give us th' once over, which they seem t' think is necessary b'fore they'll let us take another million c so of insurance.

I leave it t' you if th' question blanks they been usin' for th' past twenty years ain't gettin' kinda stale an' outa date! Seems like they hang t' th' assumption that people still die natural deaths, whereas th' fact is, instead o' dying of hardening of th' heart, leakage o' th' mental processes, swellin' o' th' dome or some such old fogy trouble, it's got so it's considered quite th' thing t' go bustin' through th' golden gates by reason o' something sudden an' unexpected, like a hog runnin' out into th' road at midnight, or somebody givin' back a five-spot we'd lost all hopes of ever gettin'.

Why don't they ask questions like, say, "Do you take your mind along when you jaywalk?" or, "Do you gossip while drivin'?" or mebbe, "Do you expect your life insurance t' pay for your car?"—an' so on, instead of a lotta quizzin' about things hardly anybody ever hears of any more, let alone dies from?

However, mebbe th' theory they go on is that if a feller's constitution's strong enough t' stand th' doc's third degree, he's purty apt t' live out a natural lifetime, if he's got enough cunnin' t' keep outa th' way o' trains, street cars an' flyin' bicycles!

A Popular Way Used for Presenting a "Safety Sam" Saying. Occasional Sermonettes Reinforce the Sayings

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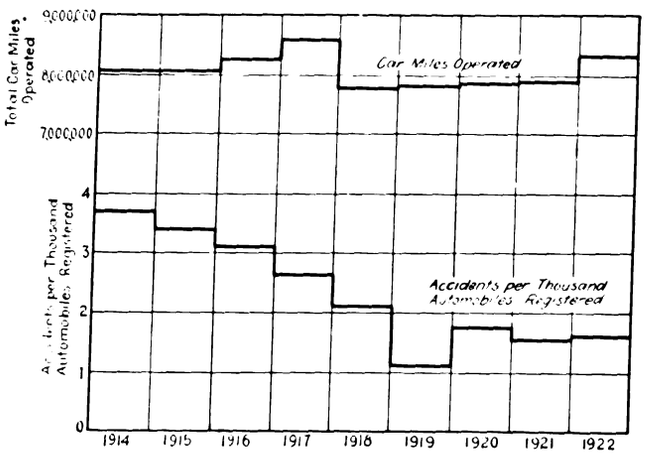
a written examination in the claims department as to what they would do if accidents of various types should occur. Following this, the new men have a conference in a group with the claim agent, who explains mistakes in the answers given, and gives a general talk on accident prevention methods. The safety engineer then gives a talk also intended to foster sane thinking on accident prevention.

Accidents Have Been Reduced Materially

One result of the consistent safety program is that during the past four years and three months not one of the 70,000,000 passengers has been killed. The accident records have been growing better consistently. The best division record for the current year is that of interurban crews of the Muncie terminal, who had,



The Reduction in Proportion of Gross Spent for Accidents Has Been Obtained Over a Period of Years

during one recent month, but three accidents in 132,000 miles of operation, corresponding to 44,000 miles per accident. This is the more noteworthy since the streets in Muncie are narrow and congested.

Automobile accidents are decreasing comparatively, as is shown by an accompanying chart. While the car-miles operated have not fluctuated greatly in the past nine years, the accidents per 1,000 automobiles registered in Indiana had been reduced by 1922 to less than half what they were in 1914.

The real test is in the cost of accidents. The graph shows the per cent of gross earnings charged to the legal and claims department, settlements and damages. It has gone down from 5.3 per cent of gross in 1912 to 2.5 per cent for the first half of the current year.

The company's proficiency in accident prevention was recognized in 1916 by the award to it of the Anthony N. Brady medal.* Since the award of the medal, the safety work has been pushed aggressively, although it has been somewhat simplified from the original plan and has been developed in those directions found most effective. As H. A. Nicholl, general manager of the company, puts it, a "working plan without frills" has been evolved.

*See issues of this paper for Jan. 22, 1916, page 169; Feb. 5, page 273, and Feb. 12, page 315.

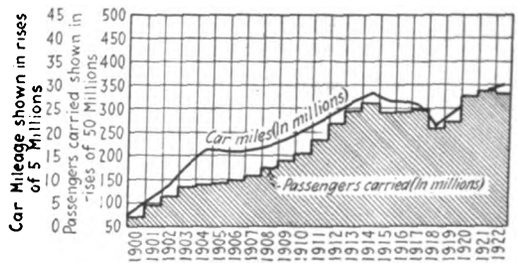
Graphs from Australia

THROUGH the courtesy of E. J. Doran, traffic manager New South Wales Government Tramways, some recent statistics in graphical form of the tramways, city and suburban electric lines are available for publication. They may be considered as supplementary to the article on the Sydney City System, published in the issue of this paper for Jan. 13, 1923.

The first diagram shows the passengers carried each year over all tramway lines (steam and electric) from 1900 to 1922. The light line indicates the car mileage during that period, and the solid area the number of passengers.

The second shows the load curve for all lines on an average week day, the light area indicating the passengers (in thousands), and the black line the number of seats during the two peak hours of from 8 to 9 a.m. and from 5 to 6 p.m. It will be seen the seats are more numerous than the passengers during the morning rush hour, but there is a slight excess of passengers over seats during the evening rush hour.

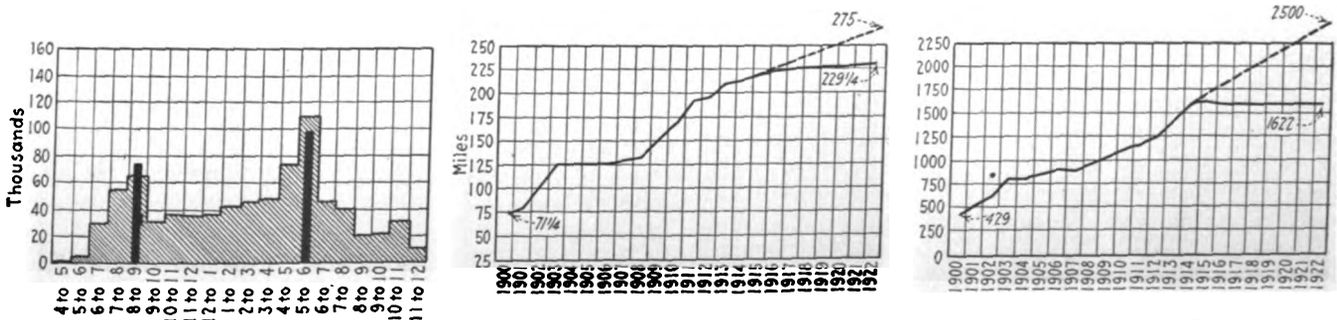
The third chart shows the length of track (all lines) measured as route-miles open for traffic, from 1900 to



Passengers Carried and Car-Miles, Sydney System

1922. As will be noticed the line starts at 71¼ miles in 1900 and finishes at 229¼ miles in 1922. The dotted line was drawn to indicate the rate of progress at the beginning of the war. If this rate had continued since 1914 as for the previous ten-year period, the route-miles would have been 275. The next chart shows similar figures for number of cars owned. The cars in 1922 numbered 1,622, whereas if the pre-war rate had been continued, the number would have been increased to 2,500.

In all of these charts showing growth since 1900 the effect of the war in stunting the development of the system is quite marked.



Australian Statistics—At Left, Passengers and Seats. In Center, Route-Miles. At Right, Passenger Cars, Sydney System

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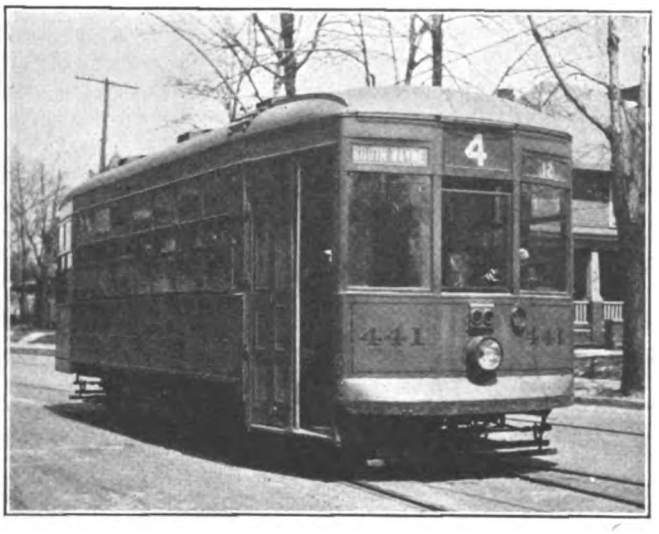
Weekly Pass Successful in Fort Wayne

The Average Fare Has Been Reduced While the Gross Earnings Have Increased—Sales of Weekly Pass Represent 29 per Cent of Passenger Revenue

THE weekly pass, which was inaugurated on March 5, 1922, on the Fort Wayne city lines of the Indiana Service Corporation, has proved so successful in the eighteen months that it has been in operation that the company states that advertising to promote its sale has been stopped. With a cash fare of 7 cents, tokens four for 25 cents and the weekly pass for $1, 49 per cent of the revenue is derived from the sale of the tokens, 29 per cent is from the sale of passes, and 16 per cent from cash fares. Demand for the pass has been greater than was anticipated at first, mainly because it is used to great advantage by people in going to and from home for the noon lunch period.



Latest Type City Car in Fort Wayne

The weekly earnings in Fort Wayne for the first week in February, 1923, were $3,816.72 greater than for the corresponding week of 1922, although on Feb. 1, 1922, before the advent of the weekly pass, the average fare was 6.31 cents, while on Feb. 1, 1923, the average rate of fare had dropped to 5.37 cents. An increase in revenue passengers for a representative week in April, 1923, over the corresponding week in 1922 was 25 per cent, while the increase in passes sold during this period amounted to 92 per cent. This was accomplished with only 10 per cent greater car mileage.

More than 7,000 passes have been sold in a single week. By means of counters on the cars, it has been found that each pass is used on an average of twenty-five times a week. Fare collection is made with the aid of the Cleveland fare box. No register is used in the car either for recording tokens, cash fare, passes, or transfers received by the operator. The management feels that the use of a register and the subsequent recording and accounting of such data would be merely a waste of time. The number of revenue passengers is calculated from the cash and token receipts for the week. An analysis of these figures discloses that the decrease in cash and token passengers due to the pass for one year averaged 15 per cent, although the weekly revenue increased during this period on an average of 21 per cent.

Actual earnings for the thirty-five weeks of 1923 compared with a corresponding period in 1922 are shown in the accompanying table. The company operates about 60,000 car-miles a week, and as a result of the frequent service and low fare there has been no bus competition in Fort Wayne.

EARNINGS BY WEEKS—FORT WAYNE CITY LINE

1922 Week Ending	Gross Receipts	1923 Week Ending	Gross Receipts	Increases	Passes Sold
Jan. 8	$18,302.66	Jan. 7	$21,819.55	$3,516.85	5,705
Jan. 15	18,887.67	Jan. 14	23,293.32	4,405.65	6,806
Jan. 22	19,640.82	Jan. 21	22,660.74	3,019.92	7,003
Jan. 29	20,764.32	Jan. 28	22,674.00	1,909.68	6,790
Feb. 5	19,085.27	Feb. 4	22,125.78	3,040.51	6,929
Feb. 12	18,841.15	Feb. 11	22,901.99	4,060.84	7,207
Feb. 19	19,240.87	Feb. 18	23,446.21	4,205.34	7,161
Feb. 26	19,353.18	Feb. 25	22,781.64	3,428.46	7,542
Mar. 5	18,902.49	Mar. 4	23,194.77	4,292.28	7,524
Mar. 12	18,326.01	Mar. 11	24,017.60	5,691.59	7,307
Mar. 19	17,875.46	Mar. 18	23,745.91	5,870.45	7,467
Mar. 26	18,634.96	Mar. 25	23,341.47	4,706.51	7,605
Apr. 2	18,651.00	Apr. 1	23,261.05	4,610.05	7,399
Apr. 9	17,269.53	Apr. 8	21,814.15	4,544.62	6,570
Apr. 16	18,769.20	Apr. 15	22,012.52	3,243.32	6,899
Apr. 23	17,459.24	Apr. 22	22,105.07	4,645.83	6,871
Apr. 30	17,406.62	Apr. 29	20,974.27	3,567.65	6,526
May 7	17,026.11	May 6	20,374.74	3,348.63	6,311
May 14	17,280.48	May 13	21,422.97	4,142.49	6,263
May 21	17,265.63	May 20	20,475.25	3,209.62	6,267
May 28	17,285.03	May 27	20,455.42	3,170.39	6,178
June 4	16,906.74	June 3	20,008.47	3,101.73	5,670
June 11	17,804.84	June 10	20,173.86	2,369.02	5,994
June 18	17,019.82	June 17	20,265.99	3,246.17	5,957
June 25	16,839.76	June 24	19,880.90	3,041.14	5,753
July 2	16,276.82	July 1	19,541.82	3,265.00	5,817
July 9	15,563.88	July 8	18,162.12	2,598.24	5,136
July 16	16,370.77	July 15	19,163.66	2,792.89	5,500
July 23	15,859.90	July 22	18,703.24	2,843.34	5,534
July 30	16,217.87	July 29	18,697.61	2,479.74	5,567
Aug. 6	16,211.66	Aug. 5	18,925.82	2,714.16	5,575
Aug. 13	17,353.11	Aug. 12	18,497.17	1,144.06	5,411
Aug. 20	16,286.90	Aug. 19	18,777.83	2,490.93	5,466
Aug. 27	15,973.48	Aug. 26	18,824.48	2,851.00	5,415
Sept. 3	15,935.70	Sept. 3	18,331.91	2,396.21	5,350

New Single-Phase Motor Car for Maritime Alps

IN A RECENT issue of *L'Industrie des Tramways, Chemins de Fer et Transports Publics Automobiles*, Jacques Schopser, head of the rolling stock department of the tramway company of Nice and the Littoral, describes a type of single-phase motor car which will be used on the departmental tramway line taken over by the Compagnie des Chemins de Fer du Sud.

This car takes single-phase power at 6,600 volts, 25 cycles, from the overhead contact line, and the pressure is stepped down by means of a transformer to from 165 to 365 volts for the motors, 86 volts for the compressors and 110 volts for lighting and heating.

The weight of the car empty is 28½ tons, and it is equipped with four motors rated at 75 hp. each on the one-hour basis when supplied with 330 volts. Under these conditions the motor draws 230 amp. and makes 800 r.p.m. It is geared to the axles at a ratio of 113:18, or 6.28. The motors are of the series-compensating type, with six poles. Resistance leads are used in the armature winding.

Air for the motors is drawn from above the platform through gratings and flexible or accordeon conduits which provide for displacement of the trucks with respect to the body. The air leaves the motors through screened orifices in the ends.

The controller makes connections with the transformer taps, without contactors, and it is provided with a magnetic blowout. The car is equipped with Westinghouse air brakes, hand brakes and electromagnetic emergency brakes. The last-named are fed by a storage battery which has a capacity of 100 amp. for fifteen minutes at 12 volts. A small motor-generator set is provided to recharge the battery.

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Six of these cars have now been in use more than a year with entire satisfaction. One of them can mount a grade of 6 per cent with 55 tons trailing load.

The Readers' Forum

Car Design that Appeals to the Rider

STATE OF NEW JERSEY
BOARD OF PUBLIC UTILITY COMMISSIONERS
NEWARK, Sept. 11, 1923.

To the Editors:

I have read with much interest the article on "Operating Results of Automatic Door Safety Cars" which appeared in the ELECTRIC RAILWAY JOURNAL, issue of Aug. 25, 1923. It was with equal interest that I read your editorial comment on this subject in the issue of Sept. 8, 1923.

When the one-man safety car first made its appearance, to me at least, an obvious objection to its design was the provision of but a single door for entrance and exit, with the resulting loss of time and not a little inconvenience to passengers, particularly at points of heavy interchange, and more especially during inclement weather. A subsequent careful study and observation of the operation of these cars and of many other types of one-man cars, both large and small, safety and otherwise, but all equipped with single doors, has demonstrated this fact to my satisfaction.

The adoption of the double door for one-man (not safety) cars by certain well-known properties was a step in the right direction, and when the Chicago Surface Lines announced about two years ago the development of a car equipped with double doors, the exit door being automatically operated, it seemed that an obstacle to successful one-man car operation had been overcome. The subsequent construction and operation of a number of these cars appears to have resulted in demonstrating their great superiority over the older types, at least in the matter of rapidity of passenger interchange, and has thus advanced the one-man car much nearer the point of development where it may be used efficiently for mass transportation.

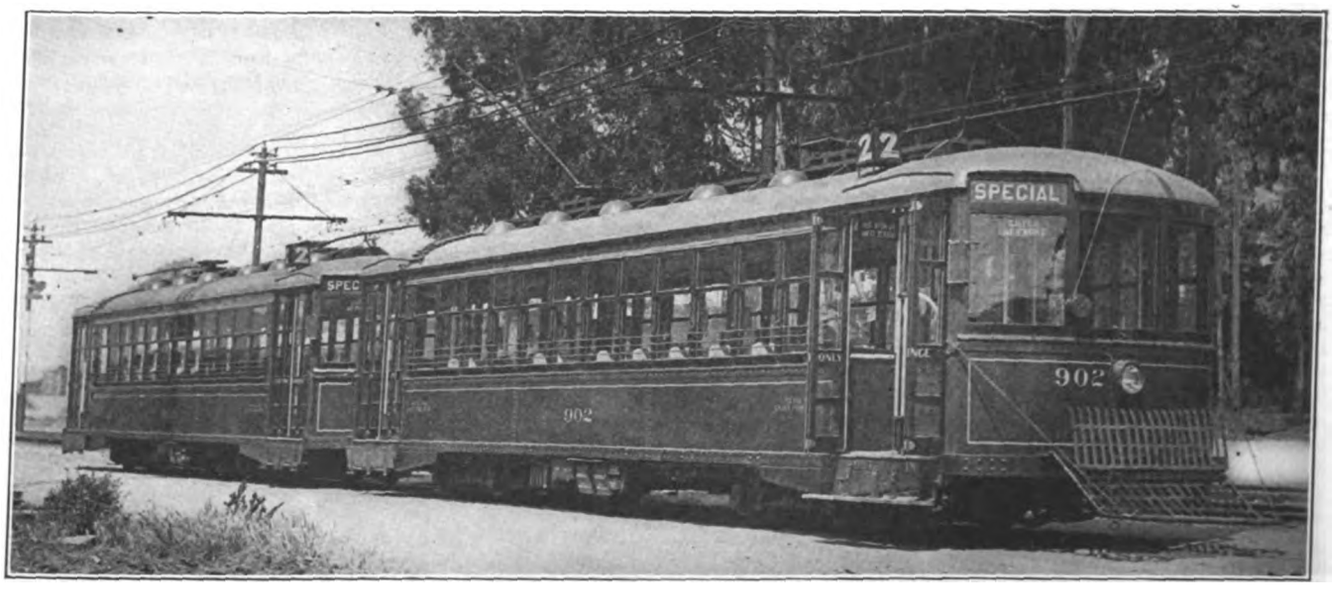
The psychology of this improvement is, to the mind of the writer, quite as great a point as the actually decreased time of passenger interchange. The annoying delay of intending passengers waiting for alighting passengers to leave the car has been entirely eliminated. This is something that the patron sees, experiences and consequently appreciates.

It appears to the writer that, particularly in these days of competition in the transportation field, it behooves the street railway industry as a whole to awake to the fact that if competition is to be met successfully, and if public favor, the greatest asset any public utility can have, is to be gained and retained, a greater study of and consideration for the needs, comfort and convenience of the traveling public must be undertaken.

The particular improvement referred to in this letter perhaps cannot, for financial or other reasons, be adopted by all, or perhaps not even by many companies, except probably in the case of purchasing new equipment, but the principle of catering as far as possible and practicable to the public interest and welfare and in a way that the public can *see* and *appreciate* can be carried out in many and frequently comparatively inexpensive ways which will tend to cause the public to "pat the industry on the back." This, in my judgment, is what the electric railway industry is most in need of today.

H. C. EDDY, Street Railway Engineer.

Multiple-Unit Train for Key System



THESE new cars for the San Francisco-Oakland Terminal Railways may be operated either as one-man single units or in two-car trains. The cars are said to be the first to be equipped with heavy bus line contacts in the face of the car couplers. When the cars are coupled together the two air lines are connected, the control circuit connections are made and the bus lines carrying power from the trolley on the forward car to the motors on the rear car are connected all upon one impact of the two drawheads. This is accomplished by a new type of Tomlinson coupler. The cars are equipped with dead-man controllers and door interlocking devices. Low step height is one of the features. The addition of fifty-five cars of this type will greatly aid in carrying the peak loads.

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Association News & Discussions

Organizing a Public Relations Department*

By Arthur V. Bland
Director of Public Relations†

PRIOR to the organization of the public relations department of the associated Indiana, Columbus & Eastern Traction Company, the Columbus, Newark & Zanesville Electric Railway Company and the Lima-Toledo Railroad there was no systematized effort made along the lines of publicity or the molding of public opinion. Some idea of the limited scope of the advertising program can be gained by the realization that the total advertising budget in 1921 was but $3,550, of which nearly 50 per cent was spent for time folders and half of the remainder represented newspaper exchange advertising contracts.

The new department did not inherit anything in the way of a hostile attitude either on the part of the press or the public, hence there was no major problem in the shape of adverse sentiment to overcome. The attitude of the general public can best be described as negative, and the traction lines were treated for the most part with disdainful indifference.

The principal problem facing the department resolved itself into a matter of reawakening public interest in the tractions and an endeavor to create a more extensive market for the only product which we had to sell—transportation. I shall endeavor to present a broad general picture of the more notable accomplishments.

About the first move toward establishing better relations with the traveling public was the removal of all "don't" signs from the passenger cars and stations, such as "Don't Put Your Feet on the Seats," "Don't Spit on the Floor," "Don't Smoke." The absence of these signs and others of similar purport have been the subject of favorable comment, and as far as the deportment of our passengers goes we have found little to complain of as the result of the removal of the admonitory legends. The next move along this general line was the removal of the numbers from the trainmen's caps and uniforms and the substitution of metal strips bearing the crews' names, which are placed in holders prominently displayed on the interior bulkheads of the cars. Later, individual business cards were provided for the trainmen, cards which carried the conductor's name together with a friendly message on one side and an abridged time card of the line on the other. These cards were supplied at the trainmen's request. This idea has recently been carried a step further by providing similar cards for station agents in the larger cities.

An effective stroke of publicity was the placing of messages stressing the necessity of a more equitable distribution of highway costs, printed in foot-high letters along the sides of a number of the interurban passenger cars. These messages are believed to have exercised a potent influence in shaping the opinion of a considerable number of the rural residents in the direction of providing a more adequate tax upon these predatory users of the highways. Among the texts carried in this manner were: "Are the Highways Paid for by Those Who Use Them?" "Highway Travel Cost Includes Road Upkeep. Who Pays It?" "Do Private Automobile Taxes Help Passenger Buses?" and "Traction Travel 3 Cents per Mile—Highway Travel—?"

Prior to the last meeting of the State General Assembly the department organized a highway research bureau and assembled a mass of information bearing upon motor transportation, road costs, highway traffic rules and related subjects, all of which proved valuable during the ensuing widespread discussion of these subjects. After the practical failure of the department efforts to secure local and municipal regulation of buses, its activities were directed toward securing adequate state regulation. The State Legislature passed a motor bus regulatory law effective July 27 last.

Articles of general interest are mimeographed and sent out to all the leading publications in the territory. Articles of interest to the public utility industry as a whole are also, upon occasion, disseminated in this manner.

Newspaper reporters are encouraged to call upon the local public relations agents, who are authorized to give out at first hand any items of interest which, in the minds of the reporters, may constitute "news." The only instructions issued to our employees about giving news to the press is that they give full and complete information. The value of this personal contact with the reporters was demonstrated this summer by the manner in which Tecumseh Park, a picnic resort operated by the company, located between Springfield and Dayton, was popularized by the newspapers "playing up" the various picnics and outings which took place. A favorable impression was likewise created and much publicity secured by mailing to the society editors of certain papers lists of passengers booked over the company's lines for the regular weekly excursions to Niagara Falls.

Taking advantage of the space at our disposal on the interior bulkheads of the cars, cards are displayed from week to week setting forth messages which we are seeking particularly to drive home to the public. On occasion these cards have appeared in series, such as the "How Come" series, the "Why" series and in the Zanesville City cars a series of Biblical quotations. The messages carried in these cards cover a wide range, extending all the way from seasonal greetings to safety slogans. The type used on the cards and arrangement are frequently changed.

The company's time folders are revamped from time to time and a particular effort has been made to secure for them wide distribution by means of metal racks placed in each of the passenger cars, in all stations, and in the Yellow taxicabs of the principal cities along the line.

Dates and appointments have been arranged so that the general manager could appear before commercial organizations, granges and meetings where the company's story could be told to good advantage.

The newspaper advertising, previously handled by the traffic department, was taken over July 1 along with the functions of the general passenger department. Steps were immediately taken to revamp all of the advertising copy. We have now adopted a standard space of three inches, set double column. No ad runs in more than two or three issues in any one paper. Among the subjects covered are timetable information, value of the traction to the community, superiority of the traction service from the standpoint of convenience, frequency and safety, rates, points of interest along the lines, and special events.

A much closer contact is maintained with the advertising managers, managers and editors of the various papers through correspondence and personal calls than had hitherto been the case. An attractive set-up of some particular advertising copy is made the occasion of a letter of commendation, and a particularly favorable write-up of any event of importance will bring a letter of appreciation.

A form of outdoor publicity which has met with popular approval has been the placing of illuminated highway signs, 5 x 12 ft. in size, at points where entrance is made to the larger cities along the routes.

*Abstract of a paper presented at the meeting of the Central Electric Railway Traffic Association at Webster Lake, Ind., Sept. 14, 1923.

†Mr. Bland is director of public relations of the Indiana, Columbus & Eastern Traction Company, the Columbus, Newark & Zanesville Electric Railway Company, the Lima-Toledo Railroad Company, the Dayton & Columbus Transportation Company, and the Columbus & Zanesville Transportation Company.

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A radical departure from the established custom was the placing of all passenger activities formerly under the traffic department under the department of public relations. This included all matters connected with the passenger solicitation, publicity, advertising and the supervision of all agents and baggagemen who were, coincidently, taken over from the operating department.

More efficient telephone contact with the public has been established by installing a central telephone exchange at Springfield, where inquiries, complaints, etc., are handled with much better dispatch than was formerly the case. A similar plan is being worked out for Columbus and Dayton. Some of the other things which we have in mind are a house organ, a weekly publication for general distribution, organization of a safety campaign among employees and public, organization of a beneficial association among employees and general educational work among agents and trainmen.

The effect upon the general public of the department's operations thus far is difficult to estimate. It is to be expected that results will be slow in making themselves manifest. We do know that our efforts have attracted attention, that our car cards are being read, that the legends carried along the sides of the passenger cars have attracted attention. We do know that the attractive, well-kept appearance of the company's motor buses have induced patronage and caused favorable comment.

C.E.R.A. Traffic Men Hold Summer Meeting

THE Traffic Section of the Central Electric Railway Association held its annual summer meeting at Webster Lake, Sept. 14-15, jointly with the publicity committee, of which John S. Bleecker, general manager Indiana, Columbus & Eastern Traction Company, is chairman. About fifty persons were present.

The traffic meetings occupied the first half of the initial day's session, and the publicity meeting was held the afternoon of the same day. The remainder of the time was spent in fishing and shivering. There was much more shivering than fishing done, however, because of some early winter weather, a great shortage of blankets and no heat.

The publicity meeting was opened by Mr. Bleecker with a report on the work of the state committee on public utility information in the C. E. R. A. territory. He pointed out that Indiana was the banner state in supporting its committee, all but two Indiana companies cooperating. About half of the Ohio companies are helping.

More than half a dozen persons, including John C. Mellett, Arthur V. Bland, C. L. Van Auken, substituting for E. F. Kelley, Samuel Riddle, J. W. McCloy, G. L. Graffan and Labert St. Clair, either spoke or read papers.

Mr. Bland's paper, in which he told about the work that is being done under Mr. Bleecker's direction by the public relations department of the Indiana, Columbus & Eastern Traction Company and associated companies, was illustrated by an effective display of posters and advertisements. After Mr. Bland had spoken, Mr. McCloy explained the display. Mr. Bland's paper is abstracted elsewhere in this issue.

Explaining that the Advertising Section of the American Electric Railway Association not only co-operated very closely with all state committees on public utility information but rendered service to all local companies, Mr. St. Clair urged greater use of the association's advertising and publicity facilities.

American Association News

Special Train Service to Atlantic City

A SPECIAL all-steel Pullman train will be operated from Chicago to Atlantic City over the Pennsylvania Railroad, for those attending the A.E.R.A. convention. This train will be an exact counterpart of the Broadway Limited, and assurances have been received from the Pennsylvania Railroad that everything possible will be done to make the trip pleasant and comfortable.

The train will leave Chicago on Saturday, Oct. 6, at 1 p.m., Central time; Fort Wayne, 3:58 p.m.; Lima, 5:12 p.m.; Crestline, 6:43 p.m.; Mansfield, 8 p.m.; Alliance, 10:08 p.m., and Pittsburgh on Sunday, Oct. 7, at 12:09 a.m. It will arrive at Atlantic City at 10 a.m.

Delegates from Toledo, Detroit and vicinity can connect with the Chicago special at Mansfield or Pittsburgh, by taking the regular Pennsylvania Railroad train leaving Detroit on Saturday, Oct. 6, at 1:20 p.m., Eastern time; Toledo, 3:15 p.m.; Mansfield, 5:50 p.m., and arriving at Pittsburgh at 10:15 p.m.

Delegates from Cleveland can connect with the special at Alliance or Pittsburgh, by taking the Pennsylvania train leaving Cleveland on Saturday, Oct. 6, at 6:05 p.m.; Alliance, 7:33 p.m., Eastern time, and arriving in Pittsburgh at 9:35 p.m. Those from Akron, Youngstown and vicinity can connect with the special by taking the regular Pennsylvania train leaving Akron on Saturday, Oct. 6, at 5:45 p.m., Eastern time; Youngstown, 7:27 p.m., and arriving in Pittsburgh at 9:25 p.m.

The diagrams of the Pullman cars, on the Chicago special, will be kept at the office of H. J. Kenfield, chairman of the transportation committee, 431 South Dearborn Street, Chicago. Railroad tickets, however, must be secured from the regular ticket agents. The committee requests that applications for space on the special be made as early as possible, so that the railroad may know at the earliest possible moment what equipment will be required for the train.

Transportation from the Pacific Coast is in the hands of W. V. Hill, manager California Electric Railway Association, 58 Sutter Street, San Francisco. Two through Pullman cars will be run from Oakland to Atlantic City. These will be attached to the Pacific Limited leaving San Francisco on Wednesday, Oct. 3, at 6 p.m., and arriving in Chicago on Saturday, Oct. 6, at 4 p.m. The cars will be transferred to the Pennsylvania train, leaving Chicago on Saturday, Oct. 6, at 8:10 p.m. and arriving in Atlantic City on Sunday, Oct. 7, at 7:40 p.m.

Additions to the Convention Program

SOME additions to the convention programs of the American Electric Railway Association were announced by Secretary Welsh this week.

Elisha Lee, vice-president Pennsylvania Railroad, will speak at the session on Thursday morning, Oct. 11. His address will be on "The Relation of Management and Employees."

Alexander Forward, member of the State Corporation Commission of Virginia, has agreed to participate in the symposium on Public Utility Commission Regulation. This is part of the proceedings on Wednesday morning.

The association expects to publish within a few days its final program. This will include not only the program of the technical sessions and entertainment but it will contain considerable other matter of interest to delegates at the convention.

The association urges all companies who expect to be represented at the Atlantic City convention to forward advance registration cards as soon as possible.

Standards Committee Passes on Recommendations

ON account of the revision of the Engineering Manual now under way, the Engineering Association committee on standards had an unusual amount of detail to consider at its meeting held in New York City on Sept. 14. The discussion and votes showed a desire to make the Manual as useful as possible without unnecessary bulk. As the volume will be permanently bound it is necessary to have its parts revised up to the date of publication. The committee considered all recommendations, which require such consideration, contained in committee reports and prepared a report on them to be printed in advance of the convention.

The meeting was attended by these members: C. C. Beck, J. A. Brooks, H. A. Johnson, C. G. Keen, John Lindall, H. H. Norris, N. W. Storer and N. B. Trist. G. C. Hecker acted as secretary.

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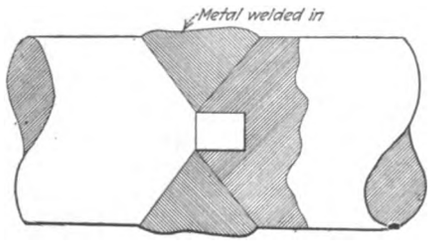
Maintenance of Equipment

Making Two Pony Axles Out of Three Worn Ones

IT IS regular practice on the part of the Tennessee Power Company (Chattanooga Railway & Light Company) to cut the good parts out of worn pony axles, joining pieces by means of electric welding to produce an axle that is practically as good as new.

The abutting ends of the two pieces, which are to form the axle, are prepared as shown in the accompanying sketch. One end is drilled with a hole $\frac{5}{8}$ or $\frac{3}{4}$ in. in diameter and about an inch deep, while a corresponding projection is turned on



Joint Between Two Pieces of Reclaimed Pony Axle

the other. This provides a dowel connection which insures centering of the pieces with respect to each other.

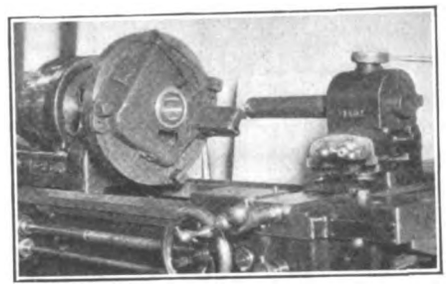
A groove for the welding metal is formed by cutting away the abutting ends in cone form, and metal is gradually built up to and above the top of the groove by means of the electric arc.

Broaching Armature Bearings

By O. A. Norene
Assistant Master Mechanic Omaha & Council Bluffs Street Railway

IN OMAHA we have changed a large part of our armature bearings, which originally were cast brass, to cast steel, babbitt lined. At first we had some trouble with the babbitt working loose in the steel shell, but this has now been entirely overcome by pressing a steel broach through the bearing to expand the babbitt, by the use of a Watson-Stillman 30-ton hydraulic vertical force press, which is shown in the accompanying picture.

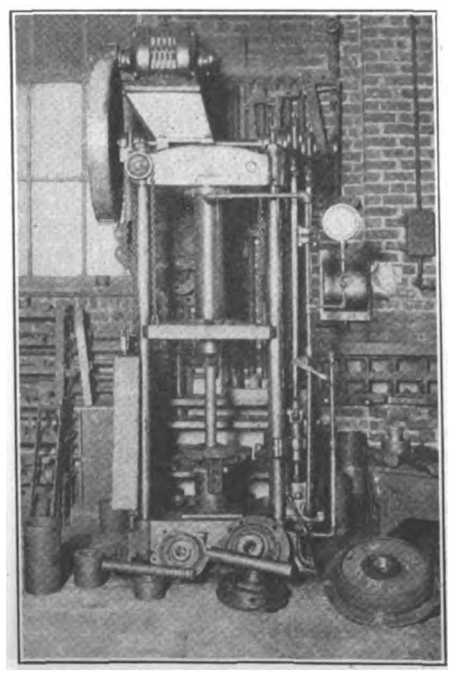
The bearings are first rough-bored



Housings Mounted in Chuck and Boring Bar in Position for Boring Bearing

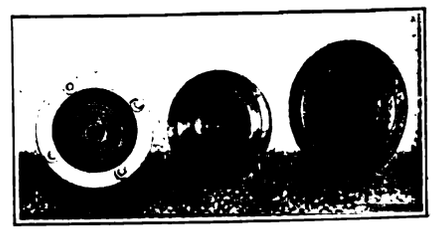
to approximately $\frac{1}{16}$ in. smaller than finished diameter, to determine the size of hole to bore to get the desired pressure. The broaches are designed so that all the operator needs to do is caliper the small end of the broach and set the cutters on the boring bar accordingly. A No. 17 Davis expansion boring bar is used for boring the armature bearings.

For the broaching operation the rough-bored bearings are placed in steel sleeves of ample strength to withstand a pressure of from 15 to 20 tons without distortion. The sleeves are designed so that a bearing which has had the broach pressed through it is reversed and the bearing is pressed out by the next bearing. This operation is repeated.



The Broaches Are Forced Through the Bearings in This 30-Ton Hydraulic Press

Bearings are next pressed into the solid housing at a pressure of from 3 to 6 tons, depending on the size. The broaches are made with a taper of from 0.015 in. to 0.018 in. and are pressed through bearings at a pressure of from 8 to 15 tons. We have used this process for about two years and it has eliminated practically all loose bearings in the armature housing. For the finishing bore to fit the armature shafts the hous-



Chucks for Mounting the Armature Housings

ings are held in specially designed chucks in the lathe and finish-bored to fit on the shafts on which they are to be used. This method assures the bearings being bored in perfect alignment and very little fitting is required.

Applying Creosote to Poles by Compressed Air

WHERE poles are defective it is the practice of the Pacific Power & Light Company to saw them off just above the ground line, pull out the stub and reset the pole. Before resetting, the pole is given a treatment of creosote, usually applied with a brush. The brush method, however, does not insure that the creosote will reach inside the cracks and holes, and to overcome this disadvantage R. J. Smith of the operating department has devised a container for holding and applying the creosote to poles at the job by compressed air.

A piece of 6-in. pipe 4 ft. long is fitted with caps at both ends. A $\frac{1}{4}$-in. nipple with a valve and a $\frac{1}{2}$-in. hose with a small spray nozzle is attached to one end. The cap at the other end of the pipe has a $\frac{3}{4}$-in. pipe opening. This is bushed so as to receive a valve stem of a type used on automobile tires.

To fill the container the bushing

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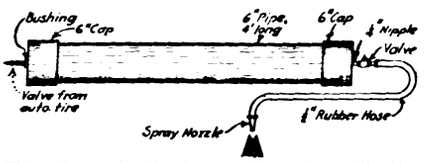


This Portable Container Provides Effective Method for Creosoting Poles

containing the valve stem is screwed out and creosote is poured in. The bushing is then screwed back into place and an ordinary tire pump is used to pump up the pressure in the pipe.

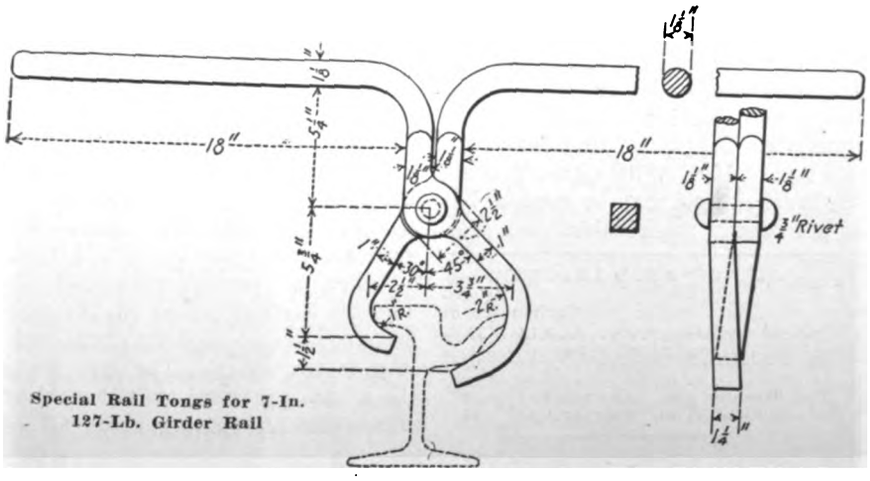
This container, together with its contents, can then be taken to the job and by opening the valve a stream of creosote is readily applied to the butt of the pole. This method forces the creosote to the bottom of all cracks and other openings in the pole and the time required to cover the butt of the pole by this method is considerably reduced.

Special Tongs Equalize Load Handling Girder Rail

By Clifford A. Elliott
Engineering Department Pacific Electric Railway, Los Angeles, Cal.

Some difficulty was experienced in handling 7-in. 127-lb. grooved girder rail with standard rail tongs. Due to the shape of the girder rail head and upper fishing, the handles of standard tongs when applied were not parallel to the rail base, which resulted in an uneven distribution of the load among the track laborers carrying the rail.

In order, therefore, to overcome this difficulty a special type of rail tongs has been designed by the Pacific Electric Railway, as shown in the accompanying illustration. The special tongs have one jaw longer and of different inside radius than the other, so that when applied to the rail head the bottom flange will be parallel to the handles and thus the load will be centralized, and trouble from unequal loading is prevented. Experience has shown that the use of these special tongs results in more efficient handling of the rail and considerable saving in time.



Special Rail Tongs for 7-In. 127-Lb. Girder Rail

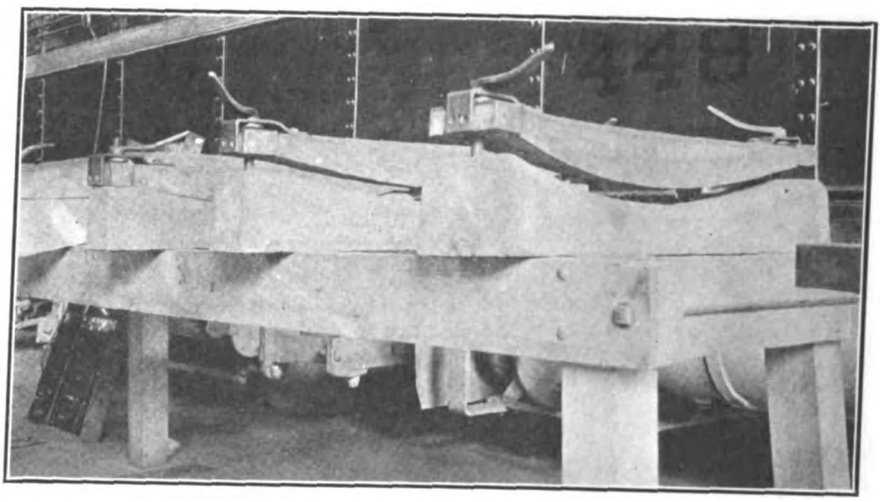
Molds for Bending Dasher Iron

The Nashville Railway & Light Company secures a uniform and neat job in bending sheet iron for bumper covers by the use of curved molds, like those illustrated. The upper part of the mold is of hard wood, the lower part of cast iron, the upper piece being shod with flat steel to give it the necessary stiffness and to minimize wear.

The two parts of the mold are drawn together by means of clamp screws, each operated by a permanently attached handle. The screw is held in a fixed relation to the upper part of the mold by means of a collar near its upper end, which plays between bent pieces of flat steel screwed to the end of the block in the manner shown, the clearance between them being slightly more than the thickness of the collar.

Where the edge of the sheet is to be bent over, the part to be thus bent is allowed to project beyond the mold and is hammered down against the block, which is suitably cut away to give the desired form.

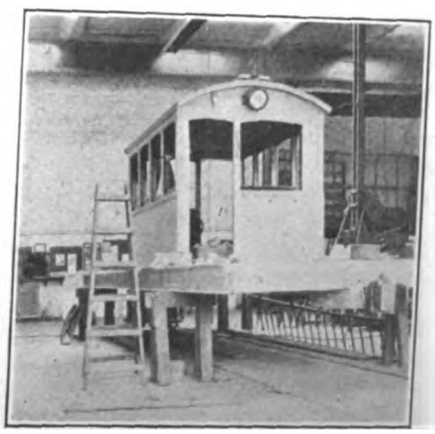
The molds rest upon a substantial framework, which can be placed near a car which is being fitted with a new or repaired dasher.



These Clamp Molds Are Used in Nashville for Bending Dasher Sheets

Unusual Locomotive Built at Chattanooga

The Chattanooga Railway & Light Company is part of the Tennessee Power Company, which has a large hydraulic power plant at Hales Bar. The railway company was recently called upon to build an electric locomotive of original design for use in connection with construction work at the power plant. Among the specifications for this machine were that it should have a capacious platform for the handling of material, that the cab should be roomy so that ten workmen could be accommodated as passengers and that it should have capacity to haul three or four loaded freight cars.



A Combined Locomotive and Work Car Built at Chattanooga

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A photograph of the complete locomotive is not available, but the accompanying illustration is from one made recently in the shops at Chattanooga. It shows the platform built up on 12-in. I-beams, the platform having a width of 9 ft. 2 in. The cab is 7 ft. wide and 8 ft. high under the eaves. There is sufficient space on the floor outside of the cab to permit the carrying of a large amount of miscellaneous material and long bars, pipes, etc., can be carried along the sides. Seats are provided in the cab for ten passengers without inconveniencing the operators.

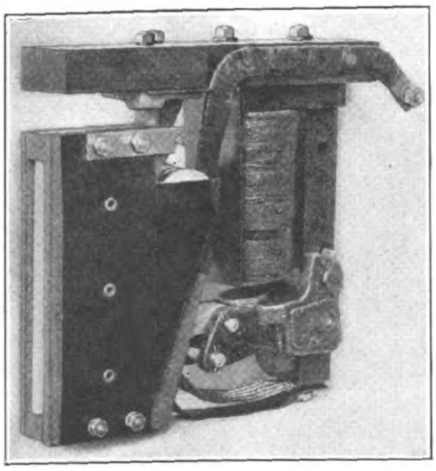
The locomotive is mounted on M. C. B. trucks with four 50-hp. motors; and air equipment of capacity ample for braking four freight cars is provided. A standard coupler is mounted at each end.

New Equipment Available

Improved Type M Control

TO MEET a demand for an efficient control for light-weight cars when the service requires frequent train operation the General Electric Company has designed a new light-weight type M control embodying improvements for this service over its standard control.

The control is of the non-automatic type, having the same accelerating characteristics as the "K" control. It consists of a master controller which carries only small currents inside the car, while the motor control apparatus carrying the motor circuit current is installed underneath the car. This latter is grouped in two boxes for easy installation. The master controller is provided with both dead-man's handle and emergency brake feature.



Contactor for Light Weight Control

A small door on the end of the contractor box gives easy access to the motor cutout. The contractor box has been designed to be insulated from the car body. The line breaker is a magnetically operated contractor, provided with a strong and efficient blowout that will rupture the overloads encountered in service. The arc chute is designed to be removed without tools and is vented to the atmosphere through an opening in the contactor box.

The contactor has the same type of removable arc chute as the line breaker. Removing the arc chute also removes the pole pieces, making the contact parts of the contactor and line breaker as accessible for repairs as are the contact fingers and segments of a drum controller when the arc chute is swung open.

The reverse consists of a solenoid-operated drum type switch mounted in a small sheet metal box having a removable cover. The master controlled is similar to a "K" controller with separate main and reverse cylinders.

The light-weight type M control has a capacity to operate trains of three cars or less, each car being equipped with four 60-hp. 600-volt motors or less.

High Carbon Welding Rods

A NEW metal for welding high carbon parts by either the oxy-acetylene or electric welding process is being placed on the market by the Page Steel & Wire Company, Bridgeport, Conn.

The principal application of these high carbon welding rods is for the building up of worn surfaces where a high resistance to abrasive wear is desired. In electric arc welding this electrode maintains a stable and uniform arc. In gas welding the metal flows smoothly. With either process the finished weld may be ground, but is not readily machinable.

TEST OF WELD DEPOSIT

	Carbon	Sclero-scope
Original metal	0.42	35
Two layers of weld metal gave:		
Outer surface of deposit	0.63	38
At a depth of 1/16 in. from top	0.56	37
At a depth of 1/8 in. from top	0.57	33
At a depth of 3/16 in. from top	0.46	34

The accompanying table shows a typical result of weld deposits when made of a steel with 0.42 carbon content.

Automatic Heat Control for Solder Pot

A NEW electric solder pot with automatic heat control has been added to its line of labor-saving devices by J. D. Wallace & Company, Chicago, Ill. The use of this pot simplifies the problem of heating babbitt, white metal, wax and other materials which are slow conductors of heat.

When solder is overheated, it oxidizes, and this action results in a loss of material. With the new automatic heat-regulated solder pot when the solder has been heated to 600 deg. F. an automatic control goes into action, which maintains the temperature of the contents of the pot and prevents overheating and underheating.

This control is an adaptation of the principle used in the steam gage. A volatile substance, which is very sensitive to heat, actuates a Bourdon tube, which makes and breaks the electric current, thus controlling the temperature of the contents of the pot.

Solder Pot with Automatic Heat Control

The pot will accommodate 15 lb. of solder and will heat this amount to 600 deg. F. in twenty to twenty-five minutes. A 900-watt heating element is built around the entire container and heat is applied to all parts of the sides and bottom simultaneously.

When the container is once filled and the current turned on, the solder pot requires no attention until refilling is necessary. The pot weighs 13 lb. and operates on either 110 or 220 volts alternating current.

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The News of the Industry

Side Lights on Toronto M. O. Meeting

Seattle Man Says City Was Outmaneuvered in Deal Taking Over Local Railway

There were several interesting side lights at the meeting of the Public Ownership League of America held in Toronto during the week ended Sept. 15. Sir Adam Beck, one of the principal speakers Monday evening, dwelt at length on the question of the amount of water being diverted at Chicago by the Chicago Sanitary District, to carry Chicago's sewage down the drainage canal. Sir Adam Beck says that every bit of water taken by Chicago to go down the drainage canal robs the Ontario hydro system of power by reducing the flow over Niagara. He called for a united movement against allowing Chicago to take any more water.

Propaganda Through Schools

Margaret Haley of Chicago, representing an organization of 7,000 school teachers in Chicago, said that this group of teachers was prepared to move directly and actively against all private utilities. According to her statement, school teachers in Chicago raised $15,000 to fight a constitutional amendment to allow Chicago to own the local transit system and conduct it under private operation. Miss Haley also told how the teachers had used school children to secure signatures to petitions worded, "Do you want 5-cent car fares and 50-cent gas?"

Jenny Buell of Michigan said that the farmers of Michigan are fighting hard for public ownership of electric power sites. She accused individual utilities and the Michigan Bureau of Public Utility Information of giving out false information with reference to the situation in Michigan.

Seattle Blundered

O. T. Erickson, Seattle, said that Seattle had made some very stupid blunders. The Skagit River project is one of them. On this plan $15,000,000 had already been spent. He said that private utility men and engineers had handed a juicy "lemon" to Seattle in Skagit. Mr. Erickson pointed out some mistakes made by private utilities. The purchase of the Seattle street railway was a blunder in administration. According to Mr. Erickson the city paid more than it should have for a worn out system. This in itself showed the frailty of public officials. The 5-cent fare humbug was set before the people and some of them fell for it. In order to make the road pay it has been necessary to raise the fare, but, with the higher fare the city is gradually paying off the debt and once the system is owned outright Mr. Erickson anticipates that there will be successful operation at a lower fare. All of this, however, points to the lack of experience on the part of public officials and it shows the need for greater ability in handling publicly-owned and operated utilities.

Carl D. Thompson, secretary of the League, made a plea for more funds and greater support. He pointed out that last year he had a budget of $7,000 to assist communities engaged in controversies with privately-owned properties and that aid was given to thirty-two separate communities. He said that he was opposed by the resources of the National Electric Light Association, bankers, and other interesting in preserving the present order of property. A voluntary collection was made following Mr. Thompson's report, and pledges made indicated he would have a slightly larger fund for 1924.

It was apparent from the tenor of the convention that the League will concentrate of super-power. The first moves are definitely planned for Washington and Oregon, where the League is attempting to have state-owned and operated super-power systems.

Saginaw to Start Up Soon

Active work looking to the resumption of electric railway service in Saginaw has started, and although the officers decline to say when the city can expect the service it is believed that cars will be operating by Nov. 1, or soon after that date.

The $400,000 fund that will be used to rehabilitate the property has been deposited with the treasurer, and under the terms of the franchise Otto Schupp, grantee, assigned the contract to the Saginaw Transit Company, and also the taxes owed by the Saginaw-Bay City Railway, amounting to more than $50,000, were paid.

Offices independent of the other city utilities have been established and work has started in reconditioning the rolling stock that has stood idle since Aug. 11, 1921, when railway service terminated.

Those who will finance the project have elected Charles S. Kressler, Manistee, and Fred J. Fox and Otto Schupp, Saginaw, their directors. The three, with the nine approved by the Mayor and two circuit judges, compose the board and have elected Mr. Kressler president and general manager, Mr. Schupp vice-president and L. F. Swartout secretary. Financing of the property has been approved by the Public Utility Commission.

Bridge Destroyed at Springfield

Quick Action by Massachusetts Road Saves City from Isolation Just Before Exposition

Five of the seven spans of the North End bridge over the Connecticut River at Springfield, Mass., were destroyed on Sept. 8 by fire. Within an hour after the blaze had been discovered the only bridge was thus put out of service over which electric railways running to Holyoke, Westfield, Hartford via the west side and various local points to the west could enter or leave the city. This created an emergency for the Springfield Street Railway that had to be met by quick and vigorous action.

In order to meet the emergency the company within a period of ten days laid 6,571 ft. of track at a financial outlay of approximately $125,000. The large amount of special work involved greatly increased the difficulties and expense incidental to this quick achievement.

The new Hampden County Memorial Bridge, over which it was intended to have electric railway cars pass, had not been connected by tracks and wires with the local railway system, because of a controversy over routes which had only lately been settled. All materials had, however, been received for the Vernon Street tracks and switches that were to provide an approach from Main Street to the new bridge. Before the flames had died down at the old bridge the Springfield Street Railway had begun action to set up an emergency service that would take care of traffic that night and for the next two or three days and to rush the Vernon Street connection to completion in the shortest possible time, this being particularly enjoined by the fact that the Eastern States Exposition, with its great crowds of residents and visitors, was due to open on Sept. 16.

Meanwhile, cars for the Hartford west side line had been operated over the new bridge and by way of the exposition grounds beginning Sept. 9 three street railway buses were running over the bridge in place of one, many independent buses also being operated over the same route, and a shuttle trolley service was put on to make connections between the bus service and the interurban car lines. On the west side as on the east the tracks for regular car service to the new bridge had not been laid. The most that could be done immediately was to establish transit across the bridge from Main Street so as to get the emergency service in working order before the

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opening of the exposition on Sept. 16. The total loss from the burning of the bridge will probably exceed $500,000. It is likely that the North End will be replaced, but as this may not be accomplished for several years, it will be the problem of the local railway to make the new bridge and its connecting loops do full service.

Oregon Utilities Organize Information Bureau

Leading public utilities of the state have just formed a joint organization to be known as the Oregon Public Utility Information Bureau. The purpose is to endeavor to promote among the people of the state a closer understanding of the services and problems of the public utilities which form such an essential factor in the progress and development of modern community life.

Identified with the bureau from the start will be seven of the largest public utility companies in the state, with a combined invested capital aggregating approximately $125,000,000. These companies now serve about 200,000 customers with light and power, gas and heat and provide electric railway transportation for many communities. Likewise, these companies now have on their books between 12,000 and 15,000 local stockholders in their home territory, and this number is growing each year under the operation of what is known as the "customer-ownership" plan.

Nearly 150 of the leading cities and towns in the state receive service from this group of companies, which includes the Portland Railway, Light & Power Company, Portland Gas & Coke Company, Pacific Power & Light Company, Northwestern Electric Company, Mountain States Power Company, Eastern Oregon Light & Power Company and the California-Oregon Power Company.

For several months preliminary negotiations have been carried on and the final organization was completed during the week of Sept. 8 with Franklin T. Griffith, president Portland Railway, Light & Power Company, as chairman.

This committee has selected as director of the Public Utility Information Bureau W. P. Strandborg, for the past eight and one-half years in charge of the publicity and advertising department of the Portland Railway, Light & Power Company.

The headquarters of the Oregon bureau will be Suite 820, Electric Building, Portland.

Special Bulletin Issued by Public Utility Information Committee

A pamphlet, prepared for the use of speakers in the celebration of Constitution Week in Louisville from Sept. 10 to 17 was sent out by the Kentucky Committee on Public Utility Information as a special bulletin in the belief that the material contained therein would prove especially interesting to all persons interested in utilities and their problems. In making the pamphlet a special bulletin, the thought occurred to the committee that perhaps the editors on its mailing list might care to utilize the Louisville celebration of Constitution Week as a basis for editorials.

Tri-City Railway Tears Up Tracks

Tracks of the Tri-City Railway, in the town of Rockingham, extending from the city limits of Davenport to the end of the line, a distance of 1,300 ft., have been torn up. This was done in compliance with an ordinance adopted by the Rockingham town council in August. Officials of the town of Rockingham declared that the company would be ordered to tear up the tracks of the Credit Island part line which are inside the limits of the town.

The company, according to the officials, has been operating in the town of Rockingham ever since the town was incorporated, but has never had a franchise. The railway is the only means of public transit to the island.

"Pave between the tracks and a foot on each side or tear up the tracks immediately," the ordinance said. The town clerk handed a copy of it to R. J. Smith, general manager of the traction company. He issued orders to the track crew to rip up the rails and ties as soon as they could get to them.

In the present financial condition Mr. Smith said that his company could not possibly consider paying for the pavement between the tracks and a foot on each side.

The street will now be paved from curbing to curbing, uninterrupted by car tracks, as the council let the contract some time ago.

The same track crew ripped up 2,000 feet of track running from Rolff Street to Forest Park. The line has not paid any revenue, according to General Manager Smith and the company could not afford to maintain the track, to say nothing of attempting to operate cars over it. Track torn up on Rockingham road and on the Forest Park lines will be salvaged as junk.

Illinois Trainmen Receive Five Cents an Hour Increase

Trainmen of the Illinois Traction system of the Illinois Power & Light Corporation are to receive an increase in wages of 5 cents an hour as the result of an agreement between the company officials and a committee representing the union held at Springfield, Ill., on Sept. 7. New wage contracts which will not expire until Dec. 1, 1924, but which will date from Sept. 1, are now in effect. While the increase agreed on is only 5 cents an hour, putting the increase in wages in effect before the expiration of the old contract will mean an actual increase of 6¼ cents an hour for the men.

Under the old wage contract motormen and conductors in passenger service promoted prior to Jan. 1, 1921, have been paid 57½ cents an hour and those promoted after Jan. 1, 1921, have been paid 55 cents an hour. All motormen and conductors in freight service have been receiving 60 cents an hour and brakemen have been receiving 45 cents an hour.

The increase will average from $15 to $20 a month for each employee including conductors, motormen, brakemen and others who are members of the union. The total salary increase will add approximately $60,000 a year to the company's payroll.

Proposal for Elevated in St. Louis

The suburban lines forming one of the constituent companies threaten to break away from the United Railways, St. Louis, and build an elevated line along the present right-of-way of the Hodiamont line of the United Railways. This will be done, however, only if the holders of the $4,500,000 of the general mortgage 5 per cent bonds of the United Railways and of $2,000,000 of the consolidated bonds of the old St. Louis & Suburban Railway (the present Hodiamont line) are successful in a foreclosure suit they will file in the United States District Court.

Where issues already due have been provided for by receiver's certificates, it has been the contention of attorneys that under-lying issues automatically succeeded them as prior lien. It is on this point that the legal question would be thrashed out.

In his order last Monday Judge Faris authorized a total interest payment of $381,728 to be made on Oct. 1. The $4,200,000 bonds which were authorized extended from Oct. 1 are secured by mortgages on the Cass Avenue, Compton Heights and Lindell system.

Office of President No Longer to Be Revolved

Announcement of the election of Edwin M. Walker as president of the Schenectady Railway was made in Schenectady on Sept. 18 by Harry B. Weatherwax, former president of the company, returning to Albany from New York, where he attended a directors' meeting of the company. As stated previously in the ELECTRIC RAILWAY JOURNAL, Mr. Walker will enter upon his new duties on Oct. 1.

The Schenectady Railway is owned jointly by the Delaware & Hudson and the New York Central. It has been the practice in the past to alternate the presidents each year, one year the D. & H. naming the president and the next year the New York Central naming a man to that position. Mr. Weatherwax announced that this practice is to be abandoned and that a president was being named to hold that position permanently. Mr. Weatherwax gave out this statement:

With the strike over it has been decided by the board of directors of the Schenectady Railway to abolish the managing committee, consisting of Harry B. Weatherwax, president, and James F. Hamilton, vice-president and general manager, who have alternated yearly in these positions for many years past, and appoint a permanent president, who should reside in Schenectady and become part of the city's civic life.

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Public Service Railway Restores Service

Company Decides to Abide by Order of Chancellor Walker, Directing It to Resume Operation—Needs $2,500,000 of Additional Revenue per Annum and Will Appeal for Ten-Cent Fare, Hoping Later to Be Able to Adopt Boston Plan of Reduced Rates for Short Riders—Many Interesting Points Covered in Opinion by Chancellor

SERVICE is being restored on the lines of the Public Service Railway of New Jersey. The first cars were run on the company's Bergen division on the afternoon of Sept. 20. Other lines were then being prepared for service and it was expected on Sept. 21 that all the lines would be restored to service within the next few days. It was just fifty days from the time the cars were run into the carhouses following the strike of the employees until the first car was run in Bergen County.

Restoration of service by the company followed upon the issuance by Chancellor Walker on Sept. 17 of a mandatory order calling for a resumption of service at once. The Chancellor said that it was not an answer to say that the company could not operate at a profit and therefore should not be obliged to run at all. He said the answer to that contention was that if the railway stood still long enough it would be absolutely ruined. This would ultimately result in the appointment of a receiver under insolvency who would be directed to operate the road under order of the court. Such an ending, said the Chancellor, would be disastrous to those owning the securities of the company and to its other creditors, unless the property at receiver's sale brought sufficient to discharge all its obligations in full, which was not likely.

The course was open to the company of appealing from the ruling to the Court of Errors and Appeals, but on Sept. 19 it issued the following statement announcing its decision to comply with the order:

"The Chancellor, the highest judicial officer of the state, having ordered the railway to resume service, the company will obey the order and service will be restored as soon as practical conditions will permit, which it is hoped will be not later than next Monday morning (Sept. 24). Of necessity the service will be a little disorganized at first, but every effort will be made to straighten it out as rapidly as possible. For example, it will take several weeks to change over the equipment from open to closed cars, work which is ordinarily done earlier in the year.

"To anyone familiar with the facts, it is apparent that the company must have substantially increased revenues, if it is to meet the largely increased costs of operation caused by the increase of wages, which it is necessary for it to pay to secure resumption of service; otherwise, the property of the railway must of necessity pass through the disintegration process into its constituent parts, which results, of course, in a demoralization of the system, a large investment loss, inability to finance extensions and betterments for the future and the payment of several fares by the public in lieu of a single fare.

"To avoid this calamity the company must have at least $2,500,000 of additional revenue per annum. It is believed that a 10-cent fare will produce this money and that no other remedy is immediately available. The company will therefore file with the Board of Public Utility Commissioners a 10-cent rate without charge for transfer. As the business of the company grows and develops, as destructive and unfair competition, which is the real cause of the high fare, is removed through the co-ordination of service or otherwise, or as declining costs make possible, it is hoped that either this base rate can be lowered or that while retained as the base, a lesser fare may ultimately be worked out for short riders in congested centers. This will be following the plan that has been worked out so successfully in Boston. The Chancellor in his opinion says that a resumption of service should stimulate the settlement of existing problems.

"The company appeals to the Board of Public Utility Commissioners, to municipal officers and to the public for co-operation in making it possible to operate the property upon a sound basis of economics and in a manner to give satisfaction to the traveling public. The company will do its part."

After fifty days of suspension of service the employees were naturally scattered into other walks of life, but it is said that unusual success has attended the efforts of the company to round up its former men. William Wepner, head of the union, stated on Sept. 20 that despite the long period of inactivity there would be possibly a loss of only 5 per cent of the total number of men employed when the strike broke. The number employed on all lines was 6,500.

The ratification of the company's plan by the men at the various union headquarters over the state, voted on Wednesday night was said to be unanimous. The company agrees to pay the men an increase of 20 per cent and allow one day off in eight. The latter will cause the employment of an increased number of men, for the day off plan is an entirely new one. The contract is to run for three years and a working day calls for a full nine hours. On the wage basis men in the employ of the company for more than a year will receive 60 cents an hour and operators of one-man cars 65 cents an hour.

It should be remembered that two companies, the Public Service Railway and the Public Service Railroad, the so-called fast line, were both involved in the various proceedings before the courts and the commission in connection with the suspension of the service. The railroad operates under the steam railroad act, and while it is an important part of the entire railway system, the great bulk of that system is comprised within the corporate identity of the Public Service Railway. Thus is explained in part the alternative references to the "railroad" and the "railway" contained in the official orders and the opinion of the Chancellor. The opinion on which the order of the Chancellor was based follows:

In Chancery of New Jersey.

Between THOMAS F. MCCRAN, attorney general, for and in behalf of the State of New Jersey, Informant, and PUBLIC SERVICE RAILWAY COMPANY, Defendant.	54-300. On Information. **Opinion.**

1. A preliminary mandatory injunction will issue to compel the restoration of a *status quo ante* in aid of a suit at law where irreparable damage would result from its being withheld.

2. Where a *mandamus* is sought in a court of law to compel a public utility corporation to perform its duty to the public, the court of chancery will enjoin the performance of that duty pending the suit at law.

3. It is not a defence that the company cannot operate at a profit; that is not the test: the duty resting upon a *quasi* public corporation must be performed, or its privileges and franchises must be surrendered; it cannot discharge its duty on and off, as it may find it profitable to do so.

4. It appears that a receiver may be appointed for a public utility corporation to discharge its duty to the public in the event of its not obeying the mandate of the court.

On application for mandatory injunction in aid of suits at law.

THOMAS F. MCCRAN, *attorney general, and* WILLIAM NEWCORN, *assistant attorney general,* for the State.

ROBERT H. MCCARTER, FRANK BERGEN, MERRITT LANE, E. AMBLER ARMSTRONG *and* WILLIAM H. SPEER for defendant.

WALKER, *Chancellor.*

The attorney general has filed an information on behalf of the state, in which he shows that the defendant company was organized and created under a consolidation agreement dated Aug. 20, 1907, between sundry street railway companies, and shortly thereafter it entered into an agreement of consolidation with certain other street railway companies operating in the northern part of the state, and thereby became possessed of all rights, privi-

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leges and franchises, subject to all restrictions, disabilities and duties of the corporations so consolidated.

Under the act of consolidation and merger it was provided that all rights, privileges and franchises, and property of each of such corporations, was transferred to and vested in such new corporation; and that it has also acquired other street railways by long-term leases, thus forming a united and complete system of about 850 miles of street railway tracks in 142 municipalities, and took possession of such railways and operated such system from the dates of such leases and entry upon the properties respectively, until Aug. 1, 1923, carrying in recent years about 1,000,000 passengers per day; that prior to Aug. 1, 1923, employees of the defendant company voted that a strike should go into effect on said date unless the terms and demands of the employees were met or conceded by the corporation, which it refused; such strike went into effect, and the company has failed to operate its cars from that date up to the present time, notwithstanding the duty imposed upon it, a common carrier, having franchises from the state to provide proper service for the citizens thereof, and more particularly for the inhabitants in the communities served by such corporation.

The information also charges that the failure of the defendant to operate its cars deprives the state and its municipalities of revenue to which it is lawfully entitled by way of taxes on its gross income, and jeopardizes the investments of its bondholders and stockholders, and those of its subsidiaries; that it deprives the citizens, and more particularly the inhabitants of the municipalities, of the service to which they are entitled by the company; and that the corporation has obligations which it cannot meet unless its road is operating, thereby working irreparable injury upon the state, its subdivisions and citizens.

Further, that the Board of Public Utility Commissioners of this state, on Aug. 9, 1923, served a notice upon the defendant of a hearing in the matter of its refusal to operate its road, and, after hearing, and on Aug. 14, 1923, made an order directing the defendant forthwith to furnish adequate and proper service and keep and maintain its property and equipment in such condition as to enable it to do so; that the defendant failed to comply with the terms of said order, and on Aug. 17, 1923, the board made application to the New Jersey Supreme Court for a writ of *mandamus* to compel the company to obey the said order, and on the date last aforesaid an alternative writ of *mandamus* was allowed, and served upon the defendant company on Aug. 28, to which the company filed an answer, wherein it set forth that by reason of the increased cost of operation it was impossible for it to comply with the order of the board, which proceedings are pending and undetermined; that by reason of the company possessing exclusive grants to operate its railway system, it is bound to perform that duty until it has lawfully surrendered, suspended or abandoned its franchises and privileges by the legally expressed consent of the state.

This information further shows that on Sept. 4, 1923, the attorney general filed an information for a *quo warranto*, inquiring by what right the defendant company exercises the franchises and privileges acquired by it at the time of the consolidation and merger agreements aforesaid, and by what right it refuses to operate its cars and perform the duty required of it under and by virtue of the privileges and franchises acquired by it as aforesaid.

The information before me prays that in aid of the *mandamus* and *quo warranto* proceedings mentioned, and in order to preserve the rights of the public, that a mandatory injunction be issued requiring the defendant company forthwith and pending the determination of said suits at law, to resume the operation of its railways and render service to the citizens of New Jersey; or, in the alternative, upon the continued refusal of the defendant company to operate its railways and discharge its public duty as aforesaid, that a receiver be appointed to take charge of the property of said company and operate the same until the final determination of the actions at law now pending. This succinctly states the issue tendered by the attorney general on behalf of the state.

The defendant company has answered, and while this is not a final hearing, the case has been fully submitted on pleadings and affidavits on both sides. The gravamen of the answer is that the company cannot operate without loss, and it claims that therefore it should not be compelled to operate at all. That present operation, that is, operation pending a settlement of its dispute with its employees, would be at a loss may be conceded for the purpose of the decision of the matter before me.

In arriving at a determination in this matter I deem it unnecessary to consider the question of the prospective loss of taxes to the state or municipalities, or of interest of the bondholders or dividends of stockholders of the company. The question transcends any such considerations and, to my mind, turns upon the single question of the power of this court to grant the injunction prayed for because of the public duty owed by defendant company to the citizens of this state, and that irrespective of whether such operation can be carried on with profit or with loss.

Mandamus is the appropriate remedy to compel a street railway company to operate its road for the benefit of the public. Hamilton Township vs. Mercer County Traction Company, 88 N. J. L. 485. In this case in the Court of Errors and Appeals, 90 N. J. L. 531, Mr. Justice Swayze said, at page 534, that the writ of mandamus is used to enforce a public duty which may sometimes grow out of a contract as well as out of a statute, citing Wilbur vs. Trenton Passenger Railway, 57 N. J. L. 212; Bridgeton vs. Traction Company, 62 N. J. L. 592; Rutherford vs. Hudson River Traction Company, 73 N. J. L. 227; Pleasantville vs. Atlantic City Traction Company, 75 N. J. L. 279; Camden vs. Public Service Railway, 82 N. J. L. 246. Here the duty arises out of statutory and charter obligation.

It is true that in McCran, attorney general, vs. Western Union Telegraph Company, 120, Atl. 515, I held that *mandamus* and not mandatory injunction is the proper remedy to compel the performance of a public duty enjoined upon a quasi public corporation; and so it is. But in the same case I also held that an injunction would issue to preserve the status pending the *quo warranto* suit at law; for, if it were not for the injunction, the public duty owed by the defendant to the state would not be performed during the litigation over it. And that is this case; unless a distinction is to be made between an injunction to preserve an existing status and one to restore a *status quo ante*. As a fact, the injunction in the Western Union case amounted to a mandatory one, because the company had refused to perform the duty of receiving and transmitting messages of public officers free of charge under the statute. And while the writ was couched in negative terms and restrained the company from refusing to accept and transmit the messages, because that was the prayer of the information in that case, nevertheless, the injunction compelled the corporation to receive and transmit them, and was, consequently, in effect, a command to do an affirmative act.

Chancellor McGill in National Docks Railway vs. Pennsylvania Railroad, 54 N. J. Eq. 10, at page 16, said that his understanding was that our courts have always recognized the right of a court of equity in a proper case to grant a mandatory injunction after preliminary hearing, even though that be the whole relief sought, citing numerous cases.

In granting temporary injunctions to protect easements, as in other cases, the court does not take jurisdiction for the purpose of settling the rights of the parties permanently, but simply to preserve the property until the legal title to it is established. The title which the plaintiff must show in such a case is not, of course, an incontestable one; he makes out a sufficient case when he satisfies the court that his claim is a substantial one and that there is reasonable ground for doubting the validity of the title of his adversary. The injury against which protection is sought is that which is likely to occur before the question of title between the parties can be settled, that is, in the limited time before a decision of the pending suit can be had. Pomeroy's Eq. Jur. (2 ed.) 1970, citing Fulton vs. Greacen, 36 N. J. Eq. 216; Todd vs. Staats, 60 N. J. Eq. 507. In the latter case an injunction was denied because irreparable injury was not shown. See page 513. The instant case is not one of easement, but the principle applies.

Where a gas company, having a

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franchise and virtual monopoly, demands of a city an unreasonable price for gas, the city may offer a reasonable price; and if the gas company refuses to furnish at that price, the city may maintain *mandamus* if the supply has not been commenced, and may sue in equity to enjoin the stoppage of a supply then being furnished. Public Service Corporation vs. American Lighting Company, 67 N. J. Eq. 122. See also, Public Service Gas Company vs. Newark, 86 N. J. Eq. 384, 388.

Jaquelin vs. Erie Railroad, 69 N. J. Eq. 432, is relied upon by defendant because there Vice-Chancellor Garrison refused an injunction compelling the railroad company to maintain a station, holding that the remedy was by *mandamus*, and said that the authority of courts to compel a railroad company to maintain a station where not required to do so by charter or statute was not so clear as to justify the granting of a preliminary injunction restraining the discontinuance of such a station; but at page 444 he also said that courts will compel the completion of a road if the charter clearly imposes that duty upon it, and they will also compel the operation of the road and other clear duty enjoined upon the corporation. This case would appear to be an authority for the contention of the state.

That a preliminary mandatory injunction may be issued in a proper case has the sanction of the Court of Errors and Appeals. See Bailey vs. Schnitizius, 45 N. J. Eq., 178, where it was held that a mandatory injunction was rarely granted before final hearing, and will only be ordered to prevent extreme or very serious damage. In other words, that it will be ordered in such circumstances.

That a preliminary mandatory injunction will lie in a proper case has been decided over and over again in this court. See Whitecar vs. Michenor, 37 N. J. Eq. 6; Pennsylvania Railroad vs. Kelley, 77 N. J. Eq. 129; Barna vs. Kirczow, 71 N. J. Eq. 196; 201; Savage vs. Port Reading Railroad, 73 N. J. Eq. 308; National Docks Railway vs. Pennsylvania Railroad, 54 N. J. Eq. 10; 16.

In Hodge vs. Giese, 43 N. J. Eq. 342, Vice-Chancellor Van Fleet held that a court of equity may protect legal rights in real estate where the right, though formally denied, is yet clear on facts which are not denied, and according to legal rules which are well settled, and the injury against which protection is asked is irreparable; that an injury is irreparable which is material, and which cannot adequately be redressed by pecuniary damages; that contrary to the general rule, a mandatory injunction may issue at the inception of a suit for the protection of an easement and other rights of like nature.

The important question is, May this court lay a public utility corporation under a mandatory injunction to operate its works for the benefit of the public where to do so would appear to entail a loss upon the company. The only cases in this state which I have found that bear upon the question are Public Service Corporation vs. American Lighting Company, and Public Service Gas Company vs. Newark, supra; and there the question was as to a reasonable price for gas, and it was held that injunctions would issue to compel the companies to serve the public with gas for lighting at a reasonable price where the companies demanded more. But in Georgia and New York it has been held that a utility corporation could be compelled to serve the public even if that service would be unprofitable.

In Savannah, &c. Co. vs. Shuman, 91 Ga., 400, the court held that so long as the corporation retains its franchise it will not be allowed to urge as an excuse for failing to perform any duty required of it by its charter that service would be unprofitable. It cannot consistently keep the franchise and reason that such performance would be unremunerative. And in People vs. New York Central & H. R. R., 28 Hun (N. Y.) 543, the court said that the question was, Could a railroad corporation refuse or neglect to perform its public duties upon a controversy with its employees over the cost and expense of doing them; that the question admitted of but one answer, that the excuse had no validity in law; that the duties imposed must be discharged at whatever cost; that they could not be laid down or abandoned or suspended without the legally expressed consent of the state; that the trusts were active, potential and imperative and must be executed until lawfully surrendered.

After all, that is the test. The duty resting upon a quasi public corporation must be performed or its privileges and franchises must be surrendered. It cannot assume to discharge its duty to the public on and off, as it may find it profitable to do so. And this apparently has the sanction of the Supreme Court of the United States, for in Brooks-Scanlon Company vs. Railroad Commission of Louisiana, 251 U. S. 396, 64 Law ed., 323, at page 326, that court, while holding that a carrier cannot be compelled to carry on business at a loss (a question of fact which doubtless concerns the Public Utility Commission and the Supreme Court on *mandamus*), nevertheless observed that "it is true that if a railroad continues to exercise the power conferred upon it by a charter from the state, the state may require it to fulfill an obligation imposed by the charter, even though fulfillment in that particular may cause a loss." And that is the point I make, for, it seems to me, on an application for injunction to restore the status, it is not for me to make an exhaustive investigation of facts, and to adjudicate whether or not the company could be operated at a profit, but that it is enough if it appears that it is obliged to operate under a charter which it has not surrendered. See, also, Atlantic C. L. R. Co. vs. N. C. Corp. Com., 206 U. S. 1, at page 26.

The condition with which the court is dealing is appalling. I have never known anything like it to exist in this state. To say that in its presence there is no court competent to give needed prompt relief, is to assert that there is a defect in the law itself. If the defendant can cease to operate its lines for the benefit of the public under a charter which requires it to do so (which charter it sought and received), then the great steam railroads, even the transcontinental roads, can do so, and thus paralyze transportation business over a wide territory, to the untold loss and inconvenience of a suffering public.

Now, in order to grant relief admittedly the damage must be extreme and serious; it must be material and irreparable. It is all these and more. It is not an answer to say that the company cannot operate at a profit, and therefore it should not be obliged to run at all. The answer to that answer is: It stands still at a loss, and if it stands still long enough it will be absolutely ruined. This would ultimately result in an insolvency receiver, who would be directed to operate the road under order of the court.

Such an ending would be disastrous to those owning the bonds and stock of the company and to its other creditors, unless the property at receiver's sale brought sufficient to discharge all its obligations in full, which is not likely. No one hopes more than I do that that calamity will never befall this great corporation with its numerous security holders. Nor do I think that ordering operation will have that effect. I think, on the contrary, that the effect will be to stimulate negotiations to settle the many difficulties with which the company is confronted. But, be that as it may, I think it my duty to order the injunction prayed for to restore the *status quo ante* in aid of the suits at law.

If the injunction were not obeyed then it appears the informant would be entitled to the appointment of a receiver, under the general equity powers of the court, to carry out its mandate by operating the road. See Stockton vs. Central Railroad, 50 N. J. Eq. 489. And the attorney general could make an application to that end.

It should be stated in closing that the defendant objects that the informant is not entitled to relief in this court respecting the matters set forth in the information, and prays the same benefit and advantage as though it had moved to strike out the information in conformity with the present practice substituted for demurrer. The views which I have above expressed lead to a denial of this application.

Mandatory injunction accordingly.

The various orders of the court follow in part:

In Chancery of New Jersey.

In the matter of the application for a receiver for Public Service Railroad Company, by A. Henry Kollmar, Petitioner.	On Petition, &c. **Opinion.**

1. An application for the appointment of a receiver under the general railroad act, *Comp. Stat. 4219, sec. 86*, is not a proceeding before the Chancel-

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lor as a statutory magistrate or legislative agent, but is a proceeding in the Court of Chancery itself.

2. Under a prayer for further or other relief, or without it according to the present rule of court, petitioner may have such relief as he shows himself to be entitled, without a specific prayer therefor.

3. On application for a receiver under the statute, to operate a railroad for the benefit of the public, where the railroad has ceased to run any car for a period of ten days, and the facts and circumstances warrant it, the court may, under its general jurisdiction, issue a mandatory injunction compelling the company to operate, with leave to petitioner to apply for a receiver under the general equity powers of the court in case the injunction is disobeyed.

On application for appointment of a receiver for Public Service Railroad Company.

THOMAS F. MCCRAN, *attorney general, and* WILLIAM NEWCORN, *assistant attorney general*, for petitioner.

ROBERT H. MCCARTER, FRANK BERGEN, MERRITT LANE, E. AMBLER ARMSTRONG *and* WILLIAM H. SPEER, *contra*.

WALKER, *Chancellor*.

This is an application for the appointment of a receiver for a trolley line organized under the general railroad act, Comp. Stat. 4219. The power invoked is that residing in section 86 of the act, which provides that if any railroad company has failed or neglected to run daily trains on any part of its road for ten days, the Chancellor, on petition of any citizen of this state, and on due proof of the facts, may appoint a receiver who shall take possession of all the property of the company and operate its road and transact the ordinary business thereof in the transportation of freight and passengers for such time as the Chancellor may direct.

The case is before me on petition and affidavits and answer and affidavits. It is conceded that the road has not operated since Aug. 1, 1923; and defendant asserts that it has always been operated at a loss, which is not denied.

The petition prays for the appointment of a receiver and for further and other relief. The court is therefore not obliged to grant or deny the relief specifically prayed, but can give any measure of relief to which in its judgment the petitioner is entitled.

I do not feel willing to appoint a receiver in this matter in the facts and circumstances before me, and have concluded under the prayer for further and other relief to grant a mandatory injunction compelling the defendant company to operate its road, the same as in McCran, attorney general, vs. Public Service Railway, and for the reasons stated in that case, with the alternative that if the mandate to operate is not obeyed, a receiver may be applied for, as in that case, under the general equity powers of the court. This course I deem much fairer to the defendant company, and it will also avoid any doubt as to the validity of section 86, which has been questioned by the defendant, and concerning which the Court of Errors and Appeals suggested difficulty in Long Branch S. S. R.R. Co., 26 N. J. Eq. 539, at page 540.

As the Public Service Railroad has always been operated by the Public Service Railway, since the latter acquired the former, operation of its own road by the Public Service Railway will facilitate operation of the Public Service Railroad.

Mandatory injunction accordingly.

NEW JERSEY, to wit: *The State of New Jersey to Public Service Railroad Company, Greeting*:

Whereas, it hath been represented to us, in our Court of Chancery, on the part of A. Henry Kollmar, petitioner, that he has lately exhibited a petition pursuant to the statute made and provided against you, the said Public Service Railroad Company, Defendant, to be relieved touching the matters set forth in the said Petition.

We, therefore, in consideration of the premises and of the particular matters set forth in the said petition do strictly enjoin and command you, the said Public Service Railroad Company under the penalty that may fall thereon, that you forthwith resume the operation of your railroad system and furnish adequate and proper service as a public utility to the citizens of the State of New Jersey until our said Court shall make other order to the contrary.

Witness, his Honor, Edwin Robert Walker, our Chancellor, at Trenton, the eighteenth day of September, in the Year of Our Lord one thousand nine hundred and twenty-three.

.....
Attorney-General of New Jersey,
Solicitor of the Petitioner.

.....
Clerk.

In Chancery of New Jersey.

In the Matter of the Petition for a Receiver for the Public Service Railway Company, by A. HENRY KOLLMAR, Petitioner.	**On Petition.** Order that a Mandatory Injunction Issue.

Thomas F. McCran, attorney general of the state of New Jersey, having filed a petition for and in behalf of A. Henry Kollmar, a citizen of the state of New Jersey, praying for the appointment of a receiver to operate the railroad for the defendant for the benefit of the public, and for further or other relief, pursuant to the statute made and provided, and an order to show cause having been issued, and the matter coming on to be heard in the presence of Thomas F. McCran, attorney general, and William Newcorn, assistant attorney general, solicitor and of counsel with the petitioner, and Robert H. McCarter, Frank Bergen, Merritt Lane, E. Ambler Armstrong, and William H. Speer, solicitors and of counsel for the defendant, and the court having read and filed the petition and affidavits attached thereto, and the answer and answering affidavits annexed thereto, of the defendant and listened to the argument of counsel pro and contra, and having duly considered the same, and it appearing to the court that the defendant has ceased to run any cars for a period of more than ten days, and to discharge its duty as a public utility for the benefit of the public, and that a mandatory injunction should issue compelling the defendant company to operate its road;

It is, thereupon, on this eighteenth day of September, A.D. nineteen hundred and twenty-three, on motion of William Newcorn, assistant attorney general, solicitor and of counsel with the petitioner, *ordered* that the State's Writ of Mandatory Injunction be issued forthwith, directed to the Public Service Railroad Company, commanding that it forthwith resume the operation of its railroad system, and furnish adequate and proper service as a public utility to the citizens of the state of New Jersey.

In Chancery of New Jersey.

Between THOMAS F. MCGRAN, attorney general of the State of New Jersey, for and in behalf of the State of New Jersey, Informant, and PUBLIC SERVICE RAILWAY COMPANY, a corporation, Defendant.	**On Information.** Order that a Mandatory Injunction Issue.

Thomas F. McCran, attorney general of the state of New Jersey, having filed an information for and in behalf of the state of New Jersey, praying that a mandatory injunction be issued, directed to the Public Service Railway Company commanding it that it forthwith resume the operation of its railway, or, in the alternative upon the continued refusal to operate and discharge its duty to the public as a public utility that a receiver be appointed to operate the same until the final determination of the actions at law now pending, and an order to show cause having been issued, and the matter having come on to be heard, and the court having read and filed the information and the affidavits annexed thereto, of the defendant, and listened to the argument of counsel pro and contra, and having duly considered the same, and it appearing to the court that the *status quo ante* should be maintained in aid of the actions at law now pending, in order to prevent irreparable damage and injury, and that a mandatory injunction should be issued;

It is thereupon, on this eighteenth day of September, A.D. nineteen hundred and twenty-three, upon motion of William Newcorn, assistant attorney general, solicitor and of counsel with the informant, *ordered* that the State's Writ of Mandatory Injunction be issued forwith, directed to the Public Service Railway Company, commanding that it forthwith resume the operation of its trolley cars over its railway system, and furnish adequate and proper service as a public utility to the citizens of the State of New Jersey until the determination of the actions at law now pending in the New Jersey Supreme Court.

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Financial and Corporate

Monthly Deficits Increase

Cincinnati Traction Unable to Meet Added Burden of Higher Wages—Fares Increased

Deficits in the operating expenses of the Cincinnati Traction Company for July and August will result in an increase in fares from 7½ to 8 cents on Oct. 1. Formal announcement of the proposed increase was made on Sept. 15, when the company proceeded to advertise it, according to law.

A financial statement of the company shows a deficit of $38,990 for July and $68,685 for August. The award of the board of arbitrators announced on Aug. 11, granting the company's 1,700 employees increases in wages from 3 to 7 cents an hour, is directly responsible for the increase in fares, according to Walter Draper, vice-president. After the increase goes into effect it will be of no advantage to passengers to buy tickets as the cost of a single ticket will be the same as a cash fare. It is possible that the traction company will do away with the ticket system.

Under the terms of the service-at-cost franchise the railway is required to raise its fares after a deficit occurs in its operating expenses for two consecutive months. The ordinance also specifies that the company must advertise its intention fifteen days before the date fares are to be increased. Fares have been at 7½ cents since late in the summer of 1921, when the City Council passed an ordinance relieving the traction company of payment of its franchise tax of $380,000 to the city. The ordinance was passed because the 7½-cent fare was not producing enough revenue for the traction company to meet its operating expenses and pay the franchise tax. In other words the city surrendered the tax money due it from the traction company to permit fares to remain at 7½ cents. It is possible that before the end of this year fares will reach 8½ cents, which level they topped in April, 1920, shortly before W. C. Culkins, former Director of Street Railroads, enjoined the railway from increasing its fare to 9 cents. The 8½-cent fare was the largest paid by the car-riding public in the history of street railway service in Cincinnati. Prior to October, 1918, the 5-cent fare was in vogue for many years. In that month, which was in the war period, the traction company served notice of an increase in fares on Jan. 1, 1919. On that day it was increased to 5½ cents and kept increasing ½ cent every three months until April, 1920.

On Aug. 16, following the announcement of the award of the arbitrators in the wage controversy between the traction company and its employees, W. Kesley Schoepf, president, said in a statement that drastic measures would have to be taken to reduce expenditures to keep the rate of fare at 7½ cents. Since that time the traction company has made reductions and has practiced economy in all its undertakings, but the additional burden is too large to offset without impairing the service.

The $250,000 in additional charges brought about by the arbiters' agreement means an increase of approximately $22,000 a month in the operating expenses of the traction company. By increasing the rate of fare at this time, the ordinance deferring the payment of the franchise tax to the city becomes void and the company must earn enough money out of the 8-cent fare to meet this charge.

The traction company has introduced one-man cars on many of its routes since the announcement of the award of the board of arbitrators and this measure has helped to some extent to relieve the situation.

Excess Profits Tax Discussed

Can a railway which is operated under a service-at-cost franchise with a provision that it can pay its stockholders no more than 6 per cent return on their investment ever be subject to an excess profits tax?

This is the issue involved in the attempt of the Cleveland Railway to prevent the Federal government from collecting the sum of $405,992 from it for income and excess profits taxes for the years 1917 to 1920, inclusive.

A hearing on the issue was held in Washington on Sept. 11. The company was represented by former United States Senator Atlee Pomerene, Attorney Fielder Sanders, former city street railway commissioner, and Attorney Harry J. Crawford. These attorneys contended that instead of the railway owing the Federal government any income or excess profits taxes, the Federal government really owes the Cleveland Railway $175,000 for taxes already collected for the years 1921 and 1922.

Outlining the operation of the Tayler plan in Cleveland, Mr. Pomerene contended that inasmuch as not more than 6 per cent return could ever be paid the stockholders, the company never could make anything that could properly be taxed under an income or excess profits tax because all earnings over and above 6 per cent went into the fare stabilizing fund and acted to reduce the rate of fare paid by the car riders.

Attorney Crawford in the opening argument said:

> While this appears to be a controversy between the Cleveland Railway and the Federal government, it is ultimately a controversy between the city of Cleveland and the Federal government. We operate in Cleveland on the service-at-cost basis with a definite, fixed return to the holders of the stock.
>
> To say that the company owes the government money as excess profits is absurd, because the company cannot have excess profits under the Tayler plan ordinance. If the profits raise the amount in the interest fund above $500,000, the money is held in trust for the people of Cleveland. It is returned to them in the form of reduced fares or increased service.

At the conclusion of the hearing Kingman Brewster, who presided over the government committee on appeals and review, declared that the case presented "new questions" because of the form of the contract between the city of Cleveland and the railway.

Deficit in July in Toledo

Operations for the month of July by the Community Traction Company, Toledo, resulted in a deficit of $36,483, which after a credit for interest earned on cash resulted in a charge of $35,969 to the fare stabilizing fund, bringing it down to a balance of $150,368. Decrease in revenue passengers amounting to almost 10,000 daily as compared with the previous month, higher wages, large maintenance program and settlement of a large damage claim are factors which went to make up the big loss for the month. The prospect is that the August deficit will be considerably less.

Bus operations on Oak and Erie Streets feeder lines still result in a loss, but business has improved on the Oak extension.

The ratio of operating expense to gross income was 86.925 per cent. This is the highest experienced since July, 1921.

The maintenance program for the month involved an expenditure of more than $65,000 and was the largest for any month in the history of the company.

The Council has finally refused to take advantage of the clause in the Milner ordinance by which it would have demanded $1,000,000 of new capital from the Doherty interests for financing improvements.

Railway Assessment Advances

According to figures recently published by the Tennessee Railroad & Public Utilities Commission, the assessments of public utilities in the state have increased approximately $9,000,000 in 1923 over the 1921 biennial assessment. For 1923 the street railway assessment was $32,264,250, against $31,877,963 in 1921. There was no change in the assessment of the Citizens' Railway & Light Company, the Knoxville Railway & Light Company, Memphis Street Railway and Nashville Railway & Light Company. In the Jackson Railway & Light Company there was a tentative assessment made of $788,000. In 1921 this figure was $368,065. Another change was a reduction in the assessment of the Memphis & Lakeview Railway, from $122,100 in 1921 to a total assessment of $88,500 in 1923.

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Amendment to Increase Stock.—The Kentucky Utilities Company, Louisville, has filed an amendment increasing its capital stock from $5,000,000 to $10,000,000.

Resolutions Passed for Bond Issue.—The South Jacksonville, Fla., Council passed resolutions to have the bond issue for the municipally-owned car line printed and advertised for sale at once. The amount of the issue will be $100,000.

Auction Sales in New York.—At the public auction rooms in New York there were sold on Sept. 19 thirty-five shares of Columbus, Marion & Bucyrus Railway, $10 lot, and 1,000 shares of Manhattan Transit Company, $90 lot.

Initial Preferred Dividend Declared.—The Monongahela-West Penn Public Service Company, Pittsburgh, Pa., has declared an initial dividend of 43¾ cents on the 7 per cent preferred stock, payable on Oct. 1 to stock of record Sept. 15.

Common Stock Dividend Declared.—The Board of Directors of the Bangor Railway & Electric Company Bangor, Me., declared a quarterly dividend on common stock amounting to 1 per cent. The dividend is payable to stockholders of record on Oct. 10.

Prior Lien Stock Offered.—The Chicago, North Shore & Milwaukee Railroad is offering to its stockholders and the public $1,500,000 of 7 per cent prior lien stock. The proceeds will be used to pay indebtedness incurred and for additional working capital.

Line Shuts Down.—The Hamilton & Dundas Electric Railway is now in the hands of receivers. The line was closed by the Dominion Power & Transmission Company on Sept. 7. It had been in operation for about forty-five years and was one of the oldest short lines in Canada and one of the oldest electric lines. Bus and jitney traffic put it out of business.

Will Resume Service.—According to a recent announcement by the New York Transit Commission the Union Railway has accepted the recent order of the commission to resume service on that portion of its Morris Park Avenue surface line between Bronxdale Avenue and Williamsbridge Road, the Bronx, which has been closed since 1916. The portion of the line to be restored is approximately ½ mile in length and will serve a community of more than 1,200 persons, many of whom now have to walk more than a half mile to the nearest transportation point.

Wants Dividend Payments.—Seeking to recover $1,249,956 in dividends alleged to be owed to him and other stockholders of the Eastern Massachusetts Street Railway, L. Sherman Adams of Wellsley has filed a bill in equity in the Supreme Court against the company and against Arthur G. Wadleigh of Lynn, Fred J. Crowley of Lowell, Isaac Sprague of Wellsley, Earl P. Charlton of Fall River and Samuel W. McCall of Winchester, its public trustees.

Order Entered for Railway Sale.—An order has just been entered in the Henry County Circuit Court for the sale of the property of the Galesburg & Kewanee Electric Railway, Kewanee, Ill., as an entirety. This line operates the interurban between Galva and Kewanee and the city cars in Kewanee. This order came following an application by the company. Attorney John T. Cummings of Kewanee has been appointed special master in chancery to make the sale, which will be made some time in October, and will take place in front of the Henry County Courthouse at Cambridge.

Tracks Will Be Ordered Torn Up.—All car tracks in Tiffin except those used for interurban traffic by the Tiffin & Fostoria Railway will be ordered torn up. This was the City Council's reply to the company's offer to move its tracks from a business to a residence street in order to restore city service. Legislation ordering the tracks removed will be started right away and the city will fight its stand through the courts if the company contests the order. If this ultimatum is carried out it will leave the company with rails only in West Perry Street, four blocks on East Perry Street and a spur in Jefferson Street. The company would be forced to dispose of its freight depot in the south end of the city.

Merger of Subsidiaries Proposed.—The New York Transit Commission has approved the petition of the South Brooklyn Railroad for permission to acquire the outstanding capital stock of the Prospect Park & South Brooklyn Railroad and the New York & Coney Island Railroad. The South Brooklyn Company is controlled by the Brooklyn-Manhattan Transit Corporation, the successor to the Brooklyn Rapid Transit Company, and is the lessee of the other companies. In its petition, the South Brooklyn Company disclosed that it is proposed to buy the required outstanding stock at $112 a share.

Seeks Abandonment.—The Aurora, Plainfield & Joliet Railway has petitioned the Illinois Commerce Commission for permission to abandon its road between Joliet and Aurora. The competition of buses is assigned as the reason by the railway for its desire to junk the line. The line began operating in 1904, and profits were shown every year until 1911, when dividends were suspended and efforts were required to keep the road running without incurring deficits. Vice-President Winston stated that the petition for suspension was filed on the basis of a Supreme Court decision which held that no company could be compelled to operate a business at a loss.

New Connecticut Road Elects Officers.—W. Scott Eames, general manager of the New Haven Trap Rock Company, was elected president of the New Haven & Shore Line Railway at a stockholders' meeting on Sept. 12. A. William Sperry was chosen vice-president, Frederic E. Kingston was named treasurer and Leonard O. Ritter was elected secretary. A board of directors made up of Clarence Blakeslee, David S. Walton, Jr., Charles M. Walker, Donald A. Dunham of Hartford, Philip J. Stueck, Middletown; Robert B. Lively, Clinton; Frederick C. Spencer, Guilford; Arthur W. Chambers, Frederick N. Sperry, A. William Sperry, W. Scott Eames and Frederic E. Kingston were elected at the same time. As noted previously in the ELECTRIC RAILWAY JOURNAL the company is operating a rehabilitated electric railway out of New Haven, Conn.

Conspectus of Indexes for Sept., 1923

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Sept. 1923 **7.00**	Aug. 1923 **6.92**	Sept. 1922 **7.01**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	Aug. 1923 **165**	July 1923 **169**	Aug. 1922 **189**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages* 1913 = 100	Sept. 1923 **215**	Aug. 1923 **214**	Sept. 1922 **208**	Sept. 1920 **232**	Apr. 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Aug. 31 1923 **5.41**	July 31 1923 **5.91**	Aug. 31 1922 **5.95**	July 31 1920 **11.12**	Feb. 28 1922 **4.14**
U.S. Bank Clearings Outside N. Y. City (Billions)	Aug. 1923 **13.90**	July 1923 **14.69**	Aug. 1922 **12.92**	Mar. 1920 **18.54**	Feb. 1922 **10.65**
Business Failures Number	Aug. 1923 **1,433**	July 1923 **1,406**	Aug. 1922 **1,675**	Jan. 1922 **2,722**	May 1923 **1,467**
Liabilities (millions)	**48.40**	**36.58**	**36.89**	**105.7**	**31.77**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	Sept. 1923 **221.5**	Aug. 1923 **221.5**	Sept. 1922 **185.0**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Aug. 1923 **150**	July 1923 **151**	Aug. 1922 **155**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	Sept. 1 1923 **12.91**	Aug. 1 1923 **12.82**	Sept. 1 1922 **12.08**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's—Wholesale Commodities 1913 = 120.9	Sept. 1 1923 **188.0**	Aug. 1 1923 **186.7**	Sept. 1 1922 **172.5**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Aug. 1923 **146**	July 1923 **147**	Aug. 1922 **139**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Aug. 1923 **161.6**	July 1923 **161.9**	Aug. 1922 **154.5**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

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Traffic and Transportation

Court Upholds Commission

California Body Ruled to Be Right in Fixing Different Basis for Local and Interurban Fares

Action of the Railroad Commission of California in fixing interurban railway fares upon a different basis from local passenger fares for street car service has been upheld by the California Supreme Court in a decision in litigation involving Pacific Electric Railway fares between Los Angeles and Pasadena, South Pasadena, Alhambra and Glendale.

The decision clearly establishes for the first time the correctness of the theory used by the Railroad Commission in fixing interurban fares on a mileage basis as distinct from local fares which are fixed on the basis of the average ride per passenger, without regard to the distance traveled within the local fare zone by the individual passenger.

Does Not Violate Constitution

The Supreme Court in its decision, rendered by the court *en banc*, holds that neither the order of the Railroad Commission nor the tariff schedule filed pursuant to the provision thereof violates the provisions of Section 21 of Article XII of the State Constitution.

As pointed out by the court, in its decision, the commission established local passenger fares, dividing Los Angeles proper into two zones, and fixing a fare of 6 cents for the inner zone, and 6 cents for the outer zone, or a through fare for the two zones of 10 cents.

The reasonableness of these zone rates was not questioned, the court pointed out, they being fixed on the basis of the average distance all the passengers ride, the individual passenger paying the prescribed fare regardless of the distance he rides in the prescribed zone.

The rates of fares on the interurban service were fixed upon a mileage basis, to and from Los Angeles, being calculated from the Los Angeles terminal stations of the company. The general one-way fare for all interurban passenger service was fixed at 2.75 cents per mile, and the reasonableness of this rate is not questioned, the court pointed out.

In the suit brought by the cities of Pasadena, South Pasadena, Alhambra and Glendale, it was alleged that inasmuch as the sum of the local passenger fares (in case a passenger would ride to Sierra Vista, the outer edge of the outer zone from Los Angeles, for 10 cents, and then could board another car and ride to Pasadena for another fare of 10 cents, or 20 cents for the entire trip), was lower than the interurban rate of 29 cents for a through trip, without change to Pasadena, that the tariff violated the provisions of the state constitution prohibiting discrimination against passengers and places using the same character of service.

The Supreme Court points out that this is exactly where the petitioners failed to prove the rates discriminatory, as there is a distinction between the interurban service and the local service, the interurban trains being operated on separate tracks from the local service, and the interurban service being by means of larger and heavier cars and operated at high speed, with more, and more comfortable seats than the local service provides.

The court points out that there were no decisions to which it might refer for precedents in deciding this litigation, and that it had recourse to the decisions of the Interstate Commerce Commission, and also that it is strengthened in its decision by the wording of the State Constitution, Section 21, of Article XII, which specifically provides that there shall be no discrimination between places or persons "or in the facilities for the transportation of the same classes of freight or passengers within this state."

"It is manifest," the court observes, "that an interurban passenger, who pays a fare depending upon the exact distance he rides, is not in the 'same class of passengers' as the local passenger, who may ride one block, or 5 miles, for the same fare."

Survey of Houston Conditions Under Way

Speeding up cars of the Houston Electric Company will reduce operating costs and improve service, it is declared by J. A. Beeler, New York, employed by the city of Houston. The company's prime contention in its petition, filed in Federal court, seeking relief from what it alleged to be confiscatory fares imposed by the city, was that it is losing money.

The average speed for cars in Houston is 6 m.p.h., Mr. Beeler said. The system is fairly efficient and furnishes service that compares favorably with the service given in other cities, but big savings can be made in several instances, the traction expert said. By rerouting and speeding up cars the company will be able to please its patrons, render more efficient service and effect a material saving in the cost of operation.

Reduction in the number of stops on all lines is the first recommendation toward speeding up service. Houston has sixteen stops for the mile, Mr. Beeler said, while an average of eight stops should be sufficient.

Before any rerouting can be determined upon it will be necessary to make a complete survey of the transportation needs of the city, and a corps of men is now engaged in checking the service on all lines. The report will be digested and put in such form that it can be used in court.

The trial of the company's suit in Federal court is set for Sept. 24.

Freight Handling Discussed

D. U. R. Will Install New System for Expediting Freight—Officials Approve

The new system for handling freight soon to be installed by the Detroit United Railway on its lines in Michigan and Ohio, with a view to solving difficulties now encountered by electric and steam railways, manufacturers and other shippers, was discussed at a meeting of railway officials at the office of the Detroit United Railway on Sept. 13. Officials of the Michigan roads and also officials of some of the Ohio, Illinois and Indiana railways were present. Large containers to be equipped to fit upon a motor truck and a flat car are provided for by the system which in the opinion of officials of the Detroit United Railway will result in a considerable saving of time by reducing the number of times the freight is handled from twelve times to approximately seven.

Truck lines are to be established as feeders for the electric lines by the Detroit United Railway to compete with the truck lines operating from Detroit to Michigan cities and to Cleveland and Toledo. It is pointed out that the proposed plan for competition with the truck lines will result in a considerable change in railway equipment, including construction of special flat cars and the building of stands for unloading the trucks directly onto the cars.

Special waterproof containers resembling large boxes will be furnished to shippers in the factory of the shipper and picked up by the specially-built trucks operated by the company for delivery to the nearest point on the electric line. When the container is unloaded from the car it will be again picked up and delivered at the plant or store of the receiver.

The use of flat cars will be possible in connection with the containers with the resulting reduction in the weight of the load. By using the engine of the truck to haul the containers onto the chassis and unload it again, the company will be able to dispense with a number of freight handlers. It is estimated that only 50 per cent of the time now consumed in loading and unloading freight will be required when the containers are used. With the use of the containers it is anticipated that shippers will save considerable time and the company considerable money by avoiding claims for damages to freight and freight stolen in transit. The present arrangement whereby the freight is packed loosely in a freight car and the car sealed will be replaced by the use of the container, which can be moved to

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any part of the factory or warehouse to be packed securely and sealed for shipment. Closer contact between the company and the farmers as well as the manufacturers is expected by the use of the new system as containers for the shipment of farm products, milk, etc., will be built.

The proposed system was approved by a number of the railway officials present and the discussion brought out the fact that a system similar to that proposed by the Detroit United Railway had been in successful operation in England for several years for the transportation of freight in London, Liverpool, Manchester and other cities. The manner in which a similar system is working out in Cuba was reviewed and moving pictures shown to illustrate how time and labor can be saved by the new arrangements.

Michigan railway development, it was cited, has not kept pace with the growth of Michigan cities and the necessity for railways for finding a system for feeding into their lines by motor trucks was emphasized.

Jitney Ouster in Effect in Birmingham

Birmingham jitneys ceased operation at midnight, Sept. 15. As a result the Birmingham Railway, Light & Power Company reduced fares on Sept. 18 to 7 cents for cash fares and 6 cents for tickets, according to the agreement with the City Commissioners some weeks ago. The fare was formerly 8 cents, while fifteen tickets were sold for $1. An additional 2 cents will be charged for transfers, either on cash or ticket fares, the same as before.

At a meeting between Assistant City Attorney W. A. Jenkins and Attorney G. J. Prosch of Prosch & Prosch, representing the Jitney Men's Association, it was agreed to request the Supreme Court to vacate an injunction of the Jitney Men's Association against the City Commissioners restraining them from putting the jitneys out of business. The injunction was therefore vacated and annulled by Associate Justice Lucien D. Gardner on Sept. 13. After appealing to the Supreme Court by the Jitney Men's Association for the reinstatement of the temporary injunction which had been dissolved by a lower court, an initiative election of the people was held and the jitneys were defeated by a vote of approximately four to one.

The fight between the city and the jitneys has been a long drawn out one. But the big majority vote against the operation of the jitneys proves conclusively that the people of Birmingham prefer the street cars to the jitneys.

The settlement of the jitney question will also settle the long-drawn-out controversy between the city and the company over the pavement of certain streets and the improvement of its system. In fact, the company has already complied with some of its agreements with the city, which depended upon the elimination of the jitney from Birmingham streets. The company has already placed in effect the Jim Crow law, required by the city, on most of its street cars.

And now that the jitney is eliminated there is a strong likelihood that the company will be reorganized and lifted from the receivership where it has been for some time. It has been the contention of the company all along that the jitney was injuring its business to such an extent that it was unable to make any progress. It was also argued by the company that it was impossible to improve the system as it was barely paying expenses, and being in the hands of a receiver money could not be borrowed for improvements and extension of the lines.

It is likely that some changes will be made in the Tidewater Street car line, as this line has never been a paying proposition owing to the fact that it operates through territory still largely unsettled.

Buses Will Supplant Cars.—As the result of a town meeting in Westport, Conn., at which a large majority of citizens voted for bus service, all the trolley tracks of the Connecticut Company, except those by which cars pass from Bridgeport to Norwalk, will be torn up. Bus service will supplant the railway service.

Fare Period Extended.—The Missouri Public Service Commission has granted a further extension of the 8-cent fare rate for the Kansas City Railways for a period of six months from Sept. 18. John B. Pew, city counselor of Kansas City, in a letter to the Missouri Public Service Commission Sept. 14 informed the board that he would not oppose the application of the receiver of the Kansas City Railway lines for an extension of the present fare for a period of one year.

Fines Imposed.—In the Supreme Court before Justice Charles E. Nichols on Sept. 8 twenty-seven jitneys drivers were cited to appear for violation of the Hinman injunction of two years ago forbidding competition with the United Traction Company. Nine drivers who failed to make their appearance either in person or by counsel are to receive "jail" sentences. Fines of $100 were imposed on two operators and the cases against a number of others were adjourned.

Transfers to Bus Line.—The New York State Railways (Oneida line) has filed a local passenger tariff approved by the Public Service Commission which provides that passengers paying Utica city zone fare or Oneida line cash fare will, upon request to the conductor, be given transfers to the Utica Railway Co-Ordinated Bus Line, Inc., for transfer at Parkway and Genesee Street. Transfers issued by said bus line will be accepted for passage on Oneida line cars.

Wants Order Changed.—The Schenectady Railway has applied to the Public Service Commission for an amendment of an existing order which requires it to carry Albany city passengers within the Albany city limits. It is alleged the United Traction Company has extended its city fare service to the Albany city line, and the Schenectady Railway alleges that there is no public reason for it carrying Albany city passengers, as service to the west city line is now given by the United Traction Company.

Bus Certificate Granted.—The Iowa Railroad Commission has granted to the Waterloo, Cedar Falls & Northern Railway a certificate permitting it to operate a bus line from Cedar Falls to Waterloo. A bus line already existing between Cedar Falls and Waterloo protested to the commission several months ago that the interurban company's line, conducted as an auxiliary to its railroad system, was not operating in good faith, at the time of the passage of the motor bus license law by the General Assembly on April 14, 1923, and that the railroad company ought therefore to be enjoined from operating the bus line.

Working for Safety and a Picnic.—The safety first campaign started by the railway employees of Keokuk has been given added impetus by Walter H. Burke, manager of the Keokuk Electric Company, who announced that the company would provide a dinner or picnic for its men if they closed a month without an accident. The men hold midnight meetings once or twice a week to discuss the safety campaign, safety slogans appear on all cars each day and motorists and pedestrians have caught the spirit and are doing all they can to prevent an accident involving personal injury during the month.

Will Petition for Bus Permit.—The stockholders of the Sheridan Railway, Sheridan, Wyo., will petition the State Utilities Commission for permission to operate buses in the city. The railway was not making money and when the city decided to repave the streets the assessment against the tramway was more than it could pay, so it petitioned the commission for permission to cease operation of the railway. This was granted and the next step will be the petition to operate a bus line within the city. The cessation of the railway service within the city of Sheridan will not affect the electric line between Sheridan and Fort MacKenzie.

Council Rules One-Man Cars to Stay.—The City Commission of Dayton, Ohio, has rejected the repeal petition submitted by the Central Labor Council officials, requesting the abolition of one-man cars in Dayton. The action was taken at the close of a public meeting. Following this action of the Council, the Labor Council officials announced that they would file with the Board of Elections petitions signed by 25 per cent of the voters and force the one-man car issue to a decision at the polls in November. Before the issue can come to a vote, over the city commission's objections, it will be necessary for the labor committee to secure an additional 15 per cent of the votes of Dayton.

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Personal Items

Indiana Man in New Post

Hudson R. Biery Becomes Assistant to President Charles L. Henry of the Indianapolis-Cincinnati Line

Hudson R. Biery, as noted briefly in the ELECTRIC RAILWAY JOURNAL for Sept. 15, has tendered his resignation as purchasing agent for the Union Traction Company of Indiana, Anderson, Ind., effective on Oct. 1. He will become associated with Charles L. Henry, president and general manager of the Indianapolis & Cincinnati Traction Company, as assistant to the president. This company is in the midst of a program of complete rehabilitation, which will be concluded during the spring and summer of 1924.

Mr. Biery's electric railway experience began in 1908. In that year he entered the service of the Indianapolis & Louisville Traction Company at Scottsburgh, Ind., the original 1,200-volt d.c. line recently acquired by the Interstate Public Service Company. He was employed at first as storekeeper. Later he was made clerk to the superintendent, then traffic manager and purchasing agent in 1911. Following the receivership of the property in 1915, Mr. Biery continued with the Indianapolis & Louisville Traction Company as assistant to John E. Greeley, president and general manager, in charge of transportation. He resigned this office in 1919, when he was made purchasing agent for the Union Traction Company of Indiana. His successor with the Union Traction Company has not yet been appointed.

H. R. Biery

Changes in West Penn Property

E. A. Morgan, who has been superintendent of the West Penn Electric Company, Wellsburg, W. Va., has been transferred to the same position at Weirton, W. Va., and M. J. Zurick, who has held a similar position at Charleroi, Pa., will go to Wellsburg. J. S. Johnson, who has been general superintendent of the territory, will be transferred to the treasury department and will give his time to the sale of West Penn securities in Brooke, Ohio, and Hancock counties.

W. S. Eames Heads Rehabilitated Road

W. Scott Eames has been elected president of the New Haven & Shore Line Railway, New Haven, Conn., which recently took over and restored to service a part of the old Shore Line Electric Railway. Mr. Eames is very well known throughout Connecticut. For more than five years he was Director of Public Works in New Haven under the late Mayor Frank Rice. He retired from that office because of press of business in other lines in which he was interested. At present he is general manager of and director in the New Haven Trap Rock Corporation, the largest concern of its kind in New England. Mr. Eames was elected head of the National Crushed Stone Association of the United States two years ago. He is also one of the moving spirits in the B. B. Savage Company and the New Haven Upholstery Company. He is treasurer of the Totoket Electric Company. He is a member of the Union League Club and other social and fraternal organizations and is prominent in Masonic circles.

W. B. Carson, formerly secretary of the Pittsburgh & Beaver Street Railway, is now vice-president. The office of secretary is being filled by A. W. Washabaugh.

Milton E. Ailes, a well-known Atlanta newspaper man, has been appointed by the Georgia Railway & Power Company a member of the public relations department for the company. Mr. Ailes has, for the past fourteen years, been connected with the Associated Press in charge of the bureau at Memphis and at Atlanta.

Rev. Francis A. Chancellor Stone, who for thirty-five years served on the "L" lines of the Brooklyn-Manhattan Transit Company, has severed his connection with the railway to devote his entire time to the ministry. Up to a year ago Mr. Stone had a regular run as motorman on the Broadway or Lexington Avenue "L" lines. He devoted his Sundays and other off time to preaching and his other duties as a minister. He has been active in the ministry since 1901, when he was ordained in the Congregational Church. He was well known throughout Brooklyn as "The Railroad Evangelist." On Aug. 1, 1923, he became a member of the company's Service Honor Legion.

Mr. Baehr to Manage Merger

Well Known Consulting Engineer Is Elected Vive-President and General Manager of Combined Properties

William A. Baehr has recently been elected vice-president and general manager of the Illinois Power & Light Corporation. He will make his headquaretrs in Chicago, in which city are located the general offices of the new corporation, which is a consolidation of the North American Light & Power Company's properties and the Illinois Traction System.

Mr. Baehr has been active as a consulting engineer and operator of public utility properties for many years and is one of the best known utility men in the country. His first connection with public utilities was in Wisconsin. Following his graduation from the University of Wisconsin, Mr. Baehr spent three years in general engineering work and then became superintendent of distribution of the Milwaukee Gas Light Company. From this position he went to Denver as superintendent of the gas department of the Denver Gas & Electric Company. In 1903 he became chief engineer of the Laclede Gas Light Company, St. Louis.

W. A. Baehr

In 1909 he opened offices in Chicago as consulting engineer. He has been employed by many of the leading utility companies of the country in connection with the operation of properties and the construction and design of plants and on many occasions has been engaged in valuation and financing problems.

Prior to becoming the directing head of the merged corporation, Mr. Baehr occupied a similar position with the North American Light & Power Company, operating gas, electric light and power, street railways and interurban properties in Illinois and other Middle Western states. He was born in Oshkosh, Wis., on Sept. 15, 1873.

The merged company is one of the very largest earners in point of gross receipts among the utilities of the United States.

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Mr. Seely in Motor Field

Former Executive at Youngstown Joins Yellow Coach Manufacturing Company at Chicago

Garrett T. Seely has joined the forces of the Yellow Coach Manufacturing Company as its Western sales manager. Announcement to this effect has been made from the office of the company at Chicago. It will not surprise Mr. Seely's intimates to learn that the former vice-president and general manager of the Pennsylvania-Ohio Electric Company and its subsidiaries, among them the Pennsylvania-Ohio Coach Lines, Inc., has become identified with the automotive industry.

For an engineer Mr. Seely has been unusually alive to sales possibilities in the transportation field. At Youngstown he created an entirely new business by bus by supplying a public demand. His company was, in fact, the first to supplement a car line with buses to develop new interurban business. It was, indeed, a radical thing to do, to put in a line of this kind, but Mr. Seely did it. The story of the results achieved was told to the members of the Central Electric Railway Association in a paper read at Louisville on Jan. 18 and 19, 1923. There is no need to repeat any part of it here. That paper, published in the ELECTRIC RAILWAY JOURNAL for Jan. 27, page 169, not only told the story of the Youngstown installation, but tucked away in its text was the story of the talent of the man behind the move.

From the very first Mr. Seely has been a believer in the use of the bus properly articulated with the electric railway. His work at Youngstown affords striking proof of this. But his belief in the use of the bus as a feeder and in service supplementary to the electric railway is only a part of the story behind his decision to accept the Chicago appointment. The position at Chicago will afford him a greater opportunity than any purely operating position with a single railway to exercise his natural talents and his knowledge of engineering and transportation. With the Chicago company his activities will extend to the distribution, sale and installation of the company's products and, more important still to Mr. Seely, they will include the conduct by him of analysis of conditions governing future bus installations.

The record of Mr. Seely's achievements in the steam railroad and the electric railway fields has been the subject of a review recently in the ELECTRIC RAILWAY JOURNAL and is generally well known in electric railway circles.

The Yellow Coach Company has already drawn liberally on the electric railway industry for transportation talent, and in inducing Mr. Seely to join its forces has indirectly paid that industry another very great compliment. There is no excuse for the application of the cut and try method when talent is available that can unearth the facts needed to prevent what might turn out to be costly errors. This the Yellow Coach Company has realized from the first. Its appointment of Mr. Seely is further evidence of its desire to round out its personnel so as to include the most expert construction, selling and transportation engineering knowledge.

W. P. Strandborg to Manage Bureau

Portland Man Chosen to Direct Publicity Work for Public Utility Companies in Oregon

Another little job more or less means absolutely nothing to William P. Strandborg, publicity and advertising man of the Portland Railway, Light & Power Company, Portland, Ore. So when the public utility men of Oregon got together recently and decided that they needed a permanent bureau of publicity through which to tell their story to the public the members unanimously decided that Bill, as he is familiarly known, should direct the bureau. Bill accepted. He has never been known to duck anything. Just when he does his work is a mystery, but he does it.

W. P. Strandborg

While carrying on for the Portland company and editing *Watt's Watt* Bill finds time to act as president of the Public Utilities Advertising Association, and to be an active figure in the civic life of Portland, managing community chests and doing other odd jobs that require the kind of writing that brings in the money. Many Portlanders are the owners of securities of the Portland Railway, Light & Power Company, and it is Bill's copy with its purchase-producing urge that has made a hugh success of the issues sold locally at Portland for cash or on partial payments.

Bill was graduated from Western Reserve University, Cleveland, Ohio. At the time he was graduated Bill probably could not have answered correctly all questions Mr. Edison might propound, but being unconscious of that then it did not stifle in him the urge to write and he served on the *Plain Dealer* and the *Press* in Cleveland. In 1903 he went to the Pacific Coast as editor of the Seattle *Star* and later was special writer on the *Evening Telegram*, Portland, Ore. There he won great popularity with the newspaper-reading public for his whimsicalities. That was some time before the vogue of the column conductor, which fate Bill apparently escaped because President Griffith of the Portland company, who had just taken over that office, was able to win Bill over along about 1915 to his way of thinking about the local utility. There Bill has been ever since, chaffing the public of Portland to laugh with him at some of their own foibles, building up good will for his company and selling to the thrifty issues of stock and bonds that pay liberal returns on the investment and doubtless have saved thousands of local dollars from the maw of the get-rich-quick promoter.

If there is anybody in Portland that really counts that doesn't know Bill it is not Bill's fault. Among the organizations of which he is a member are the Portland Ad Club, Portland Press Club, Portland Automobile Club, Progressive Business Men's Club, Portland Transportation Club and the Elks, to mention just a few. He also founded the local chapter of the Ancient Order of Muts. For a number of years he was vice-president of the Associated Advertising Clubs of the World for the Pacific Coast.

Charles S. Kressler has been elected president and general manager of the Saginaw Transit Company, the successor to the Saginaw-Bay City Railway, under which railway service is to be resumed in Saginaw soon in accordance with the terms of the settlement franchise passed recently. Mr. Kressler has been engaged in public utility work for ten years, of which seven have been with electric railways.

Obituary

Samuel Edward Young, former general manager of the Johnstown Passenger Railway, now the Johnstown Traction Company, died recently at his home in Johnstown, Pa., at the age of seventy-four years. He was made assistant general manager of the railway in 1892 and a short time later general manager, retiring three years ago.

Henry W. Harris, associate editor of the "Stone & Webster Journal," died suddenly upon the golf links at Marion, Mass., Sept. 9. Mr. Harris was born in 1871 at Flushing, L. I. He was graduated from Yale University in 1895. He entered the public utility industry about nine years ago and was on the staff of the Northern Texas Traction Company, Fort Worth, Tex., from 1914 to 1921. He went to the Boston office of Stone & Webster, Inc., about two years ago and for most of that time was engaged in editorial work.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Industrial Standardization Progresses

Reduction Has Been Made in Variety of Sizes Available in Many Lines of Manufactured Products

Definite progress in the movement to eliminate waste in industry is being made in a number of important lines, according to a bulletin just issued by the Chamber of Commerce of the United States. The bulletin states that industry is no longer thinking of simplification and standardization as activities which may stifle initiative or interfere with service to the trade. No confusion can result if it is kept clearly in mind that the objective is the elimination of waste, which is today obstructing industrial progress.

Forty or fifty manufacturers, jobbers, retailers, consumers of paints and varnishes have adopted a simplification program. This action will reduce the varieties of containers used in marketing the commodities and also will eliminate many colors and shades of paints, stains, enamels and varnishes. The adopted schedule is substantially the same as that drawn up for wartime operation. The action taken is to become effective Dec. 31, 1923.

A general conference of asphalt producers, together with road commissioners, state, municipal and highway engineers was able to reduce the varieties of asphalt grades from 102 to 10. Certain definite penetration limits were established for paving asphalt, sheet asphalt and block filler. This simplification is to be put into effect on Jan. 1, 1924.

Conference Decides Brick Sizes

Not until a survey had been made was it very generally realized the multiplicity of sizes for brick. If any commodity should be standardized dimensionally it is building brick. This has been accomplished by a conference of clay brick manufacturers, engineers, builders and other interested elements. Two sizes of face brick have been retained and one for common brick. The face brick sizes are: Rough brick, 8 x 2½ x 3¾; smooth brick, 8 x 2½ x 3¾. For common brick the standard size is 8 x 2½ x 3¾.

Another outstanding simplification program was adopted at a meeting of retail dealers, users, and manufacturers representing 85 per cent of the wire fence production. Sizes, types and varieties of wire fence were reduced from 552 to 69. This action carried with it a reduction of fence packages from 2,072 to 138. The simplified schedule became effective Sept. 1, 1923, for new production, and stocks of discontinued lines are to be cleared by Jan. 1, 1924.

Discusses Readjustment of Freight Rates

The question of freight rates was made the subject of discussion at a recent meeting of the Chamber of Commerce in Washington at which were present representatives of the agricultural, manufacturing, labor and transportation interests constituting the rates committee designated by the chamber. The rates were discussed looking toward a readjustment rather than a reduction. F. A. Delano, former member of the Federal Reserve Board and now chairman of the rates committee, stressed this point when he said that it was a matter of readjusting rates to eliminate inequalities in relative rates.

Overhead Contract in Morocco Let

The contract for the equipment of the overhead section of the line from Casablanca to Kourigha, Morocco, by the "suspension catenaire" system, has been given to the Compagnie d'Enterprises Hydrauliques et de Travaux Publics of Paris on behalf of the Compagnie des Chemins de Fer du Maroc. Only within these last days, following upon the French occupation of Morocco but a dozen years ago, have standard gage railway lines been in operation, an outgrowth of the narrow gage *automotrice* (gasoline - motor) lines which connected Casablanca with Rabat and Rabat with Mekenes, Fez and Taza. The result was that the automobile came to be the preferred form of locomotion, indeed the only efficient and rapid means of communication, public service vehicles being as numerous as privately owned cars. A big step forward has been taken under the ægis of Marechal Lyauty, the real founder and animator of Morocco, by the electrification of one of the first portions of the rail lines of narrow gage recently transformed to standard.

Brazil Orders for England

The English Electric Company has secured a contract for the electrification of the Campos do Jordao Railway in Brazil. The contract, which has been awarded by the government of São Paulo, covers the conversion of an existing meter-gage railway, including the supply and erection of about 30 miles of overhead catenary construction for use with 1,500-volt d.c., 15 miles of 30,000-volt, three-phase transmission line, motor coaches for passenger and freight service and the building and equipment of a substation. At the substation the 30,000-volt, fifty-cycle supply will be transformed and converted to direct current at 1,500 volts for the working conductors. Each passenger coach will seat forty passengers, and each freight car will carry 10 tons. The electrical equipment per coach will be four D. K. 30 self-ventilated traction motors, wound for 750 volts. The motors are connected two in series and the two pairs operate in series-parallel. Two-thirds of the railway is on gradients, the steepest of which is 10.5 per cent. The motor coaches are accordingly to be fitted with four brakes—hand, air, rheostatic and electro-magnetic track brakes.

Consolidated Car Heating Company Handles All Heating and Ventilating Equipment

As was announced in the ELECTRIC RAILWAY JOURNAL of Sept. 15, the Automatic Ventilator, formerly manufactured and sold by the Automatic Ventilator Company of New York, has been taken over by the Consolidated Car Heating Company. By adding this equipment to its line of electric car heaters and thermostats the Consolidated Car Heating Company is now in a position to handle the entire heating and ventilating requirements for any design of car.

The Automatic Ventilator has been on the market for many years. It is perhaps best known in the steam railroad field, where it is standard equipment on the passenger cars of a number of leading railroads. Railway mail cars have been very largely equipped with the Automatic Ventilator because it so adequately meets the rigid ventilator specifications of the United States Post Office Department.

The Automatic Ventilator is said to be a self-acting combined intake and exhaust ventilator, performing the dual function of drawing in the proper amount of fresh air and exhausting the used air, without creating draughts or troublesome air currents.

Metal, Coal and Material Prices

Metals—New York	Sept. 18, 1923
Copper, electrolytic, cents per lb.	13.437
Copper wire base, cents per lb.	16.00
Lead, cents per lb.	6.925
Zinc, cents per lb.	6.75
Tin, Straits, cents per lb.	41.50
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.05
Somerset mine run, Boston, net tons	2.375
Pittsburgh mine run, Pittsburgh, net tons	2.25
Franklin, Ill., screenings, Chicago, net tons	1.55
Central, Ill., screenings, Chicago, net tons	1.175
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.75
Weatherproof wire base, N. Y., cents per lb.	18.50
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal.	$0.93
White lead, in oil (100-lb. keg), N. Y., cents per lb.	11.375
Turpentine, (bbl. lots), N. Y., per gal.	$0.99

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Rolling Stock

Knoxville Power & Light Company, Knoxville, Tenn., will purchase, it is reported, fourteen cars of the most modern type. It is said that the order will specify seven single-truck cars and seven double-truck cars.

Androscoggin & Kennebec Railway, Lewiston, Me., has placed in service the five new cars purchased from the Wason Manufacturing Company of Springfield. They are double-truck cars of Birney type construction with four G. E. 258 C motors and Westinghouse DH 16 air compressors. These cars were substituted on a car for car basis for the old double-truck two-man cars. One-man operation was started Sept. 1.

Chicago North Shore & Milwaukee Railroad recently changed the order on five passenger coaches under construction in the plant of the Cincinnati Car Company to have them finished as parlor cars of the very attractive type described in the ELECTRIC RAILWAY JOURNAL for July 14, 1923. The cost of the five parlor cars will be about $3,500 in excess of the cost equipped as coaches. Inasmuch as these cars were purchased on a car trust plan which had been all arranged, it would have been quite a lot of trouble to revise and increase the trust agreement and so the excess cost was charged to the railway's advertising appropriation — an operating expense. This was considered fair and practical because the first parlor cars in use had been of the greatest advertising value and had attracted much new patronage.

Long Island Railroad, New York, N. Y., has announced that it intends to purchase new equipment costing approximately $2,863,000. The equipment authorized by the management consists of sixty steel motor passenger cars for electric service, five large passenger locomotives for heavy express trains, five heavy freight locomotives and two hundred gondola or open top cars for general use. Contracts for the new equipment will be placed not later than Oct. 15. This is the 1924 car and locomotive program and assures delivery of all the new equipment in ample time for the 1924 summer traffic. With the ninety-two additional steel passenger cars ordered for 1923 delivery and the sixty now to be placed on order, and deducting eighty wooden cars of the older type that have been retired, the passenger equipment will total 1,282 cars at the end of 1924.

Track and Line

New York State Railways, Syracuse, N. Y., will extend the Court Street line one-half mile to the new Onondaga pottery plant. Materials have been ordered which will cost between $20,000 and $25,000.

El Paso Electric Railway plans to relay its loop around Oregon Street. Alves Dixson, superintendent of the company's traffic department, estimates the cost at $50 000. The new rails will be much heavier than those now in use in order to provide for the heavy traffic now passing over the loop.

Arkansas Central Power Company, Little Rock, Ark., is reconstructing the tracks on East Fourteenth Street from Scott to College Street.

Northern Texas Traction Company, Fort Worth, Tex., has been granted franchises to construct the Riverside and Sycamore Heights car lines in the city of Fort Worth. Work has begun on both lines and it is expected that the work will be completed in about two months. Construction of these two lines will represent an outlay of about $150,000.

Power Houses, Shops and Buildings

Lake Superior District Power Company, Ashland, Wis., plans the erection of a brick carhouse at Ironwood as one of the steps in the rehabilitation program.

Androscoggin & Kennebec Railway, Lewiston, Me., has recently installed an automatic arc welding equipment at the Lewiston shop. In the spring the company placed four substations on a semi-automatic basis of operation, having already one full automatic substation.

Trade Notes

Peter Smith Heater Company, Detroit, Mich., has moved its factory from the old location on Mount Elliott Avenue to new and modern quarters at 6209 Hamilton Avenue.

J. D. Phillips has been appointed office manager of the new Oakland, Cal., plant of the General Electric Company. Mr. Phillips, who was formerly traveling auditor, will have charge of accounting, statistics, payrolls and all clerical operations at these works.

Dayton Mechanical Tie Company, Dayton, Ohio, announces the appointment of G. H. Jameson to its field forces. Mr. Jameson was associated for six years with the Indianapolis Switch & Frog Company as welding engineer. Through this connection he became an authority on track construction.

Metropolitan-Vickers Electrical Company, London, received the order for the motors for 100 cars recently awarded by the London County Council. Altogether motors for 200 cars were ordered. A reference to this order appeared on page 279 of the issue of this paper for Aug. 18, but the name of the manufacturing company receiving the motor order for the other 100 cars only was mentioned.

Benjamin F. Thomas, Jr., since 1917 mechanical engineer of the United Railways, St. Louis, resigns that position to become affiliated with the engineering sales force of the Economy Electric Devices Company, general distributor of Economy meters, with offices in Chicago. His most recent work with the United Railways has been the conducting and analyzing of tests to determine the economic feasibility of installing Economy watt-hour meters in St. Louis street cars. He had charge of installing the meters and organizing a new department to handle the work and has worked up considerable original data as to energy consumption figures, which were printed in the ELECTRIC RAILWAY JOURNAL of Sept. 1, 1923. Previous to his association with the United Railways, Mr. Thomas was affiliated with the Electric Company of Missouri, Webster Groves, Mo., 1915-1916, and with the General Storage Battery Company in the capacity of secretary and treasurer from 1916 to 1917. Mr. Thomas is a graduate of St. Louis University, where he received the degree of bachelor of arts in 1910 and later the degree of master of arts in 1912, following which he attended the Massachusetts Institute of Technology and received the degree of bachelor of science in electrical engineering in 1913. He is a member of the St. Louis Section, A. I. E. E.

New Advertising Literature

Detroit Hoist & Machine Company, Detroit, Mich., has issued Catalog 23E on "Electric Hoists."

Irving Iron Works Company, Long Island City, N. Y., has issued catalog 4-A 92 describing the safety, comfort and durability at competitive cost of the Irving subway grating.

Reliance Electric & Engineering Company, Cleveland, Ohio, has issued bulletin No. 5018 descriptive of a new line of polyphase induction motors of the squirrel-cage type which the company manufactures.

Crouse-Hinds Company, Syracuse, N. Y., has issued a pamphlet on "Switches and Plug Receptacle Housings." The pamphlet illustrates various types of plug receptacle housings, waterproof housings and condulet fittings for them.

Motorbloc Corporation, Philadelphia, Pa., has issued Bulletin S-101, describing and illustrating the application of the Motorbloc in several capacities which have been developed as the result of eighteen years' experience in the material handling field. A tabulation of capacities, speeds, weights and electric motor sizes is given on page 3.

Hisey-Wolf Machine Company Cincinnati, Ohio, has issued a thirty-two-page miniature catalogue, No. 3027, which briefly describes the complete line (112 different sizes and types) of Hisey products. This has been prepared principally for its dealers and agents, who know the value and necessity of placing complete, condensed and practical information in the hands of all customers and prospects.

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New York, Saturday, September 29, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

Volume 62 HENRY W. BLAKE and HARRY L. BROWN, *Editors* *Number* 13

Inviting You to Get Aboard—the New Interurban Cars of the Northampton Transit Company, Easton, Pa.

The Broad Trend of Car Development

We Move Either Forward or Backward— We Must Progress

REAL progress comes when one sees beyond the restrictions of precedent. And it is this sort of progress that the industry is most earnestly in need of these days. Some small measure of this spirit has been in evidence during the past year and a half, for there has been an unusual degree of activity in connection with the development of the electric railway car. Out of this has come many new ideas, and there appears to be a number of distinct trends of development which it is worth while to assemble and study for the purpose of determining where we are headed. The more important of these, detailed in succeeding pages, are summarized here.

There is in evidence a distinct trend away from the single-truck, single-door safety car whose adoption has been so strongly urged as a standard. This trend has been first toward a double-door car of the single-truck type, and more recently and with greater rapidity toward the general use of a double-truck, double-door, one-man safety car. A still more recent though pronounced trend is toward a very broad use of a type of car larger than the one-man car but smaller than the common two-man car, which is usually termed the one-man two-man type. More cars of this design have been purchased during the first six months of this year than of all other types put together. It is simply a realization of the fact that the operation of cars with one man, which was so timidly entered into a few years back, has a very much broader application than was at first conceived, provided the design of the car is made suitable for the widened field. The adoption of this car goes a long way toward solving the problem from an economic standpoint of being able to supply an entirely satisfactory off-peak service while making it possible to handle the rush hour crowds on all but possibly the heaviest lines in most cities without excessive investment in cars suitable for rush period service only.

Originally it was considered that a one-man car was adapted only for the very lightest lines, but now with this later development the one-man idea may be spread, in fact, is being

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spread, to include lines where the loading runs quite heavy. The best part of this is that this is meeting with favor on the part of trainmen. They have even expressed their preference for one-man operation on lines that were considered by the management to be outside the range of one-man service.

Increasing street traffic is tending to bring increased use of train operation on the heaviest city lines. In this connection several notable installations have been made this year where the type of car used was of the one-man two-man class, but equipped with multiple-unit control so that two-car trains could be made up and operated with three men. This has been a development in the direction of providing a universal car.

Nature of the Developments in Car Equipment

These are the major aspects of recent car development. Paralleling them have come many improvements in equipment details. There has been an almost universal adoption of small diameter wheels in new cars for everything except the very heavy interurban service.

Marked improvements in car body construction have been introduced, including some most interesting applications of new materials.

Just as the heavy side sill used in wood frame cars was abandoned in favor of the plate side girder, this construction is in turn being considerably modified on a number of recent cars by the elimination of the side posts below the belt rail. These have been transformed into light sash guides only, with a self-supporting roof structure resting on rigid corner piers through which the roof load is transmitted almost directly to the bolsters.

The interior arrangements of cars have been given much thought looking toward schemes that would expedite the movement of passengers and speed up the service by reducing the standing time for passenger interchange.

As to motors, brakes, control and miscellaneous mechanical and electrical equipment, no fundamental changes have been made, but there has been considerable progress in the way of refinements both in design and construction, producing more reliable operation and reduced weight. As a matter of fact the major improvements in car equipment came some time back and really anticipated the more recent broad developments in car design. Just now the manufacturers seem to feel that there is not much further important development in sight, which perhaps indicates that somewhere near the ultimate goal has been reached and that future development must come through radical departure from the present accepted method of driving the electric car.

In connection with such auxiliary apparatus as the lighting, heating and ventilating equipment, the principal development seems to be of a nature recognizing the psychological factors involved in the problems of passenger comfort. While not much definite accomplishment can be recorded in summing up what has recently been done, there are within reach some very important developments both in the design and application of this type of equipment which should come into use in the near future.

More Thought Is Being Given to Merchandising Features

Along with all of these other developments has come a very definite attempt to provide comfort for the passenger and to make the car both attractive and pleasing in appearance. The element of passenger comfort as one of the controlling requirements in car design has come to be recognized to a degree never before attained but greatly to be desired, particularly now-a-days in view of the competition of other forms of transportation. The subjects of painting, of design to get stream line effects and to overcome stubby appearance in the smaller cars, and the use of plate glass and pleasing decoration with absence of mechanisms inside the car, are receiving new attention. Many of the pictures reproduced throughout the issue show this. We hear a great deal of the rubber urge, but much of what that means can be satisfied by a better appreciation of spring cushions, plus some further study of ways to reduce noise.

What Should Be the Average Life of a Car

There is another idea in connection with the design of railway rolling stock which has been much discussed of late but out of which no very definite design principles have been crystallized. It has to do with the subject of what is the proper life for which to build railway cars.

The final answer to this question is simply a matter of economics. That life is most economical which at its end shows the greatest net earning for the car. In other words, a car should be disposed of just as soon as it can profitably be replaced, as shown by a comparison of the operating and maintenance costs and merchandising value of the old and the new. The trouble has been that railways have clung to the old equipment even twenty-five and thirty years when plain economics would have shown that it should long since have been replaced. The common plea is that money cannot be raised to buy new cars. It has been repeatedly demonstrated, however, that when the railway has the will to modernize, it is possible to finance new equipment on the basis of the savings in operating costs that can be shown.

The chief function of a railway company is to sell rides at a profit. Its purpose is accomplished only when it succeeds in rendering satisfaction to the public. It is only when the railway is furnishing a form of transportation superior to any other of equal cost, and showing a tendency to improve and progress as conditions change, that favorable public opinion and support may be expected. Blind following of precedent frequently leads into the toleration of a great many really obsolete practices. It is therefore very desirable that railway men compare their industry with the progress made in other lines of business, and try to withdraw themselves far enough from the immediate and detailed problems of the moment to get a perspective of their own tools as they appear to others. Having this viewpoint, there may come the necessary inspiration and ideas for new development.

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New Data Show

Present Body Design Tendencies

Knowing What's Going On Is the First Step

Cars ordered during first half of 1923 indicate growing popularity of one-man two-man type for both city and interurban service. General features of current design shown by weighted averages. Arch roofs and "T"-posts universally used. Two-motor equipment and one-man two-man, center-exit arrangement in Philadelphia. Double-end pay-pass cars in Brooklyn another new departure. Flush platform construction favored. Ramps generally used. Analysis shows drop platform gives low steps

A STUDY of the types of cars recently built and of those now on order or in process of delivery indicates several distinct trends in the development of electric railway equipment, not only for city but also for interurban service. Some of the tendencies may be readily determined by an analysis of the data presented in the accompanying tabulations, which have been prepared to show in some detail the general characteristics from the standpoint of design of the cars ordered during the six-month period from Jan. 1 to June 30 of this year.

In order to facilitate comparison with similar data given in the annual statistical issues of ELECTRIC RAILWAY JOURNAL, the same arrangement has been followed in Table I, of dividing the various railway companies into districts and grouping them by states. Other tables have been prepared for particular types of cars in order to assemble the data for each type of car in such form that outstanding features of the design would be readily available for analysis.

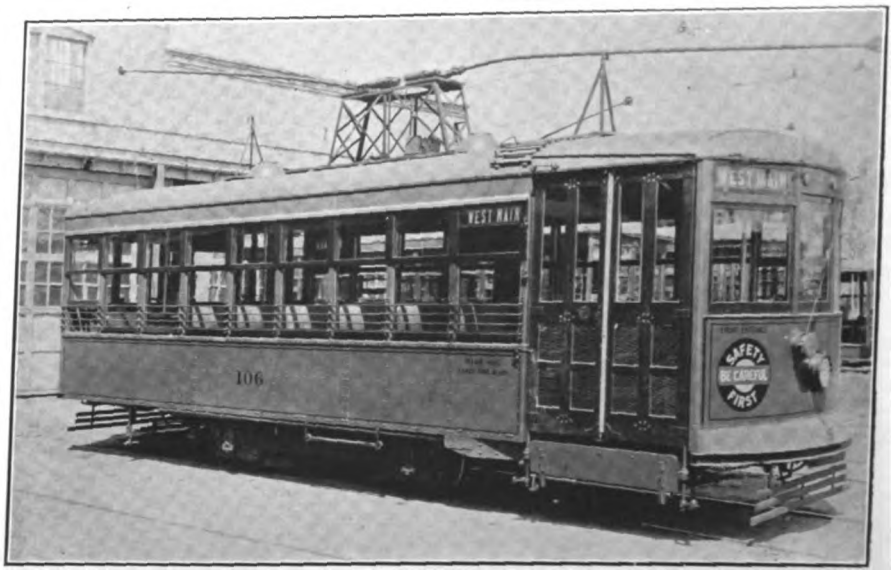
The figures compiled in Table II show the total number of cars of various classifications for both city and interurban service ordered in the United States between Jan. 1 and June 30, 1923. These figures are given in the next to the last column. For the purpose of comparison the data for the entire year of 1922 is given in the last column.

TRENDS SHOWN BY STATISTICS

A number of extremely interesting phases of present tendencies are well illustrated by these data. Out of a total of 1,385 cars for city service ordered for the first half of 1923, 1,049, or 76 per cent, were double-truck one-man cars or of the one-man two-man type. During the same period a total of 157 single-truck safety cars were ordered, of which 147 have car bodies 28 ft. over all. The number of single-truck one-man cars ordered represents approximately 11 per cent of the total for the first half of the current year.

A comparison of these figures with similar figures covering the cars built during the year of 1922 show some extremely interesting facts. The total number of double-truck one-man, or one-man two-man cars, ordered in 1922, amounted to 627 or 23½ per cent of the total number of 2,679 city cars built during that year.

Making a similar comparison of single-truck one-man cars, the table shows a total of 823 cars of this type ordered, which represents slightly more than 30 per cent of the total ordered for the year. Thus, while the number of single-truck one-man cars decreased from 30 per cent of the total in 1922 to 11 per cent of the total for the first six months of 1923, the number of double-truck one-man or one-man two-man cars which were ordered during the corresponding period increased from approximately 23 per cent in 1922 to approximately 76 per cent in 1923.



Madison Single-Truck Safety Cars Were Among the First to Be Built with Double Doors for Separate Entrance and Exit

This outstanding tendency toward the introduction of one-man or one-man two-man double-truck cars has been further analyzed in Table III

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Table I—Data on Passenger Cars Ordered During First Six Months of 1923—(New England District)

Railway	No. of Cars Ordered	Type	Single or Double End	One or Two Man	End Doors or Both Center and End Doors	Length Over All	Width Over All	Seating Capacity: Body	Seating Capacity: Platforms and Wells	Total Light Weight, Lb.	Light Weight of Car Less Trucks & Motors, Lb.	Thickness of Side Girder Steel	Car Width Inside Lining	Dimension, Lining Over Seat Aisle Plate, In.	Clear Width of Aisle, In.	Cross Seat Spacing, In.	Side Post Spacing, In.	Type of Side Posts	Type of Bolster	Type of Roof	Type of Truck	Number of Motors	Hp. per Motor	Diameter Wheels, In.	End Sill Step	Ramps From Bolster to Platform Knee, In.	Step Heights, In.
						Ft. In.	Ft. In.						Ft. In.														
CONNECTICUT																											
Connecticut Co.	50	DT-C	D	1-2	End	44—0	8— 4¼	44	0	30,000	15,800	3/32	8— 1½	34¼	29	28½	28¼	T	BU	Arch	OBC-30 66	4	...	26	No	4¾	15-14
New Haven & Shore Line Ry.	5	LI	D	1-2	End	40—3	8— 3	22	4	29,000	15,000	14	7—10	35	24	31	31	T	BU	Arch	B-77-E1	4	25	26	No	1¾	15½-15¼
MAINE																											
Androscoggin & Kennebec Ry.	5	DT-C	D	1-2	End	40—3	8— 3	48	4	29,350	15,780	14	7—10	34	26	28½	28¼	T	BU	Arch	B-77-E1	4	25	26	No	1¾	15½-15¼
Cumberland County Power & Light Co.	6	LI	D	1-2	End	40—3	8— 3	48	2	32,500	15,800	14	7—10	35	24	28½	28½	T	BU	Arch	B-77-E1	4	40	26	No	1¾	15½-15¼
MASSACHUSETTS																											
Boston Elevated Ry.	50	DT-C	D	1-2	End	45—0	8— 6¼	48	0	30,860	18,360	14	8— 2¼	35¼	28¼	28¼	28¼	T	BU	Arch	S-C 35-P	4	25	26	No	3	15-14
	30	DT-C	D	1-2	End	45—0	8— 5½	48	0	30,640	17,550	14	8— 2½	35⅛	28¼	28¼	28½	T	BU	Arch	S-C 35-P	4	25	26	No	3	15-14
Millford & Uxbridge St. Ry.	6	LI	D	1-2	End	40—3	8— 3	44	4	29,000	15,500	14	7—10	35	24	31	31	T	BU	Arch	B-77-E1	4	25	26	No	None	15-14-5
Springfield St. Ry.	10	DT-C	D	2	End	48—4	8— 5	56	...	...	...	3/32	8— 1	L	...	...	...	T	BU	Arch	Std.	4	50	31	No	None	16-12-8½
Union Street Ry.	6	DT-C	D	1-2	End	44—0	8— 4½	44	0	30,000	15,800	3/32	8— 1½	33¾	26	28½	28½	T	BU	Arch	OBC-30-66	4	25	27	No	4¾	15-14½
North of the Ohio and East of the Mississippi River																											
ILLINOIS																											
Bloomington & Normal Ry. & Lt. Co.	10	ST-C	D	1	End	28—0½	8— 0	28	4	16,000	9,500	16	7— 6¼	34⅛	22	28½	28½	T	None	Arch	B-79E	2	25	26	No	None	16¾-12 1/16
Chicago Elevated Rys.	5	El-M	D	Tn	End	48—0	8—10½	52	0	75,000	42,000	14	...	37	21¾	32	31¼	Sh. St.	BU	Arch	Bal.	2	170	30	No	None	46½ to platform
Chicago, North Shore & Milwaukee R.R.	10	HI	D	Tn	End	55—3¼	9— 0	54	0	102,200	56,200	12	...	38½	20 11/16	35	35	T	BU	Arch	Bal.	4	140	36	No	None	16 3/16-11 3/16-11 3/16
	2	HI	Tr	Tn	End	55—3¼	9— 0	31	0	80,070	50,070	12	...	...	Ch	...	70¼	Sh. St.	BU	Arch	Bal.	0	0	36	No	None	16 3/16-11 3/16-11 3/16-11 3/16
	1	HI	D	Tn	End	55—3¼	9— 0	24	0	102,340	56,340	12	...	...	Ch	...	35	T	BU	Arch	Bal.	4	140	36	No	None	16-12-12-12
East St. Louis & Suburban Ry.	1	LI	D	2	C	53— 8	8— 8	48	10	47,000	29,800	1/16	8— 1¼	34⅛	23	29½	29½	T	BU	Arch	St.L-MT	4	50	34	No	None	15¼-11-11
INDIANA																											
Beech Grove Traction Co.	1	ST-C	S	1	End	28—0½	8— 0	28	7	16,500	9,720	16	...	35	22	28½	28½	Wood	PS	Arch	C-139-C	2	25	26	No	2¼	15-12¾
Indianapolis & Cincinnati Tr. Co.	12	HI	S	2	End	60—0	8—11	54	0	75,000	38,000	12	...	41	21	34	34	T	BU	M	Bal.	4	100	37	No	None	15½-12-12-12
MICHIGAN																											
Muskegon Traction & Lighting Co.	5	DT-C	D	1-2	End	44—7	8— 4¼	44	0	32,000	19,500	...	...	...	...	28½	28½	T	BU	Arch	St.L-AB	4	25	26	No	2	16 1/16-13
NEW JERSEY																											
Cumberland Traction Co.	5	ST-C	D	1	End	28—0½	7—10¾	28	5	17,015	10,315	16	7— 6¾	34⅛	27¼	28½	28½	T	None	...	B-79-E	2	25	26	No	None	14¾-14 3/16
	1	DT-C	D	1	End	40—3	8— 2¼	48	0	30,160	16,460	3/32	7—10½	34¼	26¼	28½	28½	T	BU	Arch	B-77-E1	4	25	26	Yes	None	15½-14½-2¼
West Jersey & Seashore	2	DT-C	D	2	End	47—8	8— 7	52	0	38,700	21,700	12	8— 1½	36	25½	28	29½	Sh. St.	CS	Arch	B-77-E1	4	40	26	Yes	None	14-13 13/16-3 13/16
NEW YORK																											
Brooklyn City R. R.	100	DT-C	D	1-2	C&E	44—2	8— 1½	41	8	37,500	20,860	3/32	7—11¼	34	25¼	28½	28½	T	BU	Arch	B-77-E1	4	35	26	Yes	...	15-11-6, 15-13
	100	DT-C	D	1-2	C&E	44—2	8— 1½	41	8	38,000	21,360	3/32	7—11¼	34	25¼	28½	28½	T	BU	Arch	B-77-E1	4	35	26	Yes	...	15-11-6, 15-13
Brooklyn Manhattan Transit Corp.	50	DT-RT	Tr	...	Side	67—0	9-10 13/16	97	0	77,000	51,500	3/32	9— 1 5/16	...	...	...	...	Sh. St.	BU	M	BU	0	...	34¼	No	...	46½ to platform
Fonda, Johnstown & Gloversville R.R.	2	DT-C	D	2	End	46—0	8— 7	52	0	...	...	3/32	8— 2	36	26	29½	29½	T	BU	Arch	Taylor	4	...	...	Yes	...	16-14-11
	1	HI	D	2	End	52—9	8— 9	60	0	...	...	3/32	8— 4	37	26	31	31	T	BU	Arch	Taylor	4	...	...	Yes	...	17½-17½-13
OHIO																											
Ohio Public Service Co.	2	ST-C	D	1	End	28—0½	7—10¼	28	5	15,960	9,560	16	7— 6¾	34⅛	22¼	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	14¾-14 3/16
Pennsylvania-Ohio Power & Light Co.	5	ST-C	D	1	End	28—0½	7—10½	26	4	16,500	9,820	16	7— 6¾	34¼	22⅛	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	14¾-14 3/16
Cincinnati, Georgetown & Portsmouth Ry.	2	LI	S	1	End	39—8	8— 6¼	40	7	25,400	13,900	16	...	37	24	33	33	Wood	BU	Arch	CinArchBar	4	25	26	No	2¼	16-14
City Ry.	10	DT-C	S	1	End	42—6	8— 2	46	5	25,897	14,197	16	...	35	24½	30	30	Wood	BU	Arch	CinArchBar	4	25	26	No	2¼	16-14
PENNSYLVANIA																											
Citizens Traction Cos.	5	ST-C	D	1	End	28—0½	7—10¼	28	5	16,640	10,020	16	7— 6¾	34¼	22¼	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	14¾-14 3/16
Conestoga Traction Co.	10	ST-C	D	1	End	30—1	8— 2½	30	0	17,790	11,235	16	7—10¾	34¼	26¼	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	14¾-14 3/16
Eastern Pennsylvania Power & Ry. Co.	2	DT-C	D	2	End	45—0	8— 6⅛	48	0	35,700	19,500	14	8— 2¼	36	26¼	28½	29½	T	BU	Arch	B-77-E-1	4	25	26	Yes	None	15-14-3
Lackawanna & Wyoming Valley R. R.	4	HI	D	Tn	End	60—0	9— 2	72	0	70,000	35,000	¼	8— 9	40½	24	28½	28¼	T	BU	M	Bal.	2	...	36	No	None	15-11¾, 11¾-11½
Northampton Transit Co.	2	LI	D	1-2	End	44—8	8— 6¾	48	0	30,600	16,328	16	8— 1½	37	23½	30	30	Wood	BU	Arch	Cin AB	4	35	33 26	No	2¼	16-14
Philadelphia Rapid Transit Co.	385	DT-C	S	1-2	C&E	45—6	8— 1½	54	0	35,820	19,940	14	7— 9¼	34	25¼	29	29	T	CS	Arch	B-39-E-2	2	60	22	Yes	None	13 11/16-13-6 1/16
	135	DT-C	D	1-2	End	45—6	8— 1½	48	0	37,720	21,840	14	7— 9¼	34	43¾	29	29	T	CS	Arch	B-39-E-2	2	60	28 22 28	Yes	None	13 11/16-13-6 1/16
Pittsburg Rys.	75	DT-C	S	2	C&E	45—0	7—10½	65	4	...	...	...	...	...	22¼	30	30	Box	BU	M	AB	4	37	26	No	...	15-10½
Slate Belt Transit Co.	2	LI	D	2	End	47—0	8— 4¼	52	0	38,570	22,740	1/16	7—11½	31¼	23¼	32	32	T	CS	Arch	27 MCB2x	4	50	33	Yes	None	16 1/16-13 1/16-10 11/16

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West Penn. Rys.	17	LI	D	1-2	End	42—2	8— 6½	44	0	30,090	16,590	16	8— 1½	36	25½	30	30	Wood	BU	Arch	Std.	4	25	26	No	2¼	16-14
Wilkesbarre Ry.	10	DT-C	D	2	End	45—0	8— 6¼	48	0	37,700	19,500	14	8— 2¼	36	26¼	28½	29½	T	BU	Arch	B-77-E	4	40	26	Yes	None	15-14-3
York Rys.	3	ST-C	D	2¼	End	34—11½	8— 8¼	36	2	21,956	12,916	16	8— 4½	37	26½	29	29	T	None	Arch	B-79-E-2	2	35	26	Yes	None	14-13-3¼
WISCONSIN																											
Eastern Wisconsin Electric Co.	5	LI	D	1	End	43—0	8— 9½	44	0	36,760	.....	...	.....	.....	.....	....	30	T	BU	Arch	Com. Pd.	4	25	26	No	3	16½-12¼

South of the Ohio and East of the Mississippi River

ALABAMA																												
Birmingham Ry., Light & Power Co.	20	DT-C	S	2	C&E	49—5	8— 5	62	0	34,000	18,884	12	.....	36	25	29	29	Wood	Box	Arch	Brill	4	35	26	No	1 11/16	13-10-7
FLORIDA																												
Tampa Electric Co.	8	ST-C	D	1	End	28—0½	8— 0	28	4	15,500	8,930	16	7— 8	35	22	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	16¾-12 1/16
GEORGIA																												
Savannah Electric Co.	8	ST-C	D	1	End	28 0½	8— 0	28	4	15,500	9,200	16	7— 7¾	34 13/16	22	28½	28½	T	None	Arch	B-79-E1	2	25	24	No	None	15¾-12 1/16
KENTUCKY																												
Kentucky Traction & Terminal Co.	27	ST-C	S	1	End	26—2	8— 2	26	2	16,600	9,820	16	.....	36	23	30	30	Wood	P. S.	Arch	Cin12585-C	2	25	26	No	None	15-13
	2	LI	S	1	End	40—3	8— 6½	37	7	26,700	15,100	16	.....	38	22	33	33	Wood	Box	Arch	CinArchBar	4	25	26	No	2¼	16-14
NORTH CAROLINA																												
Piedmont & Northern Ry.	2	ST-C	D	1	End	28—0½	7—10¾	28	5	20,500	10,000	16	7— 6¾	34¼	22¼	28½	28½	T	None	Arch	79-E-2X	2	50	30	No	None	16 3/16-15 11/16
SOUTH CAROLINA																												
Columbia Ry., Gas & Electric Co.	6	ST-C	D	1	End	28—0½	7—10¾	28	5	17,120	10,395	16	7 — 6¾	34¼	22¼	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	14¾-14 3/16
TENNESSEE																												
Jackson Ry. & Light Co.	3	ST-C	D	1	End	28—0½	8— 0	28	4	16,000	9,500	16	7— 7¾	34 13/16	22¼	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	¶16¾-12 1/16
Memphis Street Ry.	40	DT-C	D	1-2	End	44—10	8— 2¾	48	0	33,400	20,900	..	.....	....	..	28½	28½	T	BU	Arch	St.L.-AB	4	25	26	No	2	16 1/16-13
VIRGINIA																												
Radford Water Power Co.	1	ST-C	D	1	End	28—0½	7—10¾	28	5	16,740	10,015	16	7— 6¾	34¼	22¼	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	14¾-14 3/16
Virginia Ry. & Power Co.	20	ST-C	D	1	End	28—0½	7—10¾	27	2	16,840	10,265	16	7— 6¾	34¼	22¼	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	14¾-15¼
WEST VIRGINIA																												
Monongahela Power & Ry. Co.	2	HI	DE	2	C	58—0	8—10½	70	0	53,120	26,540	12	.....	27	26¾	29	30	Wood	Box	Arch	AB	4	50	33	Well at Center		17¾-14-12
Wheeling Traction Co.	2	HI	DE	2	C	58—0	8—10½	70	0	53,120	26,540	12	.....	37	26¾	29	30	Wood	Box	Arch	AB	4	50	33	Well at Center		17¾-14-12

West of the Mississippi River

CALIFORNIA																												
San Diego Elec. Co.	50	DT-C	D	1 2	End	47 - 5	8 — 6½	48	8	38,000	22,200	12	7— 8½	34	24½	31	31	T	BU	Arch	B-77-E	4	40	26	No	3	16-14
San Francisco-Oakland Terminal Ry.	55	DT-C	D	1 2	End	44 -10	9 - 1½	48	0	36,000	19,700	12	8— 4½	35	30½	29½	29½	T	BU	Arch	B-77-E	4	40	24	No	2	14-13
COLORADO																												
Southern Colorado Power Co.	6	ST-C	D	1	End	28 -0½	8 - 0	28	2	16,000	9,500	16	7— 7¾	34¾	22	28½	28½	T	None	Arch	B-79-E1	2	25	26	No	None	16¾-12 1/16
Western Light & Power Co.	1	ST-C	D	1	End	28 —0½	8— 0	28	4	16,000	9,430	16	7— 7¼	34¼	22	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	16¾-12 1/16
IOWA																												
Peoples Gas & Electric Co.	4	ST-C	D	1	End	28—0½	8— 0	28	4	16,000	9,430	16	7— 6¼	34¼	22	28½	28½	T	None	Arch	B-79-E1	2	25	26	No	None	16¾-12 1/16
KANSAS																												
Topeka Ry.	10	ST-C	S	1	End	28 -0½	8— 0	29	5	15,500	9,000	16	7— 6¼	34¼	22	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	16¾-12 1/16
MISSOURI																												
St. Joseph Ry., Light & Power Co.	12	ST-C	S	1	End	28 —0½	8— 0	27	9	15,500	9,000	16	7— 6¼	34¼	22	28½	28½	T	BU	Arch	B-79-E	2	25	26	No	None	16¾-12 1/16
NORTH DAKOTA																												
Northern States Power Co.	1	ST-C	D	1	End	28—0½	8— 0	28	2	16,000	9,500	16	7— 6¼	34¼	22	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	16¾-12 1/16
TEXAS																												
Abilene Traction Co.	1	ST-C	D	1	End	28—0½	8— 0	28	4	16,000	9,430	16	7— 7¾	34 5/16	22	28½	28½	T	None	Arch	B-79-E1	2	25	26	No	None	16¾-12 1/16
Eastern Texas Electric Co.	7	DT-C	D	1	...	40—1	8 - 5	44	4	28,000	15,460	3/32	8 —2 3/16	35 5/16	28	28½	28½	T	...	Arch	B-77-E	4	25	26	No	2	¶16-13
Galveston-Houston Electric Co.	8	ST-C	D	1	End	28 0½	8 - 0	28	4	15,500	9,200	16	7— 7¾	34¼	22	28½	28½	T	None	Arch	B-79-E1	2	25	24	No	None	15¾-12 1/16
Houston Electric Co.	10	DT-C	D	1	End	40—1	8 - 5			28,000	.....	3/32	8 —2 3/16	35 5/16	28	28½	28½	T	BU	Arch	B-77-E	4	25	26	No	2	16-13
Northern Texas Traction Co.	1	ST-C	D	1	End	28 -0½	8 - 0	28	4	15,000	9,400	16	7— 7¾	34¼	22	28½	28½	T	None	Arch	B-78-M1	2	25	24	No	None	15¾—
Northern Texas Traction Co.	10	DT-C	D	1	End	40 —1	8 - 5	44	4	28,000	15,460	3/32	8 —2 3/16	35 5/16	28	28½	28½	T	BU	Arch	B-77-E	4	25	26	No	2	16-13

ABBREVIATIONS USED IN TABLES

AB—Arch bar
BU—Built up
C—Center entrance
C&E—Center and end
Ch—Chairs used
CS—Cast steel
D—Double end
DT-C—Double truck, city service
DT-RT—Double truck, rapid transit service
El-M—Elevated motor cars
HI—Heavy interurban
L—Longitudinal seats
LI—Light interurban
M—Monitor roof
PS—Pressed steel
S—Single end
Sh. St.—Sheet steel
ST-C—Single truck, city service
T—"T" section
Tn—Train operation
Tr—Trailer

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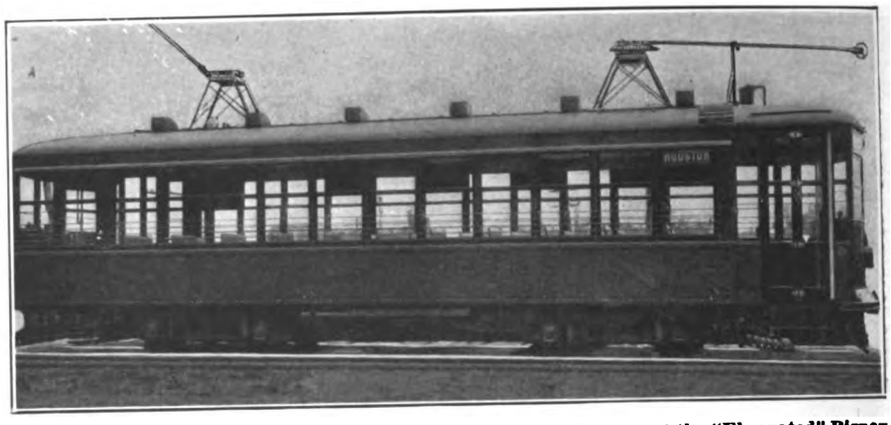
to show the more general features of design which have been incorporated in the cars ordered by various properties.

There were a total of 1,011 cars of the one-man two-man type ordered for city service during the first half of 1923. The properties ordering these cars are shown in the first column of Table III. The headings in the remaining columns are self-explanatory. In order to give a comparison on the same basis, the seating capacity is divided into two parts, one column including seats within the body only, and the other column giving the number of platform seats provided. To obtain a comparison of the weight of car bodies without trucks and motor equipment, a column covering this item is provided.

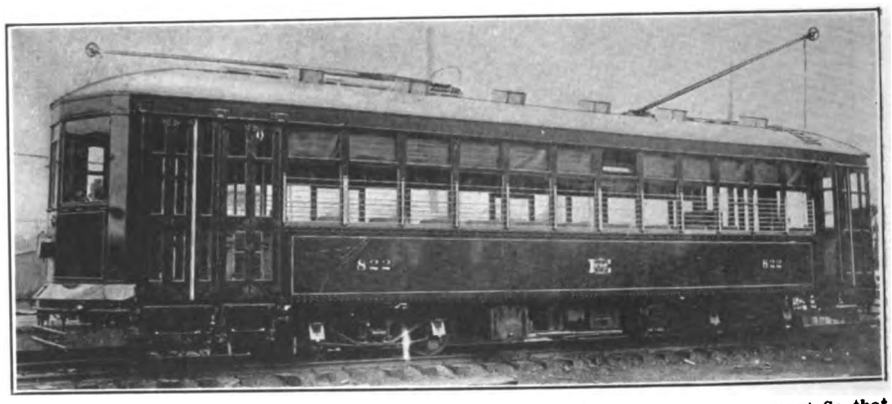
The practice in regard to platform and step construction is well illustrated by the last four columns, indicating level or drop platform construction, ramps and step heights. In the column which is headed, "Ramp from Floor at Body Bolster to Floor at Platform Side Knee," the total ramp included between these two points is given. In some cases, this ramp is made up of a section from the bolster to the end sill in the body floor and an additional ramp on the platform from the center line to the side knee.

In the next to the last column, the step heights from rail to platform floor at the side knee are given and also the step from platform to body floor at the end sill, where drop platform construction is used. In this column the first figure indicates height from rail to step and the second figure the height from step to platform floor. Where three figures are given, the last indicates the height of the end sill step. On the last line of Table III the weighted averages for the figures given in the various columns have been worked out to show the average of practice as reflected by the cars ordered this year. In each case these weighted averages are made up by multiplying the individual figures by the number of cars ordered and dividing by the total number of cars of this type.

Several outstanding tendencies are at once apparent from an examination of the data in this table. It may be noted that in every case these new cars are of the arch-roof type and are constructed with T-posts. It is also interesting to note that all of the cars with the exception of one group of 385, ordered by the Philadelphia Rapid Transit Company, are of the double-end type. The end vestibule type of construction is used on all cars with the exception of the group of 385 cars just mentioned and a group of 200 cars ordered by the Brooklyn City Railroad.



Houston Electric Company's Double-Truck Safety Cars Represent the "Elongated" Birney Design with Single Door



One-Man Two-Man Cars in Milwaukee Have Flush Platforms and Arrangement So that a Street Collector Can Open Rear Doors from the Outside

This latter group represents an extremely interesting departure, in that the cars are of the front-entrance, center-exit type, but are double-end in design. This is accomplished by providing cross-seats in a portion of both sections of the car instead of using longitudinal seats entirely in one half, as is usually done in the front-entrance, center-exit type. The lengths vary from a minimum of 40 ft. 3 in. for the five cars built for the Androscoggin & Kennebec Railway to a maximum of 47 ft. 5 in. for the fifty cars built for the San Diego Electric Company. The weighted average length for all cars ordered is 45 ft. 1 in.

The widths, which are of course largely fixed by the clearance condi-

TABLE II—RECAPITULATION BY DISTRICTS OF CARS ORDERED DURING FIRST SIX MONTHS OF 1923

Type of Cars	New England District.	North of Ohio River and East of the Mississippi River.	South of Ohio River and East of the Mississippi River.	West of the Mississippi River.	Dominion of Canada	Total U. S. for 1st 6 months 1923.	Total U. S. for 1922
City Service							
Number of one-man cars (S.T. 28 ft. body)	...	28	75	44	2	147	752
Number of one-man cars (S. T. other than 28 ft. body)	...	10	...	...	10	10	71
Number of D.T. one-man cars	141	11	...	27	...	38	156
Number of one-man two-man cars	10	725	40	105	100	1,011	471
Number of two-man motor cars	...	94	20	...	62	124	864
Number of trailers	...	...	...	...	165	...	50
Number of rapid-transit motor cars	...	5	...	...	...	5	315
Number of rapid-transit trailers	...	50	...	...	...	50	....
Totals	151	923	135	176	339	1,385	2,679
Interurban Service							
Light weight one-man cars	...	7	2	...	...	9	40
Light weight one-man two-man cars	17	19	...	...	...	36	5
Two-man cars	...	16	4	...	2	20	52
Heavy motor-cars for train service	...	15	...	...	...	15	70
Trailers for train service	...	2	...	...	2	2	16
Totals	17	59	6	...	4	82	183

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Table III—Double-Truck, One-Man Two-Man Cars for City Service

Railway	Number of Cars Ordered	Single or Double End	End Doors or Both Center and End Doors	Length Over All	Width Over All	Seating Capacity: Body	Seating Capacity: Platforms & Well	Total Light Weight, Lb.	Light Weight of Car, Less Trucks and Motors, Lb.	Thickness of Side Girder Steel	Car Width Inside Lining	Length Lining Over Seat Aisle Plate, In.	Clear Width of Aisle, In.	Cross Seat Spacing, In.	Side Post Spacing, In.	Type of Side Posts	Type of Bolster	Type of Roof	Number of Motors	Hp. per Motor	Total Hp. per Ton, Light Weight per Ft., Length of Car	Diameter Wheels, In.	End Sill Step	Ramp from Floor at Body Bolster to Floor at Platform Side Knee, In.	Step Heights, In.	Height from Rail to Platform Floor at Side Knee per In. of Wheel Diameter
				Ft. In.	Ft. In.						Ft. In.															
Androscoggin & Kennebec Ry.	5	D	End	40 3	8 3	48	4	29,350	15,780	14	7 10	34	26	28½	28½	T	BU	Arch	4	25	0.17	26	No	1½	15½-15½	1.18
Connecticut Co.	50	D	End	44 0	8 4½	44	0	30,000	15,800	[illegible]	8 1½	34½	29	28½	28½	T	BU	Arch	4	25	0.15	26	No	4½	15-14	1.12
Union Street Ry.	6	D	End	44 0	8 4½	44	0	30,000	15,800	[illegible]	8 1½	33½	26	28½	28½	T	BU	Arch	4	25	0.15	27	No	4½	15-14½	1.09
Boston Elevated Ry.	50	D	End	45 0	8 6¼	48	0	30,850	18,360	14	8 2½	35½	28½	28½	28½	T	BU	Arch	4	25	0.14	26	No	3	15-14	1.12
	30	D	End	45 0	8 5½	48	0	30,610	17,550	14	8 2½	35¼	28½	28½	28½	T	BU	Arch	4	25	0.14	26	No	3	15-14	1.12
Philadelphia Rapid Transit Co.	385	S	C&E	45 6	8 1½	54	0	35,820	19,240	14	7 9½	34	25½	29	29	T	CS	Arch	2	60	0.14	22	Yes	0	13¼-13-6 1/16	0.96
	135	D	End	45 6	8 1½	48	0	37,720	21,840	14	7 9½	34	43½	29	29	T	CS	Arch	2	60	0.14	†28			15-10-10	
San Francisco & Oakland Terminal Ry.	55	D	End	44 10	9 1½	48	0	36,000	19,700	12	8 4½	35	30½	29½	29½	T	BU	Arch	4	40	0.20	22	Yes	0	13¼-13-6 1/16	0.96
Brooklyn City R. R.	200	D	C&E	44 2	8 1½	41	8	37,500	20,860	[illegible]	7 11¼	34	25½	28½	28½	T	BU	Arch	4	35	0.17	†28	No	2	14-13	1.13
San Diego Electric Co.	50	D	End	47 5	8 6½	48	*8	38,000	22,200	12	7 8½	34	24½	31	31	T	BU	Arch	4	40	0.17	26	Yes	0	15-11-6	1.00
Memphis Street Ry.	40	D	End	44 10	8 2½	48	6	33,400	20,900					28½	28½	T	BU	Arch	4	25	0.14	26	No	3	15	1.15
Muskegon Traction & Lighting Co.	5	D	End	44 7	8 4½	44	0	32,000	19,500					28½	28½	T	BU	Arch	4	25	0.14	26	No	2	16-14	1.11
Weighted Average				45 1	8 3	48		35,754	19,903		7 11½	34	26½								0.151			2.9	16 1/16-13	1.11
																									14.3	1.125
																										0.971

Table IV—Double-Truck, One-Man or One-Man Two-Man Cars for Interurban Service

Railway	Number of Cars Ordered	One-Man or One-Man Two-Man	Single or Double End	End Doors or Both Center and End Doors	Length Over All	Width Over All	Seating Capacity: Body	Seating Capacity: Platforms & Well	Total Light Weight, Lb.	Light Weight of Car Less Trucks and Motors, Lb.	Gage Thickness of Side Girder Steel	Car Width Inside Lining	Dimension-Lining Over Seat Aisle Plate, In.	Clear Width of Aisle, In.	Cross Seat Spacing, In.	Side Post Spacing, In.	Type of Side Posts	Type of Bolster	Type of Roof	Number of Motors	Hp. per Motor	Total Hp. per Ton Light Weight per Ft. Length of Car	Diameter of Wheels, In.	End Sill Step	Ramp from Floor at Body Bolster to Floor at Platform Side Knee, In.	Step Heights, In.	Height from Rail to Platform Floor at Side Knee per In. of Wheel Diameter
					Ft. In.	Ft. In.						Ft. In.															
Millford & Uxbridge St. Ry.	6	1-2	D	End	40 3	8 3	44	4	29,000	15 500	14	7 10	35	24	31	31	T	BU	Arch	4	25	0.17	26	No	None	15-14½-5	1.33
New Haven & Shore Line Ry.	5	1-2	D	End	40 3	8 3	22	4	29,000	15 500	14	7 10	35	24	31	31	T	BU	Arch	4	25	0.17	26	No	1½	15½-15½	1.18
Cumberland County Power & Light Co.	6	1-2	D	End	40 3	8 3	48	2	32,500	15 800	14	7 10	35	24	28½	28½	T	BU	Arch	4	40	0.24	26	No	1½	15½-15½	1.18
Northampton Transit Co.	2	1-2	D	End	44 8	8 6¼	48	0	30,600	16,328	16	8 1½	37	23½	30	30	Short Wood	Box	Arch	4	35	0.24	26	No	2½	16-14	1.15
West Penn Ry.	17	1-2	D	End	42 2	8 6½	44	0	30,090	16,590	16	8 1½	36	25½	30	30	Short Wood	Box	Arch	4	25	0.16	26	No	2½	16-14	1.15
Eastern Wis. Elec. Co.	5	1	D	End	43 0	8 9½	44	0	36,760							30	T	BU	Arch	4	25	0.13	26	No	3	16½-12½	1.13
Cincinnati, Georgetown & Portsmouth	2	1	S	End	39 8	8 6¼	40	7	25,400	13,900	16		37	24	33	33	Short Wood	BU	Arch	4	25	0.20	26	No	2½	16-14	1.15
Kentucky Traction & Terminal	2	1	S	End	40 3	8 6½	37	7	26,700	15,100	16		38	22	33	33	Short Wood	BU	Arch	4	25	0.19	26	No	2½	16-14	1.15
Weighted Average					41 6	8 5½	44		30,550	15,950		8 0	36	24½								0.176			2.2	15 11/16	1.18

* Seats eight when operated by one man. † Maximum-traction trucks.

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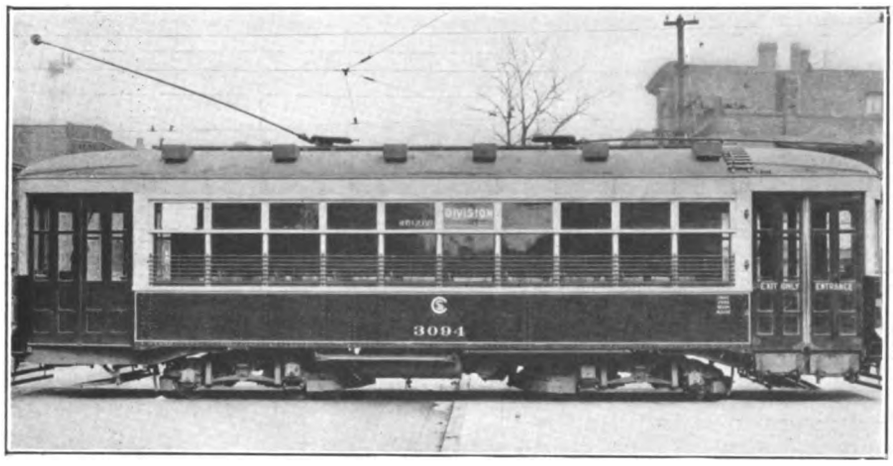
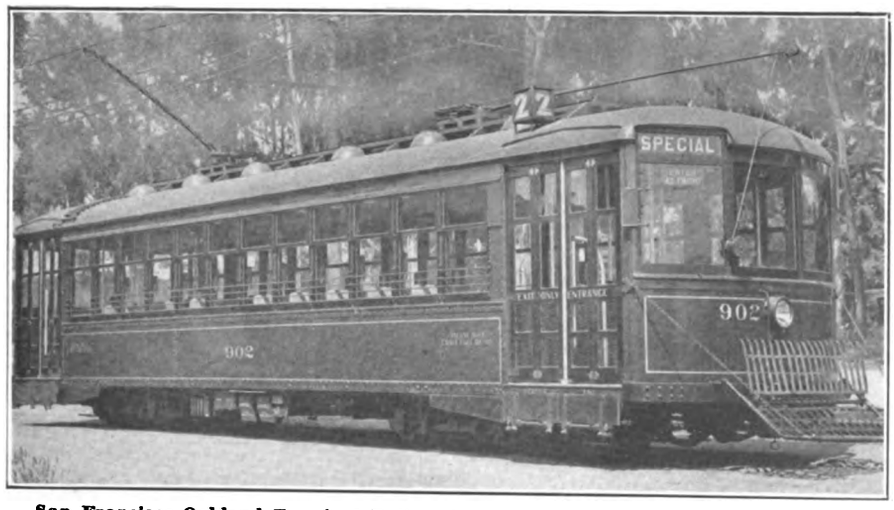
tions existing in the several localities, vary from a minimum of 8 ft. 1½ in. to a maximum of 9 ft. 1½ in. This latter dimension applies to the fifty-five cars of the San Francisco-Oakland Terminal Railway. The weighted average width for all cars is 8 ft. 3 in. The maximum body seating capacity shown is fifty-four, this being for the 385-car group ordered by the Philadelphia Rapid Transit Company. The weighted average for all 1923 cars is forty-eight passengers in the body.



Double-Truck One-Man Cars of Chicago Surface Lines Are Designed with Drop Platforms and Are Equipped with Two 60-Hp. Motors on Maximum Traction Trucks



San Francisco-Oakland Terminal Railway's New One-Man Two-Man Cars Are Also Equipped with Multiple-Unit Control for Train Operation

New Pay-As-You-Pass Cars for Philadelphia Are Arranged for One-Man Two-Man Operation

The total light weight varies from 29,350 lb. as a minimum to 38,000 lb. as a maximum and the weighted average is 35,754 lb. The weighted average light weight of the car body only is 19,903 lb. The material for side girder sheet tells a rather interesting story in that No. 16 gage material is not used for double-truck city service construction on cars ordered this year. The minimum size used as shown in the tabulation is $\frac{3}{32}$ in. and the maximum is No. 12 gage.

The average width of the cars inside, between side wall linings, is 7 ft. 11½ in. There seems to be a tendency to decrease slightly the width of cross-seats and to make this dimension more nearly 34 in. than the 36 in. which for a long time was considered good practice. With seat width maintained almost uniform, the aisle width of course varies with the maximum dimension which can be used for the car, and the table shows the use of aisles varying from 24½ to 30½ in. This latter figure, however, is based on a car width of 9 ft. 1½ in. and does not represent the clearance conditions which can be accommodated in the average city. In the 135 double-end cars purchased by the Philadelphia Rapid Transit Company, a combination of staggered cross and longitudinal seats is used, and the resulting aisle width of 43⅜ in. is not of course comparable with the full cross-seat construction which is used in the other cars shown.

Due to the variations in size and weight of cars, it is impracticable to obtain any figures to represent the average practice as regards rated horsepower of motors installed. Since the total passenger carrying capacity of a car is roughly proportional to its length, it was therefore considered of some interest to add a column showing the rated horsepower of motors per ton of light car weight per foot of over-all length. Although the motor capacity required varies of course with the type of service in which the car is used, a weighted average of this last-mentioned column gives some indication of the general tendency or rather the general requirement as to motor capacity. This figure is shown to be 0.151 hp. per ton of light weight per foot of length. Applying this figure to the average weight of 35,754 lb. and the average length of 45 ft. 1 in. shows a required capacity of 122 hp., which is approximately equal to four 30-hp. motors or two of 60 hp. motors.

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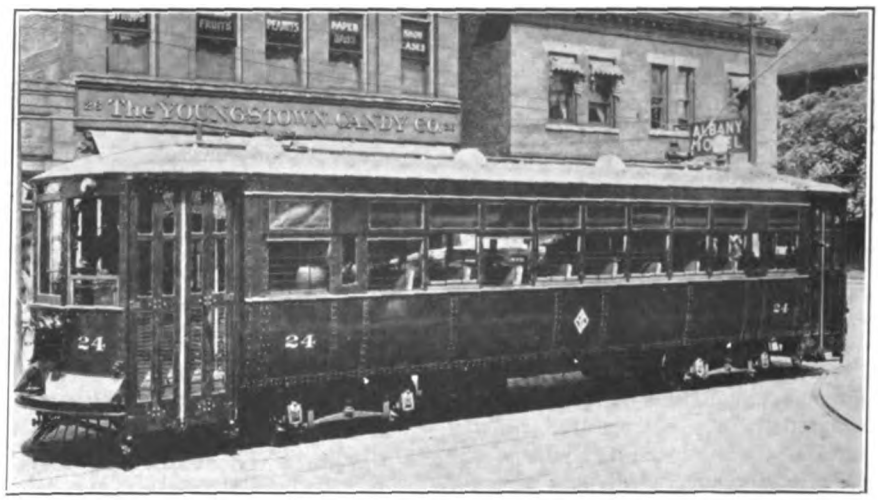
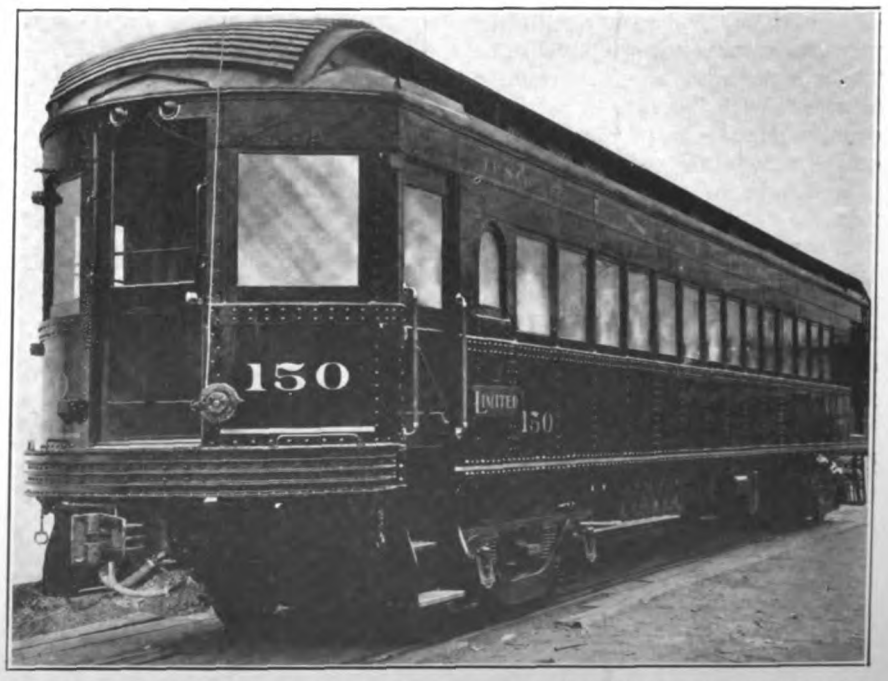
The results obtained in connection with the arrangement of steps and platforms may be analyzed in a rather interesting manner by utilizing the figures shown in the column headed "Height from Rail to Platform Floor at Side Knee per Inch of Wheel Diameter." This column was prepared in order to eliminate the differences in wheel diameter so as to study the effect of level platform or drop platform construction on step height. A weighted average of the figures in this column for cars with the level platform type of construction shows a value of 1.125 in. to the platform per inch of wheel diameter, whereas a value of 0.971 in. is obtained for the same dimensions where drop platform construction is used. Applying these figures to a 26-in. diameter wheel, we obtain an average height of 29¼ in. from the rail for flush platform construction and 25¼ in. for drop platform construction, as represented by all of the cars shown in the table. Allowing 13 in. for the step from the side knee to the step, this gives an average distance from the step to rail of 16¼ in. with the flush platform construction, compared with 12¼ in. with the drop platform construction. As pointed out in a subsequent chapter, there is a considerable question as to whether the advantages of the flush platform type of design from the standpoint of increasing safety and speed of passenger movement is not very largely, if not entirely, offset by the necessity of maintaining somewhere near an average of 16 in. for the initial step from the rail, as compared with 13 in., which is made possible by the incorporation of a comparatively low step at the end sill with the drop platform construction.

Table IV presents the same general classification of data for one-man and one-man two-man interurban cars ordered during the first six months of the current year. This table gives what in some respects is rather surprising information, in that both the length and weight of cars shown are less than that for corresponding types of cars designed for city service. No. 16 gage side sheet material appears on a number of cars and the arch roof is again used on all cars reported. Likewise, 26-in. diameter wheels and four-motor equipment seem to be universal on this type of car. Forty-five cars of this type were built during the first half of 1923, out of a total of eighty-two interurban cars built, which is 55 per cent. This is comparable with exactly the same number (forty-five) of one-man two-man interurban cars built during the entire year of 1922 out of a total of 183 cars built. This represents 24½ per cent of the total. It is therefore evident that for certain classes of interurban service there is the same strong tendency toward the use of light-weight one-man or one-man two-man cars that is noted in connection with cars for city service.



Curved-Side Light-Weight Interurban Cars of Youngstown & Suburban Railway Are Extremely Light in Weight and Paneled with Steel-Covered Plywood

Chicago, North Shore & Milwaukee Branch Line Car Is of Curved-Side Construction with Folding Doors and Steps



Type of High-Speed Interurban Car Used by Interstate Public Service Co., Indianapolis

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Facilities for
Expediting Passenger Movement

Making the Place of Business Convenient

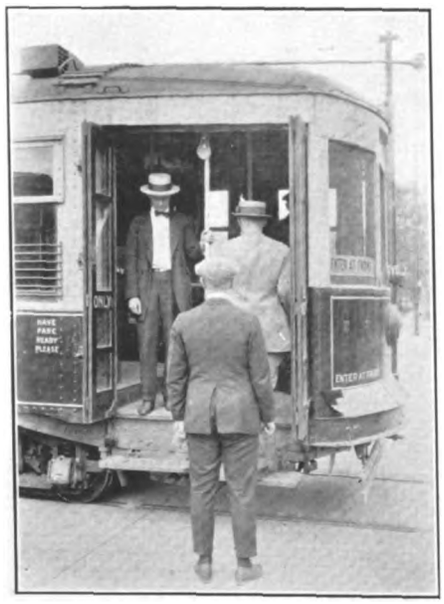
The general design of the car is determined by the necessity for expediting passenger movement. Low floors and steps, together with door and seating arrangements, are important factors. High schedule speeds require large loading reservoir capacity and power-operated doors. One-man operation introduces special problems and devices

IMPROVEMENT of the facilities for insuring the rapid, safe and comfortable movement of passengers on, off and within the car have been the governing factors of influence in molding the general arrangement of the electric railway car body. The basic and widespread effect of the successful institution of one-man operation to meet the inexorable combination of economic conditions which the electric railway industry has had to face has also resulted in a decided tendency to extend the field of one-man operation by the development of various devices for controlling the interchange of passengers. The necessity for rapid and efficient collection of fares is still another important element which has affected the design of car bodies. Marked improvement in devices to expedite this work and speed up passenger movement has recently been made.

EFFECT OF BODY DESIGN

The conditions which determine the measure of success of a given design of car body for facilitating passenger movement are listed below. Their importance as basic elements increases with increase in passenger density, frequency of stops and required schedule speed.

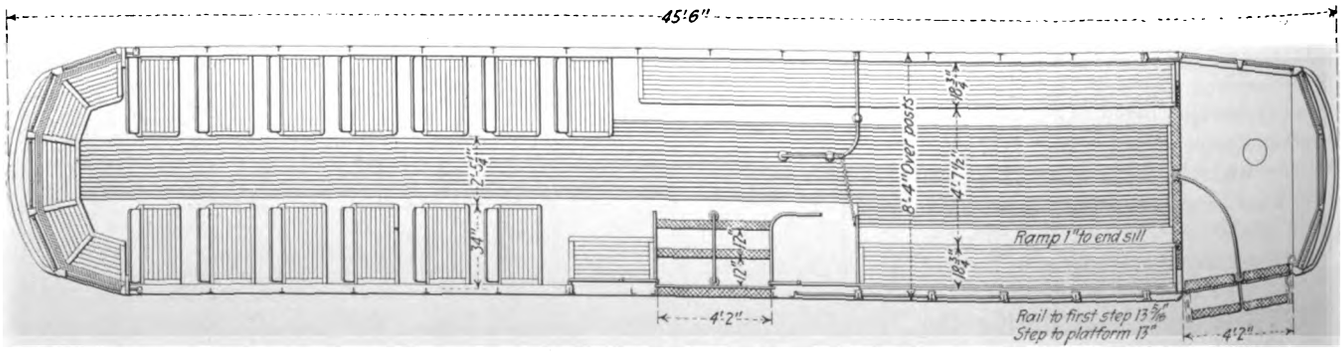
1. Height of car floor above the rail.
2. Arrangement of doors for the entrance and exit of passengers.
3. "Reservoir capacity" of loading area.
4. Design of doors, steps and operating mechanism.
5. Width of aisle.
6. Arrangement of seats.



The Exit Door Used on One-Man Cars in Chicago Opens When Passenger Steps on Treadle and Closes Automatically When He Clears the Step

The height of the car floor has a direct bearing on the number and height of entrance and exit steps. The importance of keeping the number of steps to a minimum and of making the height as small as possible has been recognized by designers for a number of years. The beginning of the definite movement toward reducing car floor heights to a minimum had its inception in Pittsburgh and finally culminated in New York with the "stepless" car. The work in Pittsburgh on this subject resulted in the conversion of motor manufacturers to an appreciation of the necessity for designing motor equipment which could be put on trucks equipped with wheels of smaller diameter than had been the practice up to that time.

The New York cars provided a design in which the passenger would step directly from the street to the car floor, and resulted in some very radical changes in car structure and also in the location of equipment. This type of car probably marked the extreme of the tendency toward low-floor construction. Cost of construction and unfavorable appearance were factors which probably prevented its further adoption.



On the New Front-Entrance Center-Exit Cars of the Philadelphia Rapid Transit Company an Initial Step Height of 13 5/16 In. from the Rail Is Obtained by the Use of an End Sill Step at the Front End

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Both the New York and Pittsburgh developments were carried out on cars of the center-entrance type. Consideration of subsequent practice is closely allied with the second factor in the problem of passenger interchange, namely, arrangement of doors.

Efforts to fit the car to the type of service in which it is to be used have resulted in the following combinations of door arrangement and type of operation:

1. Rear entrance and front and rear exits with crew of two.
2. Center entrance and exit with crew of two.
3. Center entrance and front exit with crew of two.
4. Front entrance and exit with crew of two.
5. Front entrance and center exit with crew of two.
6. Front entrance and exit with crew of one.
7. Front entrance and rear exit with crew of one.
8. Rear entrance and front exit with crew of one.
9. One-man two-man designs with end-door construction.
10. One-man two-man designs with front and center-door construction.

Considering first the general subject of end-door cars in which some form of platform structure is provided, the recent tendency has been to build the platform flush with the body floor and to provide only a single external folding, or internal stationary step to break the distance from the platform floor to the ground. This is particularly true in a large proportion of the recently constructed cars designed for either one-man or one-man two-man operation. Although 24-in. wheels have been used in some few cases, the 26-in. wheel seems to be most generally favored for four-motor equipment on this type of car. With this diameter of wheel it becomes difficult to provide much less than a 16-in. step above the rail, if the flush-type platform is utilized.

To overcome this difficulty while at the same time retaining the general effect of flush platform construction, there is a very general tendency in recent cars to ramp the body floor from the end sill toward the bolster. In many cases also a ramp is utilized from the center line to the side knee on the platform. This is done to help in reducing the step heights.

At this point another factor enters the problem. The use of two-motor equipment is favored for certain types of service in some cities. The provision of sufficient capacity in two motors for heavy city service limits the minimum wheel diameter to 28 in., and the resulting increase in floor height immediately complicates the problem of providing low steps. Under these conditions, a step from the body floor to the platform at the end sill is usually utilized.

The continued use of the end-sill step is illustrated in a number of the comparatively large recent car orders. There seems to be a basis for some question as to whether or not the advantages of the flush-platform type of construction have not been overestimated. The increased speed and safety of interchanging passengers due to lower steps, as made possible by drop platforms, may outweight the advantages of structural simplicity and reduced cost that go with flush-platform construction. It has been found in practice on some properties where the end-sill step has been retained that a step at this point tends, particularly in front-entrance cars, to encourage passengers to step on into the car body rather than to remain on the platform. The hazard of the additional end-sill step may be largely overcome by the proper provision of stanchions and grab handles. Furthermore, there seems to be some basis for questioning the superiority of a ramp as compared with an end-sill step from the standpoint of passenger safety. This is particularly true where a slope from the center of the platform to the door opening is included. In an accompanying chapter devoted to a study of tendencies in body design as represented by the cars ordered during the first half of 1923 the effect on step height of these two arrangements is analyzed.

Step and Well Arrangements for Center-Entrance Cars

The structure of center-entrance cars readily lends itself to the inclusion of low step designs. The construction usually employed in recent cars may be divided into two general types, each of which is advantageous for certain classes of operation. In the case of front-entrance, center-exit operation with the pay-as-you-pass system of fare collection, encouragement of passenger movement toward the rear end of the car is an important element, and therefore the maintenance of a continuous level floor from the front to the rear half of the car is an important requirement. Consequently this class of car requires the use of an inside step at the center door.

Where passenger loading and unloading are all carried on at the center of the car, the well type of construction may be used, and has certain advantages. Considered from the standpoint of step height, the well, particularly when combined with relatively slight ramps from the body bolsters, is considered by some operators to present a smaller hazard to moving passengers than does the inside step. The center well construction seems to be particularly favored for center-door trailers where brake rigging design and the suspension of apparatus do not become factors that cause mechanical complications.

End-Door and Center-Door Cars Compared

A comparison of end-door and center-door arrangements, together with several types of combined designs, is an important part of the study of car construction for safe and rapid passenger interchange. Experience has demonstrated that one of the fundamental requirements for effective operation through heavy loading districts is a large "reservoir capacity." This allows the entering passengers to be taken aboard and the collection of fares to be carried on while the car is in motion. In the end-platform construction, recognition of this principle is reflected in the long platforms utilized on properties where heavy passenger peaks are handled. The long platform, however, is a difficult structural problem and involves increased first cost and weight and higher maintenance expense.

The center-entrance car, with or without a front exit, which has been used by a considerable number of properties, has the inherent defect of limited reservoir capacity. The extremely ingenious methods which have been devised for overcoming this limitation as applied to trailers where only one man is available are discussed in the chapter on train operation in connection with the types of trailers adopted by St. Louis and Toronto.

The Peter Witt type of car, which was originally developed in Cleveland to obtain large "reservoir capacity," has proved very successful and has

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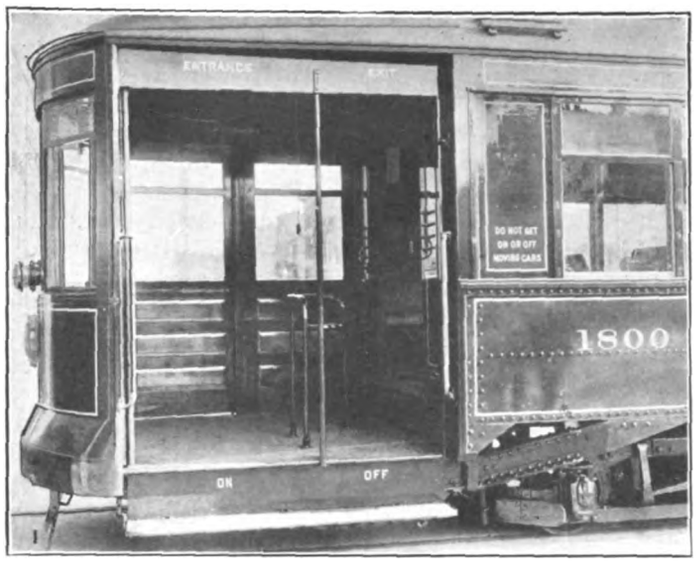

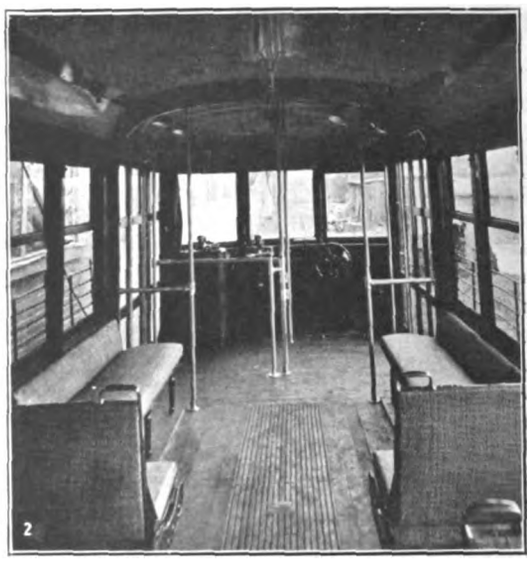

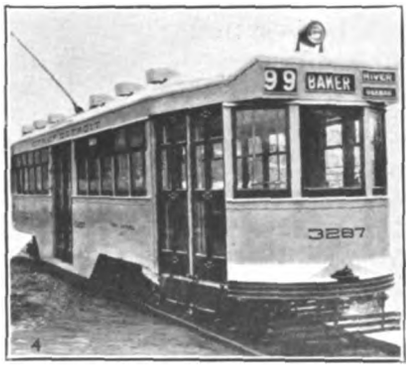

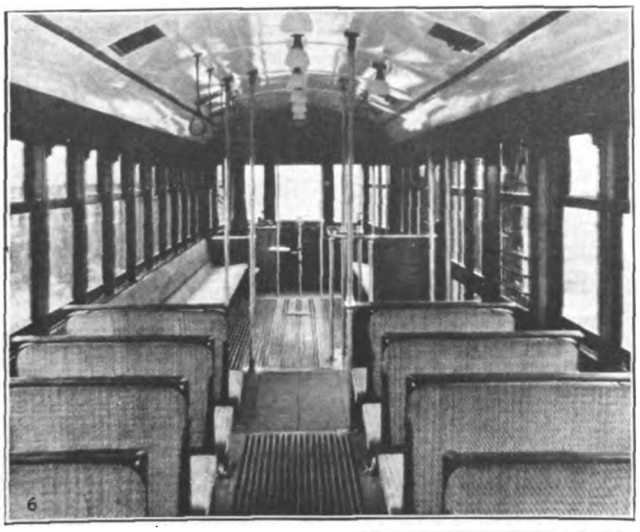

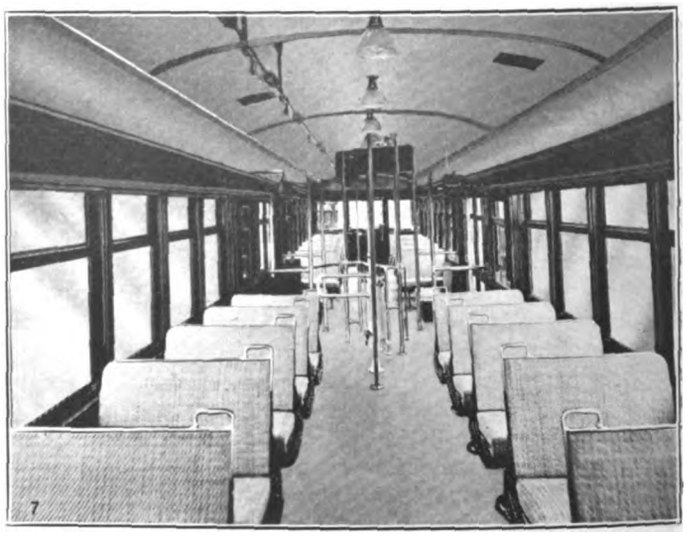

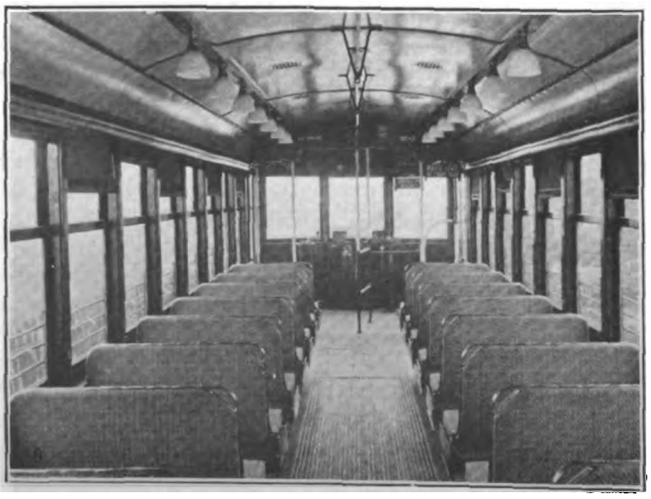

1. A type of end platform car of the Chicago Surface Lines for handling heavy passenger interchanges at high schedule speeds has very low steps.

2. The one-man two-man cars recently put in service by the Muskegon Traction & Light Company have flush platforms with a ramp from center line to side knees.

3. Outside-hung doors simplify body construction on center-entrance surface cars of Boston Elevated Railway —ramps give low step to ground.

4. New Detroit Peter Witt cars have folding steps at front end.

5. Increased reservoir capacity is obtained in center-entrance Chicago trailers by placing conductor in far corner of well.

6. Interior Detroit Peter Witt cars—safety treads are installed in floor in front of longitudinal seats.

7. A 36-in. aisle and adjustable barriers are provided in the Pacific Electric center-entrance cars to facilitate passenger movement.

8. An over-all car width of 9 ft. 1½ in. enables a 30-in. aisle to be provided in the new one-man two-man cars of the San Francisco-Oakland Terminal Railway.

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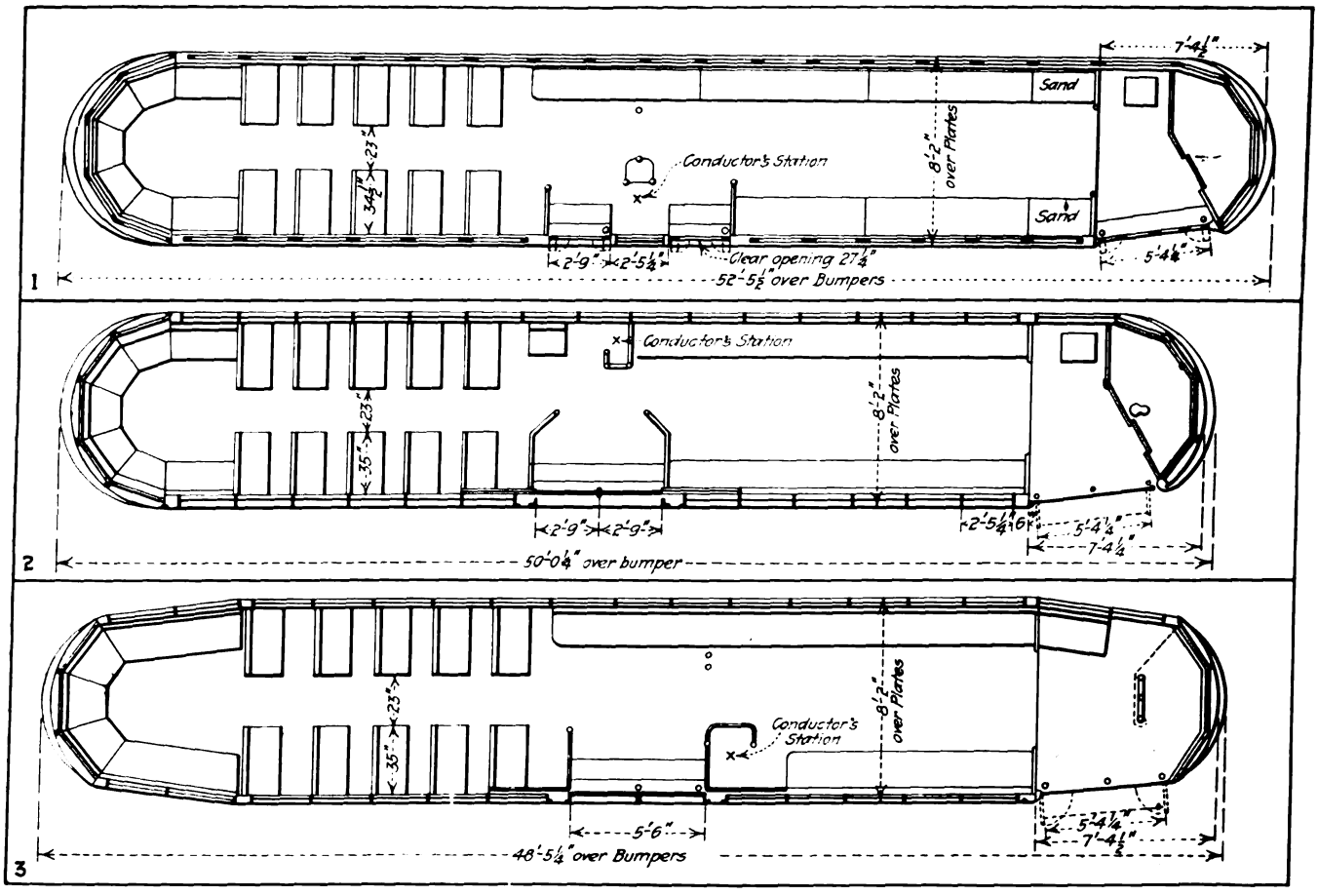
been widely adopted by many cities for operation under heavy traffic conditions. In this design the entire front half of the car is utilized as a loading space and the principle of collecting fares while the car is in motion has been fully applied in the arrangement adopted. This type of car has become very popular and there has been a recent tendency to adapt this construction to the design of one-man two-man cars.

Doors and Steps that Shorten the Standing Time

The design of doors and steps, together with their operating mechanism, has an important bearing on the success of the completed car in carrying passengers *en masse*. The adoption of devices which will insure greater speed and safety in door operation even at the expense of slightly increased initial cost and maintenance is being generally favored. The primary objectives in modern door design are maximum practicable door openings, maximum speed with safety in opening and closing, minimum space required in operation, and the elimination of the personal element in insuring safety of passengers.

Pneumatic operation of surface car doors represents the modern method of obtaining these objectives. Power operation speeds up the door movement, relieves the operator of manual duties and enables him to devote more attention to the collection of fares and the questions and safety of passengers. It also lends itself to various combinations of interlocking apparatus for safeguarding operation and permits control of the doors from any desired point. The perfection of devices for the safe operation of doors has been largely responsible for the return to favor of train operation on surface properties. It is also true that the very high degree of efficiency which has been developed in the operation of long trains of multiple-unit cars in rapid transit service, both on elevated and subway lines, has been closely allied to and dependent upon the development of pneumatic door operating and interlocking mechanism.

Although various installations of electric door operating mechanisms have been made from time to time, this form of apparatus has not been very widely favored. Experience has demonstrated it to be generally heavier and more costly than pneumatic apparatus. In addition the pneumatic type of door engine lends itself particularly well to the accomplishment of speed and flexibility in the door operation. It not only enables the greater part of the door movement to be effected rapidly but provides a sudden choking or cushioning of the final closing or opening operation. Another inherent disadvantage in electric door operation is that the device is inoperative when the electric power supply is off.



The Conductor Is Placed in Various Positions on Pay-as-You-Pass Cars in Different Cities. (1) Cleveland, (2) Akron, (3) Detroit

Difficulty with "frozen air" represents a primary disadvantage in pneumatic devices. By installing the equipment so as to insure proper drainage away from the door engine, this difficulty may be largely overcome. In addition, the modern practice of installing liberal cooling or radiating coils in the air piping from the compressor has made it possible effectively to prevent difficulties of this nature.

The design of pneumatic door engines has followed very largely the same course as other mechanical and electrical equipment described in the

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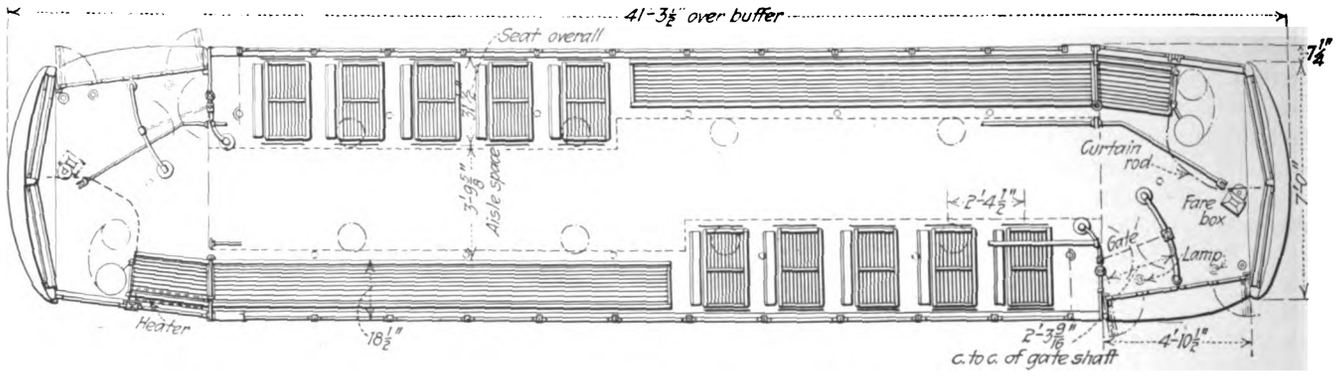


On the Eastern Massachusetts Street Railway One-Man Double-Truck Cars a Wide Aisle Is Obtained by Staggering the Cross and Longitudinal Seats

article on that subject. Reductions in weight and size, improvements in methods of manufacture, and substitution of higher grade and lighter weight materials have been the general developments. Aluminum has been successfully used for the housing castings of door engines without greatly increasing the cost. It is probable that when the method of handling this material through various manufacturing processes is better understood, it will be more generally used.

Comparison of Sliding and Folding Doors

Car door construction is generally of either the folding or sliding type. Each of these types is particularly suited for installation under certain combinations of conditions. The type which is selected for a given installation is determined largely by the relative weight which is given to certain advantages and disadvantages possessed by each design.

The sliding door enables a wider effective door opening to be obtained for a given size opening in the body structure. There is no projection beyond the body line when the door is open, or no "sweeping" area required in the opening or closing operation. This reduces the danger of catching passengers or striking them while the door is in motion. Generally there is also a lower cost of construction for the doors themselves due to the reduction in the number required and a simplification in the operating parts to be maintained.

Folding doors have the advantage of greater speed of opening and closing. With their use there is a simplication of body construction by the elimination of the door pockets necessary for the sliding type. The folding type allows independent operation of entrance and exit doors at the end platforms, and also permits of a lighter construction of door panels for a given size of opening.

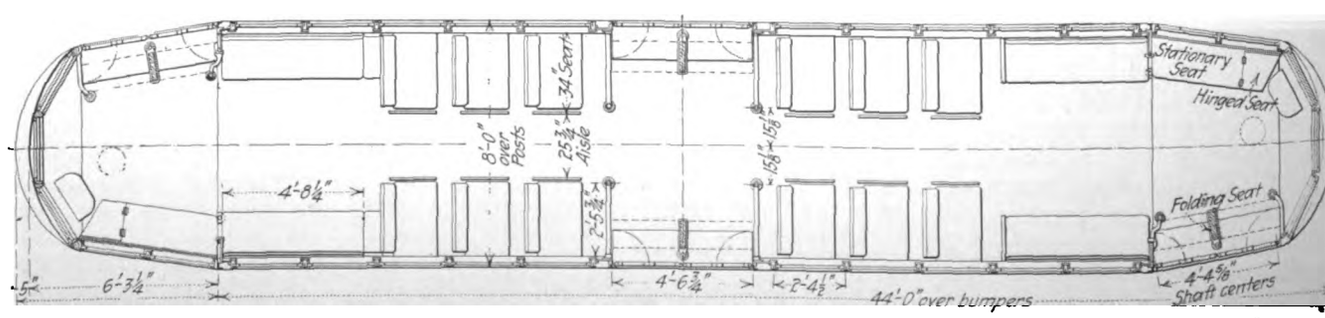
There is a general tendency toward the adoption of folding doors on cars with end platforms. To eliminate the necessity of having the doors sweep the platform, they are generally arranged to fold outward during the opening operation. The usual practice on end platform cars is to set the side knee in far enough from the outside line of the car to avoid an excessive projection of the doors when they are folded open.

In the installation of folding doors on center-entrance cars in Pittsburgh, an ingenious type of non-sweeping door design has been developed which very effectively eliminates both overhang and interior sweeping action. This arrangement is illustrated in an accompanying photograph.

Sliding doors have recently been installed on end platforms of double-truck one-man cars where either loading or unloading of passengers is allowed at the rear end of the car. Although this complicates the construction of the car body at the corner posts and necessitates the provision of sliding door pockets, this type of door was adopted in order to give the motorman an unobstructed view of the rear step from his mirror.

On center-door cars in Boston the problem of eliminating sliding door pockets has been handled by installing the doors on the outside of the car body. This effectively overcomes a difficult construction problem, but the appearance of the car exterior is not equal to that of cars on which pocket or interior construction is used.

The folding type of step was adopted in connection with the inclosed platform to prevent passengers from getting on the step after the car had started, or from securing a foothold for hanging on the outside while the car was in motion. Various types of folding step mechanisms have been designed and used. On a number of properties the stationary type step, however, is still retained and is said to present no greater accident hazard than the folding type. In some cases the stationary step is inclosed by carrying the doors down to the step line. On other recent cars this is not done and the step is allowed to remain exposed. With sliding doors on end platforms it is of course a very difficult problem to arrange the doors to inclose a stationary step.



New Brooklyn Front-Entrance Center-Exit Double-End Cars Are Designed for Two Men but May Be Operated by One —Cross Seats Are Used in Both Front and Rear Sections

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With the extension of one-man operation to double-truck cars and the spread of the use of more than one doorway for the interchange of passengers getting on and off, a number of devices have been developed for regulating the flow of boarding and alighting passengers. Several types of swinging gates have in the past been utilized, even with two-man cars in a few cases, for this same general purpose. Such gates usually consist of a light pipe or rod framework which swings open in the direction in which passenger movement is allowed at any given door opening. There is no attempt in such installations to accomplish more than simply to indicate to the passenger the proper door opening at which to board or alight.

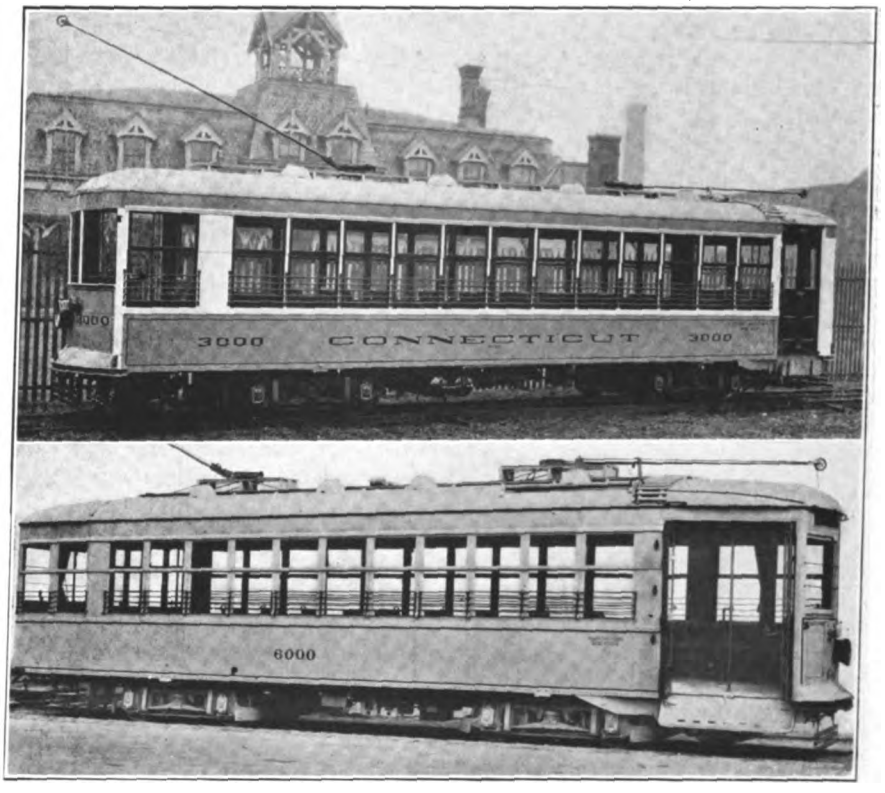
Turnstiles of various designs have recently been installed on one-man double-truck cars by several properties. These installations have been made in connection with front-entrance and rear-exit, rear-entrance and front-exit, and also front-entrance and center-exit systems of operation. The primary object in the adoption of such a device has been to allow a passenger movement in one direction only at some point remote from the operator in order to secure a continuous circulation of passengers through the car instead of concentrating both the boarding and alighting movements at the front end.

The use of such devices for regulating passenger movement has required the sacrifice of considerable floor area for the installation of the turnstile. This has been partly overcome in some recent installations by the use of a turnstile in which the arms are movable within the center body and are guided by a cam so that they extend out only from one side of the assembly as the turnstile is rotated. This makes it possible to install the device close to the wall of the car and represents an improvement from the standpoint of space occupied.

Studies are also under way on an experimental car by the New York Railways for the purpose of developing a type of turnstile which can be moved from one side of the platform to the other so as to provide for double-end operation without devoting an excessive amount of room to the turnstiles. In this installation the turnstile is combined with the fare box in the same general manner as is carried out in station prepayment turnstiles used in the New York subways. There is one equipment at each end of the car. Passengers enter or leave at either end and pass through the turnstile, which is free to rotate for entrance but requires a nickel deposit to release it for exit. When the direction of car operation is reversed, the turnstiles are both moved from one side of the car to the other. This is accomplished easily by the one operator as the turnstiles move on a depressed track in the platform floor.

The type of turnstile most generally in use consists of a three-arm rotating member surrounded by railings made up of pipe. When installed at the rear end of a car it is set close to the side on which the doorway is located. The adjacent seats on this side of the car are removed and a circular seat built around the opposite side and end of the vestibule. For installation at the exit door of a center-exit car, the necessary room for movement of passengers from one end of the car to the other is provided by removing a section of the longitudinal seat along the wall opposite the door opening.

The installation of a device of this kind materially slows up the movement of passengers. Experience in some localities has not been favorable to its use. In Duluth considerable trouble was recently experienced due to passengers refusing to pass through the turnstiles. Observations made in other cities using the arrangement indicate that in many cases the interchange of passengers is carried out entirely at the front end of the car, and the turnstile at the rear is seldom used. Some operators feel that there is no need for such an arrangement and that a passenger intent on beating his way can do so by slipping under or climbing over the turnstile or railing almost as readily as though no such barrier were provided. Whether the losses that would be met in the absence of a turnstile are of any moment is debatable. One company which has had extensive experience with a turnstile located at the rear door used for exit is now satisfied that the stile could be taken off. It no doubt was helpful in getting the passengers trained to the new plan of passage through the car but it is not needed as a means of avoiding losses of fares. People usually stand at the point where the front end of the car stops, anyway, and there is little disposition to board at the rear. One thing is fairly certain, and that is that however much the railway may value the turnstile as an insur-



Above—Connecticut Company Double-Truck Safety Car Has Single Doorway
Below—Double-Truck Safety Car of Eastern Massachusetts Street Railway Company Is Provided with Separate Entrance and Exit to Facilitate Passenger Movement

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ance of getting all the fares, it is simply a source of inconvenience and annoyance to the passenger. If some form of barrier to prevent entrance through the unguarded exit door is considered necessary, it would seem to be an equally or more efficient scheme from the railway viewpoint, and a much more desirable plan from the passenger standpoint, to use the automatic door developed in Chicago, which is referred to again below.

The selector type of brake valve which has been designed in connection with the safety car air equipment offers a means of obtaining individual operation of entrance and exit doors where the double-door arrangement is utilized for loading and unloading at the front end of one-man cars. This consists simply of an auxiliary valve and handle incorporated within the brake valve so as to give the operator individual control of each door. Its purpose is to prevent entering passengers from boarding through the exit way and also to avoid having both doors open at every stop, which is particularly objectionable in cold weather. This device has been applied in Albany for controlling one door at the rear and one at the front of the car.

One-Man Operation Facilitated with Automatic Doors

A combination of the ideas for controlling passenger movement and obtaining selective door control has recently been developed and applied to double-truck one-man cars in Chicago. In this arrangement a treadle is mounted in the exit passage on the plaform floor and is so arranged that the exit door is opened by a passenger stepping on the treadle when the operator's brake valve is moved to the door opening position, but is automatically closed as soon as the alighting passenger clears the exit step. By this arrangement passengers are prevented from boarding through the exit and at the same time free movement of alighting passengers is allowed by the elimination of any form of barrier.

This subject is particularly alive in the minds of railway operators today and is being discussed and approached from various angles. The broad principles of applying one-man operation to double-truck cars is so potent in its possibilities that a note of caution may well be sounded against a tendency toward the promiscuous application of one-man operation to a great many different types of double-truck cars.

There is unquestionably a limit to the size of unit which can be efficiently handled by one man. Attempts to operate with one man cars which were originally designed for two-man operation and which were entirely too large for the new service have resulted in making one-man operation so unpopular in some communities that this form of service has had to be entirely abandoned.

In new construction the rapid spread of the one-man two-man idea presents another subject for discussion and careful study. It is an open question as to whether or not the so-called one-man two-man car is not being designed in some cases so as to be very much more suitable for two-man than for one man operation. Although the desire to obtain what is in effect a universal type equipment by designing a car suitable for one-man or two-man operation as a single unit, or for three-man operation in a two-car train, is an exceedingly progressive and commendable ambition, there is at least some possibility of carrying this idea to a point where the resulting car is too large for one-man operation and at the same time does not have the necessary platform facilities properly to handle heavy rush-hour passenger loads when operated by two men.

In the design of a double-truck car for one-man operation or for one-man two-man operation, the car must be made smaller than the ordinary large two-man car or resulting difficulties in the proper handling of passengers will be encountered when it is in charge of only one man. In addition, if the passenger density on a given line is low enough to justify the use of one-man cars, the size and weight of the unit used, even when it is of the double-truck type, must at least be small enough to allow the use of shorter headways in order to keep a good frequency of service. When the car is so large that this cannot be done without excessive cost, one of the most important advantages of one-man operation from a merchandising standpoint is lost.

There is some doubt concerning the advisability of installing only a single door at the front end of a double-truck one-man car arranged in the same way as on the Birney single-truck car. But if the total car length is held to a reasonable figure and a proper aisle width and seating arrangement provided, it is believed that the use of a door remote from the operator for either loading or unloading is less desirable with one-man operation than the use of double doors at the front end. The best arrangement depends on the size of car used and becomes then a matter of balancing the advantages of the "circulation" idea against increased safety offered by the two doorways at the front end under the direct supervision of the operator.

Means of Speeding Up Fare Collection

Rapid collection of fares is an important element in facilitating passenger movement, and the development of apparatus to assist in the collection and registration of fares is properly an important part of this subject. Probably more improvement has been made in this form of apparatus during the past five or six years than during the previous twenty. This is largely due to the greater opportunity offered for the development of such apparatus by the location of the conductor in one place on the car as the result of the general adoption of prepayment or post-payment systems of fare collection. The second incentive to development was the increase in fare on most properties from 5 cents, which could be paid with one coin, to 6, 7 or 8 cents, which required two or more coins. A still further stimulus has been the general use of the one-man car, which necessitated reduction to a minimum of the time and manual labor expended by the operator in the collection and registration of fares.

Improvements in Fare Boxes

One improvement of the last few years in what is generally known as the "registering fare box" is the application of electric drive to displace hand cranking. Motor-driven fare boxes have been used for some time in prepayment stations, but it is only recently that it has been found possible to apply electric drive to car registering boxes without increasing materially the size and weight of the box. One such recent box, in addition to registering the fare in the usual way, rings up the fare on a register extending up above the box but forming an integral part of it. On account of the high cost, this type of box has not been put in wide use. In a more recent development of this type of box, the deposit of a coin in the slot establishes an electrical contact, which operates a separate overhead register before the coin passes to the inspection plate

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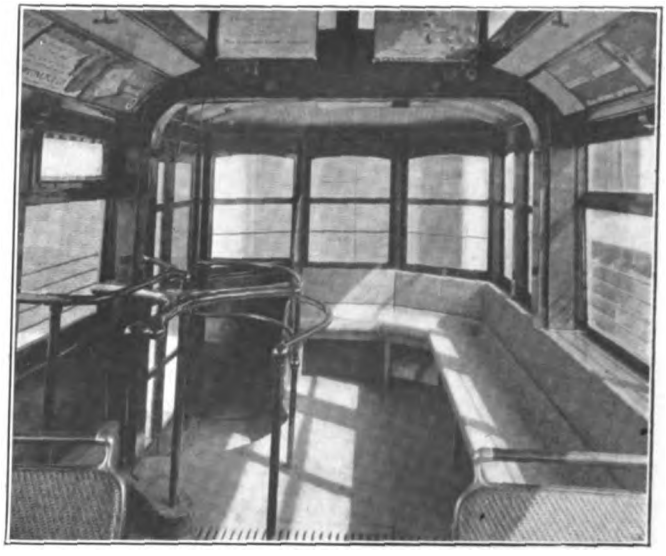
and into the motor-driven registering box. This particular fare box is being built for the Brooklyn City Railroad, whose fare is 5 cents. The box is so arranged that a nickel will automatically ring up only one fare, a dime will ring up two fares, and two dimes, if dropped in at the same time, will ring up four fares.

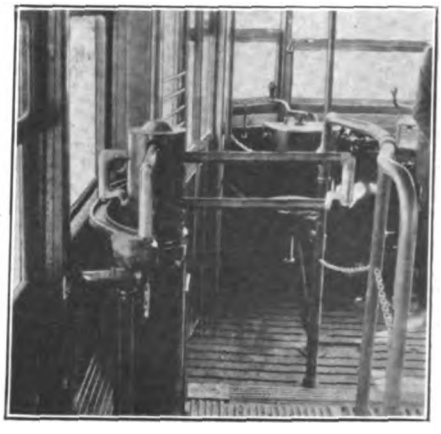
In the locked box, the principal improvement of the past few years has been to make the box safer and stronger and to increase the number of sizes to fit various classes of service. The lighter boxes can be easily moved from one end of the car to the other by one man and so are suitable for one-man car operation. Practice is about equally divided as to the use with the locked box of an overhead register to check the contents of the box or omission of the register.

Overhead registers may be divided into two classes, those which make a printed record and those which do not. With the latter, when two different fares are collected, two single registers or a double register may be used. The double register plan is preferable because, being one machine, it will always show the last fare registered. For the same reason double registers are also more desirable than two single registers for registering both cash fares and transfers. Within the last few years overhead registers have been built so that they can be operated pneumatically or electrically by push button, coin switch or pedal, instead of by a pull cord. Other recent improvements have been in the direction of simplification and durability and in lightening the equipment.

The recording overhead register makes a printed record of the fares collected, with the number of the conductor and other pertinent information, and some types of these registers also tabulate the total amount of tickets, cash, etc., collected by the trip or day. Since the introduction of the one-man car this type of register has been adapted for operation by foot pedal, vertical rods or other methods particularly suitable for such operation.

In what is known as the portable recording register the principal recent developments have been in the direction of increasing the number of coins which the box will receive. Thus on one large electric railway the register takes nickels, dimes and tokens on the city division and nickels, dimes and quarters on the suburban division, as tokens are not used on these latter lines. These various coins are inserted through the same slot but register on different dials. With one-man cars, the register is not held in the hand of the operator, but is contained in a steel box, mounted on a post, and operated with a pedal.





Left, Turnstiles were applied at the center exit of Peter Witt type cars in Syracuse.

Right, Rearrangement of seats gave required room for three-arm entrance turnstile at rear end of Syracuse cars.

Below, Design of turnstile on experimental Third Avenue Railway car, New York, has movable cam-operated arms which reduce space required.

TRANSFER MACHINE

Several efforts have been made to devise a simple form of printing machine which can be carried on a car to print the transfers to be issued. Obviously such a device would be very desirable because the conductor need issue only the number actually required and there would be no waste, an unfortunate feature of any transfer on which the date has to be printed in advance. In such case, provision has to be made for a sufficient number of transfers to care for the needs of every issuing conductor, so that it often happens that many more transfers are printed than are actually issued. Nevertheless, transfer issuing machines have not been generally used.

The machine which is perhaps on more properties than any other carries a row of push buttons for the day, hour and rate, and when the proper ones are depressed and the machine is operated by a pedal, the transfer comes out in a manner very similar to the way in which tickets are issued in the booths of movie theaters. The time required is said to be three seconds per transfer as compared with an average of ten seconds for the hand-issued transfer.

There have been efforts also to develop automatic change-making machines, but for some reason or other they have not been generally put in service.

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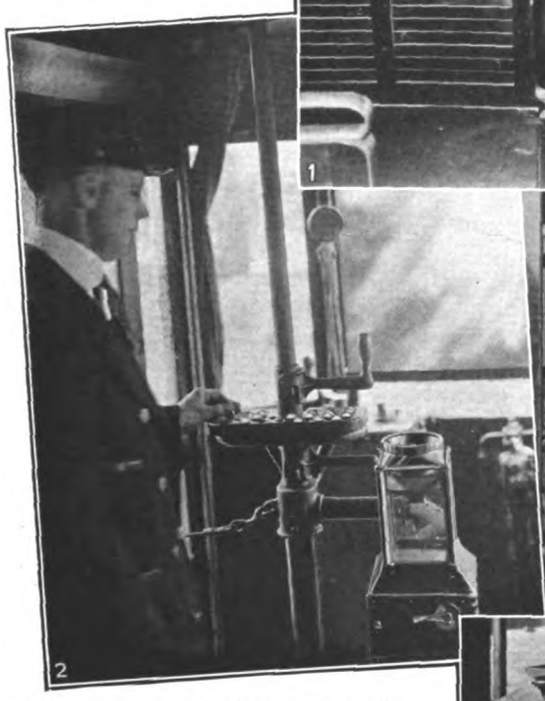
In addition to providing for rapid and safe loading and unloading of passengers, facilitating passenger movement also involves the problem of getting passengers to and from the seats in the car. This is a matter of seat arrangement and aisle width. Longitudinal seats provide a maximum free floor space and tend to encourage passengers to distribute themselves through the car. From the standpoint of passenger preference, however, heavy interchanges and relative short hauls furnish the only justification for their use. The combination of cross and longitudinal seats as used in the Peter Witt type car represents a happy combination, in that the passenger is offered the comfort of a cross-seat providing he takes the trouble of paying his fare in advance and moving to the rear half of the car. At the same time the large capacity loading reservoir desired in the front half of the car is obtained as the result of the use of the longitudinal seats in this section.

The importance of wide aisles has been long recognized, and developments in car structural design have reduced the space taken by car walls to a minimum in order to give the maximum possible aisle width for a given over-all dimension of the car. Modern designs are also arranged so that the usual window rest does not decrease the effective seating width. Where the possibilities are taken into full account in the design, the passenger next to the wall on a cross-seat is in such a position that a portion of his body projects under the arm rest.

The methods of using cross-seats along one side and longitudinal seats along the other side of a car body, or of staggering this arrangement for the two halves of the car, have been used in various places to obtain greater effective aisle width. There has been some tendency in recent cars to cut the seat width down below 36 in. It is probable that this practice does not greatly increase the effective aisle width as the average normal passenger requires a minimum allowance of approximately 18 in., and even though the seats are made narrower than this, the effective aisle width remaining after the seats are occupied is the distance across the inside lining of the car less 72 in.

Another important element in providing for free passenger movement in and out of the car is the maintenance of clear areas on platforms and wells around doorways. The action of some regulating commissions in rating the capacity of service on the basis of the number of seats provided per hour has tended to encourage crowding of seats into the car and the installation of seats within areas that should be maintained free for passenger movement. This same tendency has resulted also from the general practice of comparing car weights on the basis of the weight per seat.



1. One form of registering box for one-man cars with transfer issuing machine also on platform.
2. Registering box with change tray.
3. A locked box in a center-entrance car.
4. One-man car operation with foot-operated recording register.
5. Fare box and zone checks for one-man interurban car operation.

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Newer Methods in Body Construction

The Success of Any Structure Depends on the Design of Its Parts

Light-weight car developments have resulted from the application of new and ingenious structural methods. The addition of double doors to safety cars, construction of curved side cars, "T"-post application to double-truck cars, pressed-steel side posts and unique Minneapolis construction are among the developments in detail body design discussed

PROFITING by the many lessons learned and the economies derived from experience in the operation of light-weight single-truck cars with one man, engineers of the industry have been actively developing many new types of construction by the application of this experience to the entire field of electric railway rolling stock. As pointed out in a previous chapter one of the most outstanding general phases of this development has been the tendency to build light-weight, double-truck cars for operation either by one or two men. Attention was also called to a number of modifications in the dimensions, appearance and structure of the single-truck safety car. It was shown that there has been a parallel development going on in the construction of light-weight, attractive interurban cars and that this development has reached a stage where the operation of such cars in regular service with one man has been proved entirely practicable on a considerable number of properties.

It will therefore be of interest to compare some of the more important construction methods which have been adopted both in the further development of the single-truck car and also in extending this development to the double-truck car.

Developments in Single-Truck Car Construction

The type of single-truck one-man safety car which has been in general use weighs approximately 16,500 lb. when arranged for double-end operation and equipped with headlining and storm sash. The first important change from the original design was made in order to secure more rapid interchange of passengers. This was accomplished by the installation of a separate entrance and exit door. To accomplish this, the car design has been worked out in three ways; first, by virtually a simple elongation of the Birney construction; second, by a similar elongation but with considerable strengthening of underframe members; and third, by a complete redesign of the car. These methods are described in the next few paragraphs.

The first change is illustrated by the cars built for Madison, Wis., and Baltimore, which were among the earliest departure from the single-door design. The change involved primarily increasing the platform length sufficiently to provide for the extra door. The general structural features of the Birney type of car were retained. This included a light underframe and platform structure, continuous "T"-posts and carlines, No. 16 or 3/32-in. gage sheet steel on the side girders, and light tongue and groove poplar for the roofing material.

The Madison and Baltimore cars were made 4 in. wider than the Birney car, giving an aisle width of 26 1/16 in. The increase in platform length resulted in an over-all dimension of 30 ft. 1 in. in place of 28 ft. ½ in., and increased the weight of the car approximately 450 to 500 lb.

In the cars recently built for the Chicago, North Shore & Milwaukee Railroad for use in Milwaukee not only was the additional platform length provided for double doors, but, while retaining the general body structural features of the Birney type car, the strength of the platform and bumper structure was increased materially. This was considered essential largely because of the fact that these cars will operate over track used also by the heavy steel interurban cars operating between Milwaukee and Chicago.

The end sill was made of 5-in. 6½-lb. channel in place of 3-in. 4-lb. Instead of the 4-in. 5¼-lb. channel cross-sill used between the end sill and the trapdoor opening on the Madison and Baltimore cars, the North Shore cars were built with a 10½-in. wide formed steel plate cross-member at this location. The bumper on the North Shore cars is made of 6-in. 8-lb. channel in place of 3-in. 4-lb. material. The platform knees are built-up members, made of a plate cut to the proper shape and reinforced with angles top and bottom, instead of the 6-in. 15½-lb. channels used on the Baltimore and Madison cars.

In addition to the above changes in structural detail, two center sills made of 3-in., 6.15-lb. channel are installed between the bumper and the bent plate cross-member described above. A continuous plate of No. 12 gage steel, 30 in. wide, is used as a buffing plate back of the bumper and is riveted to the side knees and center sills. The complete car is 29 ft. 6 in. long over bumpers and weighs 19,600 lb., completely equipped, of which 9,980 lb. is in the car body.

It is interesting to note that the North Shore line adopted the double-door car after two years of experience with a single-door type in Waukegan.

Up to this point in the development, the application of double doors to the single-truck type of safety car resulted in material increases in weight. But a sample car representing a complete redesign of the body structure was built in Chicago, which gives both the increased platform length necessary with double doors and the increased aisle width desired, without increasing the weight of the car. The general features of the body structure employed in this car were later applied to the design of a double-truck safety car, which will be discussed in con-

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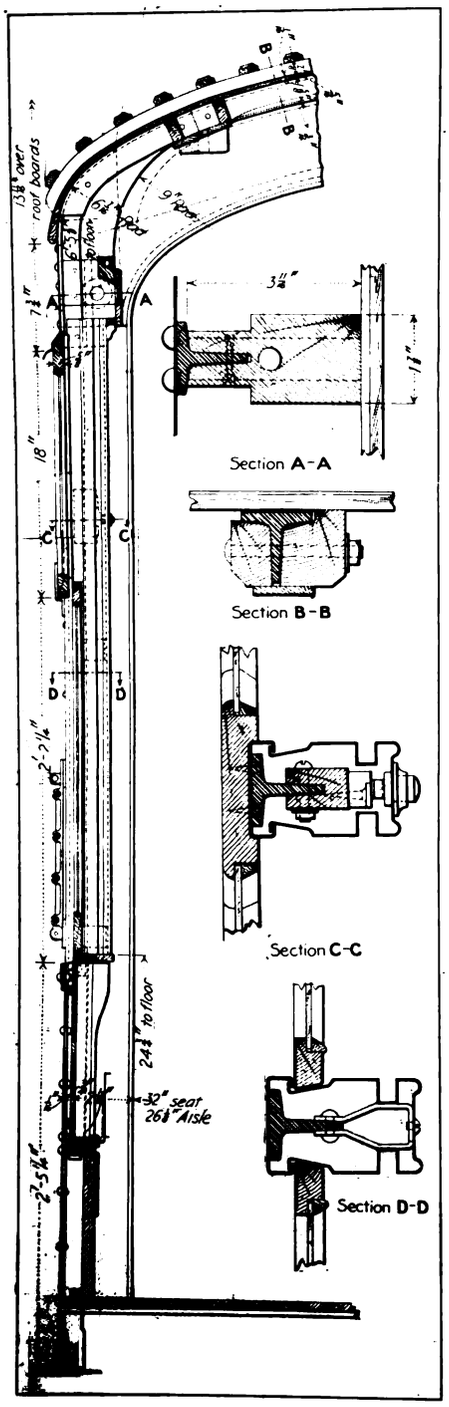
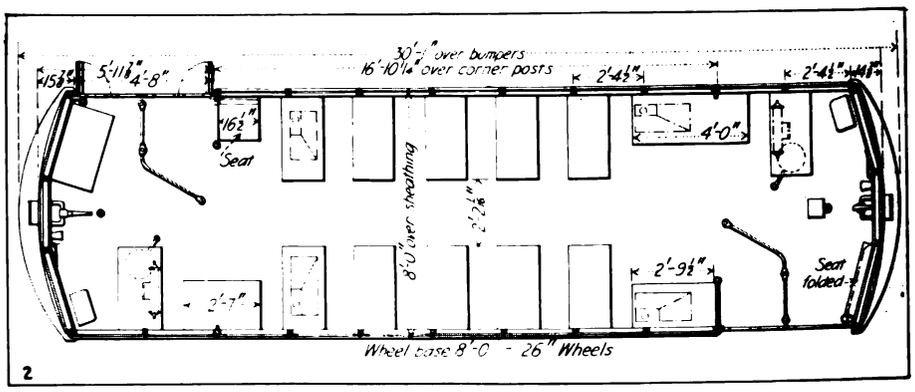
nection with the development of the larger unit.

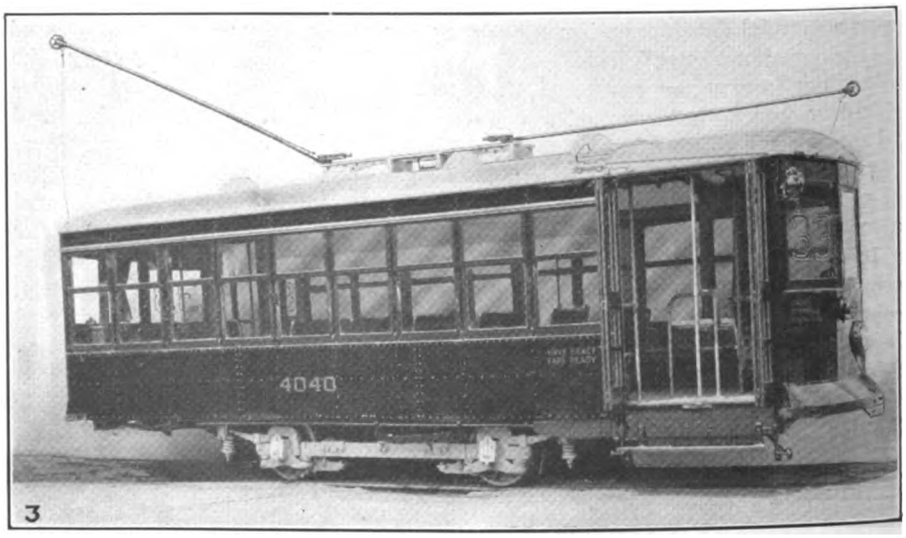
An accompanying illustration shows the general underframe arrangement of the Chicago single-truck car, in which a 4-in. 5¼-lb. channel bumper is used, and 3-in. 4-lb. channels form the platform cross-sills. The end sills are 4-in. 5¼-lb. channels and this same structural size is used for the first cross-sill at each end and at the center of the body. The intermediate cross-sills are made of 3-in. 4-lb. channel. The complete car has a total over-all length of 29 ft. 4½ in. and weighs 16,300 lb.

A still further departure from the original type of single-truck safety car is represented by the cars built for the Kentucky Traction & Terminal Company, in which a single door is used at the front end of the car for boarding passengers and a similar door is provided at the rear end for exit. Along with this unusual return to the arrangement of platforms used on early types of single-truck cars, this design presents many interesting developments in structural detail. In general the body construction is patterned after the light-weight curved-side double-truck interurban cars which have been in successful operation by this company for a considerable period. The curved side was utilized both for the purpose of increasing the effective interior width at the seat line and also with the thought of improving the appearance of the car.

The more important elements in the body structure are clearly shown in an accompanying cross-section. The outstanding features which are of interest and which represent marked variations from common practice include practically all of the elements in the side frame assembly. The side girder sheet is curved into a convex form immediately below the belt rail and tapers into a concave section just above the side sill. The widest dimension is at the belt rail,







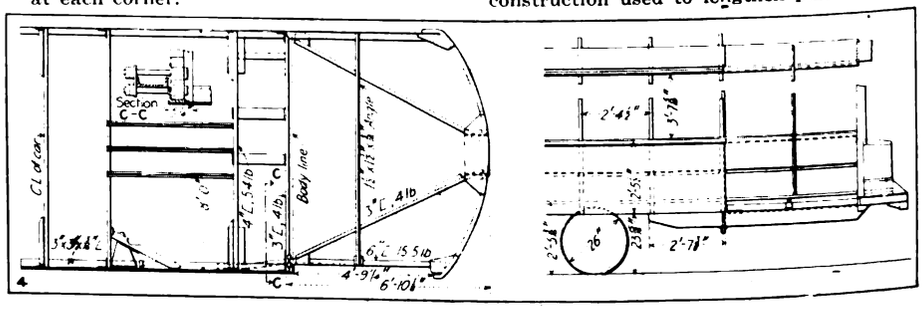
Construction Details of Baltimore Single-Truck Double-Door Safety Car, Illustrating Construction Adopted with Double Doors

1. Cross-section through side of car body shows "T"-side posts.

2. Short longitudinal seats are provided at each corner.

3. Side view shows additional facilities for entrance and exit.

4. End framing of car illustrates type of construction used to lengthen platform.



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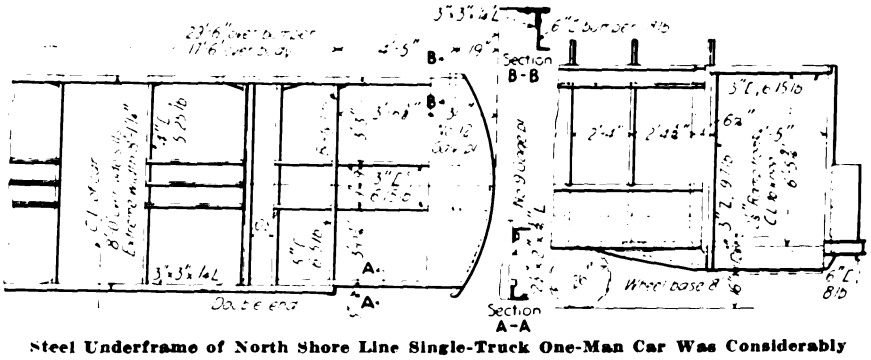
and the side posts are sloped in sharply so that a continuation of their outside line at the point of junction with the roof sheathing is approximately 3⅛ in. inside of the line of the belt rail. Similarly, the compound curve of the side girder draws the side sill 3½ in. inward and brings the lower edge of the body 3¾ in. inside the line of the belt rail. The general construction, in addition to giving this 3¾ in. additional vehicular clearance for a given over-all width at the seat line, is also said to allow the use of a wider car at the belt rail when conditions are such that the dimension across the drip rail or letterboard is the limiting factor in getting clearance between passing cars. This, it is claimed by some engineers, is a frequently encountered condition, because the clearance must be made sufficient at the top of the car to allow for side sway when passing over uneven tangent and curved track.

The curved side girder, although it has no increased strength in a vertical plane over the flat plate type of girder, is said materially to stiffen the body and increase the rigidity of the entire assembly for the same reason that corrugated iron is materially stiffer than flat sheet. In addition, this construction is said to eliminate the necessity for extending the side posts continuously to the floor line, and thus effects a saving in weight.

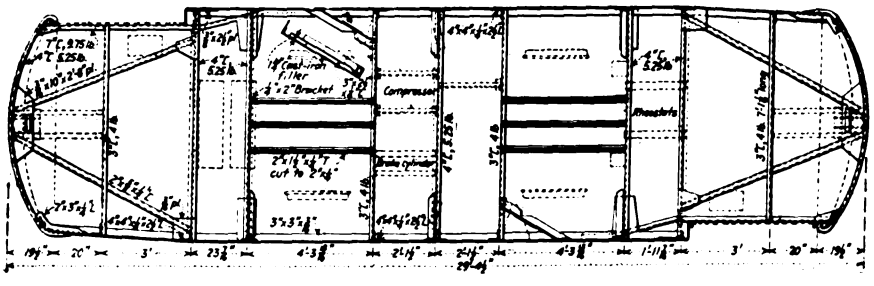
Vertical flanges or fins cut to the proper shape are riveted directly to the side sheet, and, extending at right angles to it, form substantial stiffeners. These members are designed to take the place of the customary extension of the side posts for this purpose, and when cars of this type are built for single-end operation, these stiffening flanges are riveted to the side sheet at an angle corresponding to the slope of the cross-seat backs to form the wall end of the seat structure.

The belt rail is a simple channel-shaped member made of sheet steel laid directly over the flanged tops of the vertical girder stiffeners just described, and also overlaps the outside of the girder sheet. An aluminum socket casting which forms a base for the short ash side post extending between the belt rail and the letterboard is held in place by a comparatively short, heat-treated, alloy steel bolt which is set in at an angle near the bottom of the side post and pulls the post, cap and letterboard together at this point.

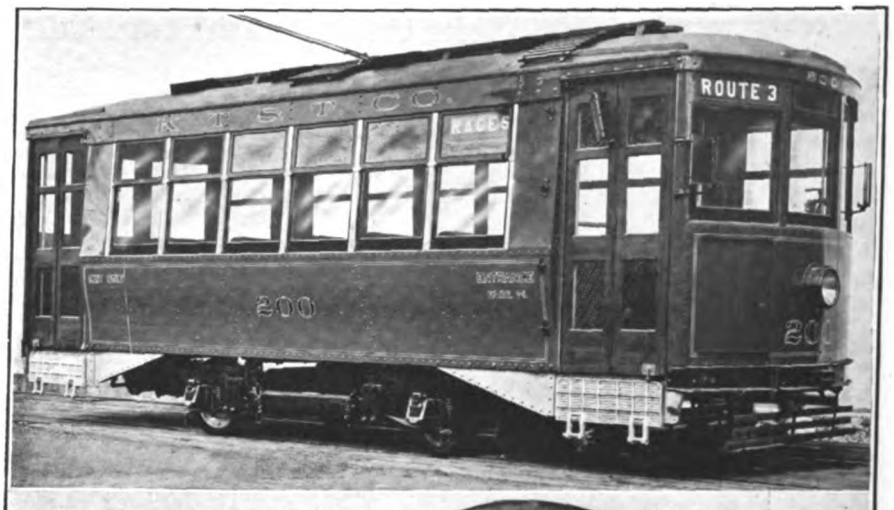
The side posts extend up to the

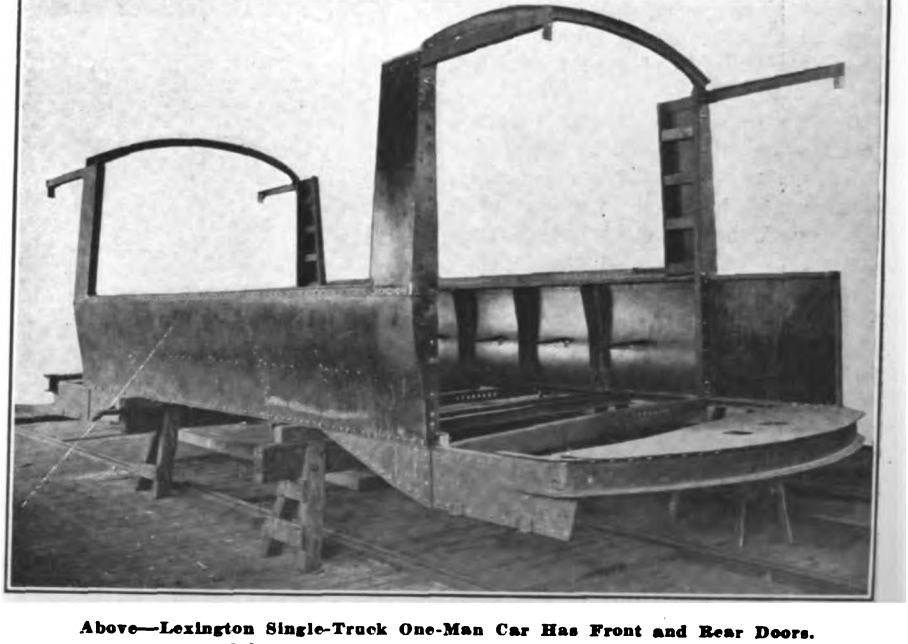


Steel Underframe of North Shore Line Single-Truck One-Man Car Was Considerably Strengthened by Heavy Bumper and Center Sills



Framing Plan of Chicago Sample Single-Truck One-Man Car Shows New Design Adopted





Above—Lexington Single-Truck One-Man Car Has Front and Rear Doors. Below—Construction of Curved Side Framing

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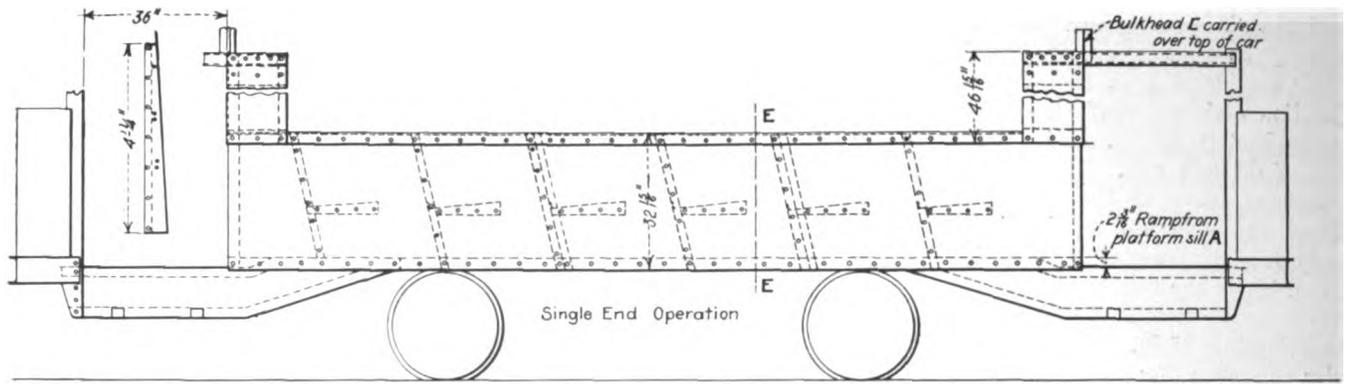
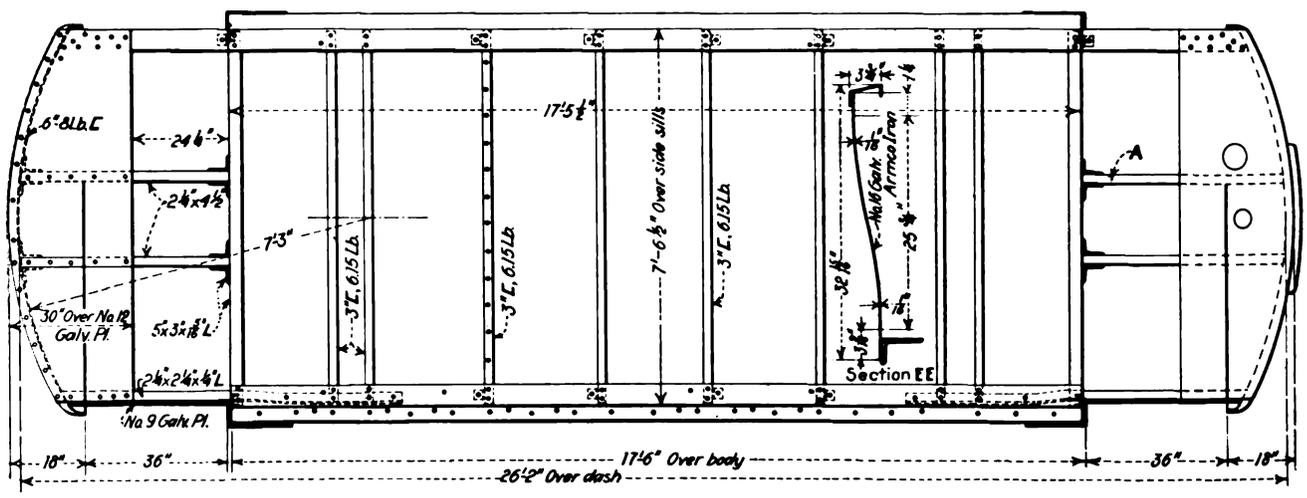


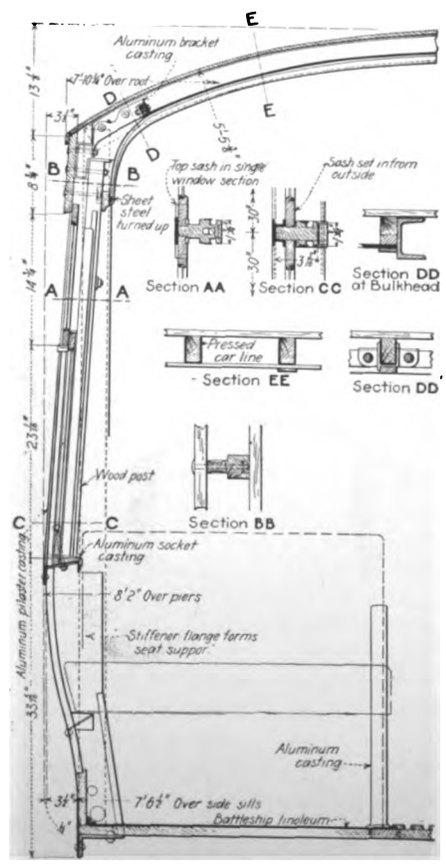


Steel Frame of Kentucky Terminal & Traction Cars. Side Sheet Stiffeners Riveted in Place at an Angle Form Part of Seat Frame. Corner Pier Construction Is Used

roof line. The customary wood top plate is entirely eliminated and its place is taken by the horizontal flange of the letterboard. An aluminum bracket casting is arranged to form a base for the pressed-steel "U"-shaped wood-filled carlines and is fastened to the side frame at each post by bolts extending through the side posts, bracket casting and wood letterboard. The "U"-shaped carlines are set in place with the open side of the "U" turned up The wood projects slightly beyond the upper edge of the steel and forms the means for fastening the roof sheathing in place.

As distinguished from general practice on the majority of cars built for some time past, the top sash is arranged in single window sections let in between the side posts, instead of being continuous. Cast aluminum outside battens screwed to the posts hold these sections in place. The method of installing the lower sash represents still another departure in design. These are set in from the outside and are also held in place by cast aluminum pilasters applied to the outside of the posts.

All of the above structural arrangement is well illustrated in the accompanying cross-section drawing. It will be noticed from an examination of this drawing that the lower side-sill angle is installed with the vertical flange projecting downward instead of upward as is customary. This is for the purpose of facilitating the assembly and it also makes it possible to replace readily a damaged side sheet without incurring excessive dismantling costs.



Section Through Curved Side Car. Side Posts Extend Only to Belt Rail. U-Shaped Carlines Are Supported in Aluminum Brackets

On these cars the floor is constructed of single thickness 1 1/16-in. tongue and groove wood flooring. It is covered under the seats with heavy battleship linoleum. The aisle is provided with the customary type of floor strips. The steel sides are lined on the interior with a layer of ⅛-in. thick compressed cork faced with 1/16-in. linoleum.

The arrangement of steel members in the underframing is similar to that in the North Shore cars previously described, and the details of the design are shown in an accompanying drawing. A feature of construction worth noting is the use of a continuous high carbon steel channel from side sill to side sill to form the corner post and header structure. A similar channel is carried out horizontally from the top of the steel corner panel as a vestibule top plate, and by this arrangement forms a load carrying member of the vestibule structure to supplement the built-up plate type of platform knees.

The doors and steps are of the folding type. The steps themselves,

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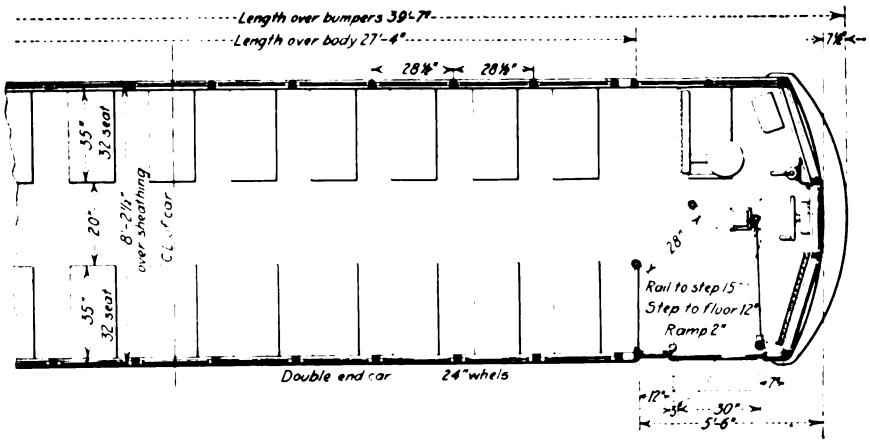
together with the lever arms which form the point of attachment for the step mechanism, are all formed as a one-piece, light-weight, aluminum casting. The cars are 26 ft. 2 in. long over dashes and 8 ft. 2 in. wide over belt rails. The weight completely equipped with plush upholstered seats is 16,600 lb., of which 9,820 lb. is in the body.

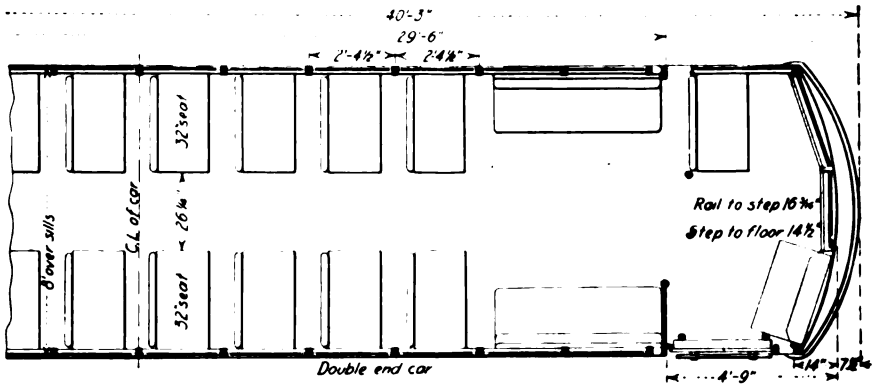
Birney Construction Extended to Double-Truck Cars

In a considerable number of one-man double-truck cars recently constructed the general features of the single-truck safety car design are extended so as to provide for the requirements of a double-truck unit, but remain intact as regards the principal features of the original construction. As in the case of the single-truck cars, some of these "elongated Birney-type cars" are provided with a single entrance and exit while others incorporate the wider double-door arrangement.

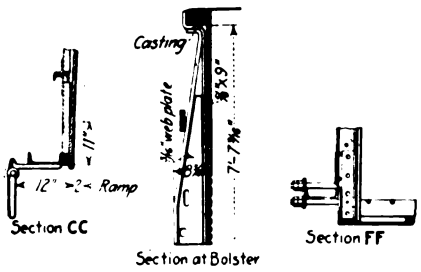
Framing details, floor plans and photographs illustrating typical cars of this group are presented in this chapter. All of these designs, though varying from each

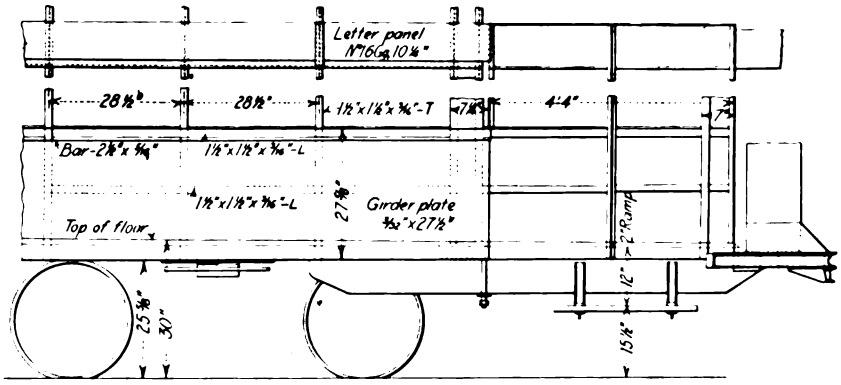


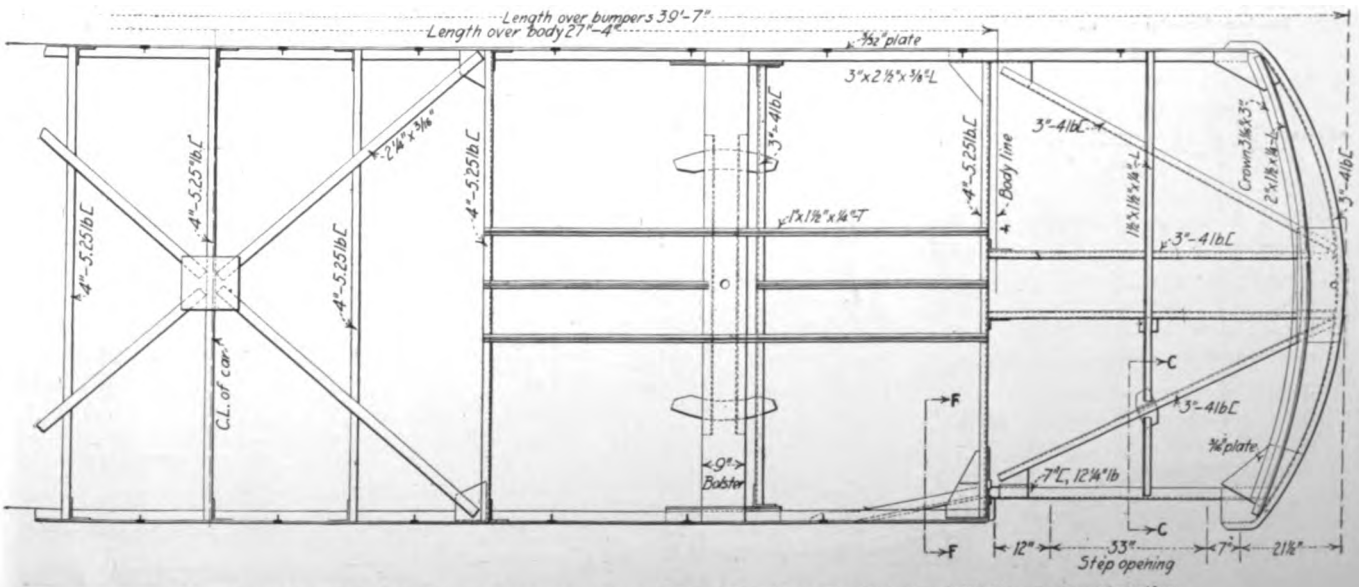
Plan of Houston Double-Truck Safety Car Shows Seat Arrangement and Single Door



Longitudinal Corner Seats in Connecticut Company Single-Door Cars Increase Room







Framing of Houston Car Shows Arrangement of Steel Members for "Elongated" Birney Construction

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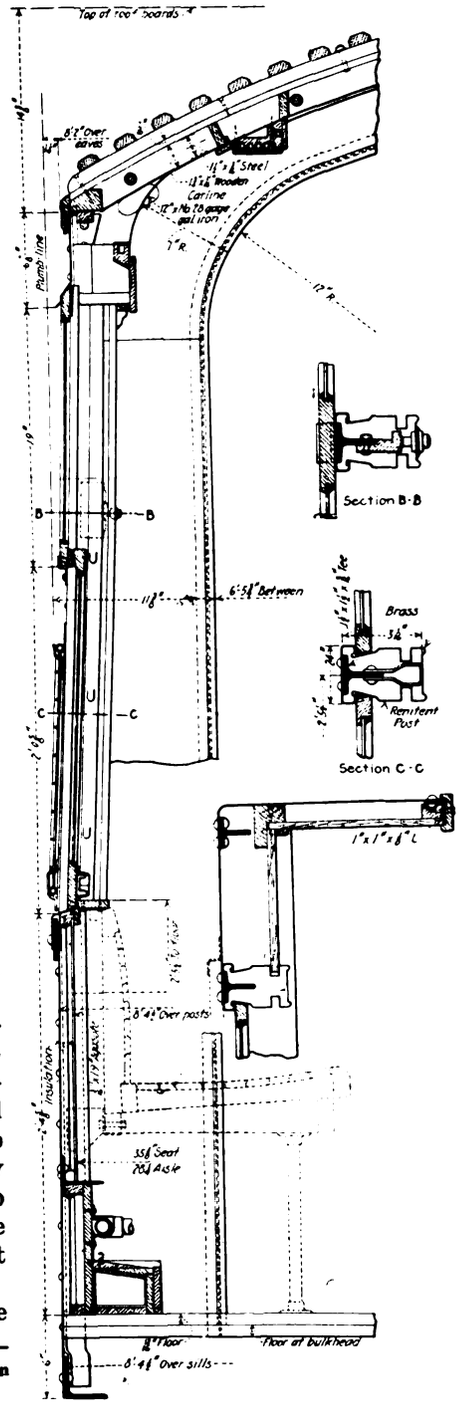
other in some details, represent essentially an extension of the type of construction employed in the Birney single-truck car. This includes the use of continuous "T" sections forming the side posts and carlines, and the use of a comparatively light vestibule structure. The weights of these cars vary from 30,000 to 32,000 lb. complete, depending on the type of equipment and trucks adopted.

The general features of car body design group themselves very largely around the type of side posts selected. A large number of cars have been built within a comparatively recent period in which the "T"-post design for the body side post is utilized, but various modifications are made in the method of applying it. One of the tendencies is to break the "T"-post at the top plate line and interpose some form of horizontal plate member to which both the top of the side posts and the carlines are fastened. In this respect at least many recently constructed cars are similar. In the details of underframe design, as well as in many details of the body structure, the various cars falling into this class represent a considerable range of ideas on the part of both operators and car builders.

The Boston type of one-man two-man car presents an interesting design utilizing this type of construction. In this car the pressed-steel letterboard is flanged over the top of the post "T"s and fastened by means of angle brackets riveted to the posts at this point. These same brackets are used to fasten the flat bar carlines.

The top sash is continuous. The posts have been bent inward from the belt rail so that the eaves molding is 1¼ in. inside the belt rail line. The lower sash are held in place by the renitent post construction in which a formed spring brass section is attached to the "T" side posts by clips, so that the sash is held tightly in place by the spring in the post material, but may be readily removed for repairs without the removal of any screws.



Modified "T"-Post Construction Is Used in Boston One-Man Two-Man Car

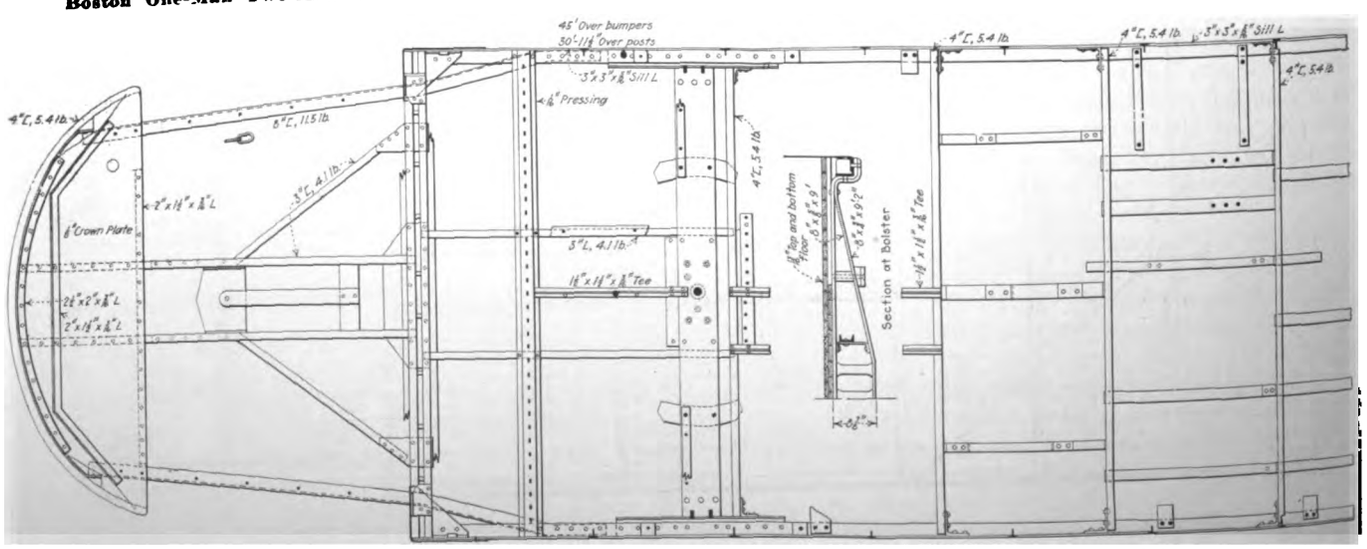
An accompanying drawing illustrates the design of underframe used and also indicates the size and location of the principal members. One interesting item of construction is the method of building the vestibule. All the vestibule posts are made of formed sheet steel, and a continuous steel top plate is carried around the ends of the car.

These cars are 45 ft. long over all and weigh approximately 31,000 lb. completely equipped.

Pressed-Steel Side Posts

Although the conventional wood post is still being used to some extent, and the "T"-post design is represented by the majority of cars recently constructed, a number of interesting applications of other types of post designs have been made, and have resulted in the development of several outstanding forms of construction.

In the one-man two-man cars designed by the Milwaukee Electric Railway & Light Company the "U"-type post is used. A similar type has also been in use in Pittsburgh. The open end of the "U" is flanged and covered on the outside above the belt rail with a steel plate. Below the belt rail the flanges of the post are riveted to the side girder plate. On the Milwaukee cars the letter-



Steel Framing of Boston Car Provides for Use of Coupler. Bolster Is Built Up of Steel Plates

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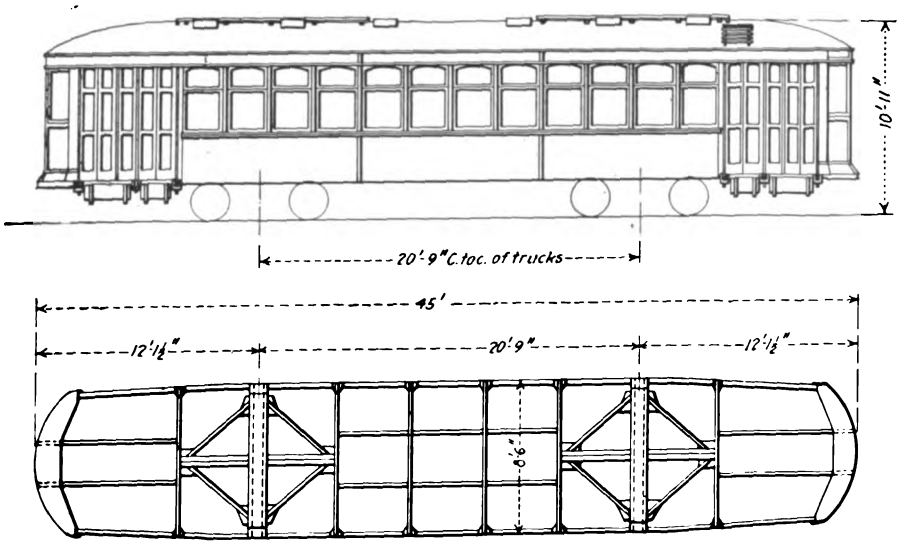
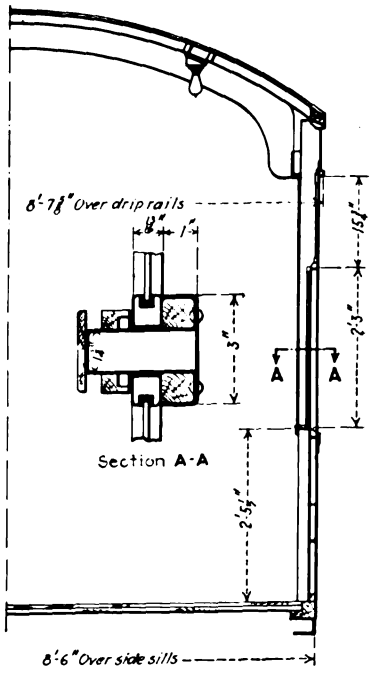




Framing, Elevation and Section of Milwaukee One-Man Two-Man Car with Pressed Steel Side Post Construction

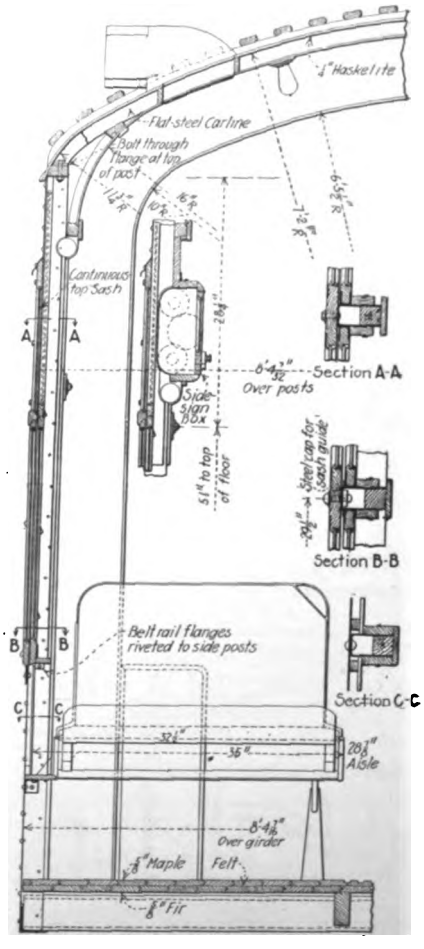
boards are made of the customary 1/16-in. steel, but are reinforced at the door openings with ⅛-in. pressed-steel plates extending from the second body side post to the vestibule corner post, thus assisting in the support of the platform. Flat-steel carlines of 1¼-in. x 3/16-in. material are riveted to the top flange of the letterboard and to each side post. These cars are 45 ft. over all and weigh approximately 32,000 lb. completely equipped.

An application of a different type of "U"-post is represented by the double-truck, one-man cars built by the Chicago Surface Lines. On these cars the open end of the "U" is not flanged and is turned toward the car interior. A wood filler is inserted in the open side of the "U" and is fastened in place by screws extending through the parting strips and post sides. This filler forms a screwing strip for the interior pilaster on the face of the post. The design enables the belt rail to be cut for the posts in such a manner that projecting flanges or ears are left at the sides of the opening and form a means of rigidly connecting belt rail and posts at this point. At the top-plate line the "U"-posts are flanged over, a light wood top plate is applied, and the flat steel carlines are bolted through the top plate, letterboard and side post flanges. The roof is constructed of large panels of plywood made up with waterproof glue and formed to shape. The completed cars are 39 ft. 7½ in. long over all and weigh approximately 31,500 lb.

Construction of Minneapolis Light-Weight Trains

All of the various types of construction so far described have been designed to obtain minimum weight and structural simplicity, while at the same time providing a construction which would have the strength and rigidity required to stand up satisfactorily in service. As previously pointed out, it is apparent in each design that the general arrangement of the entire structure has been built more or less around the particular type of side post and girder arrangement selected. Since the advent of the plate girder type of construction it has been the practice to fasten the girder plate on the outside of the body side posts below the belt rail and then to provide some sort of finish on the interior.

In the type of construction adopted on the sample light-weight train built in Minneapolis, this arrangement is not followed. The side posts are of 1½-in. x ¾-in. x ⅛-in. continuous rolled-steel channels installed with the flanges turned out and extending continuously over the car from



Left—Side View of Boston Light-Weight One-Man Two-Man Car with Ramped Flush Platforms. Right—The Chicago Double-Truck One-Man Car Has Pressed Steel Posts with Light Wood Filler, Aisle Width of 28⅞ In. Is Obtained for 8-Ft. 6-In. Over-All Width by Making Side Wall Only ¾ In. Thick

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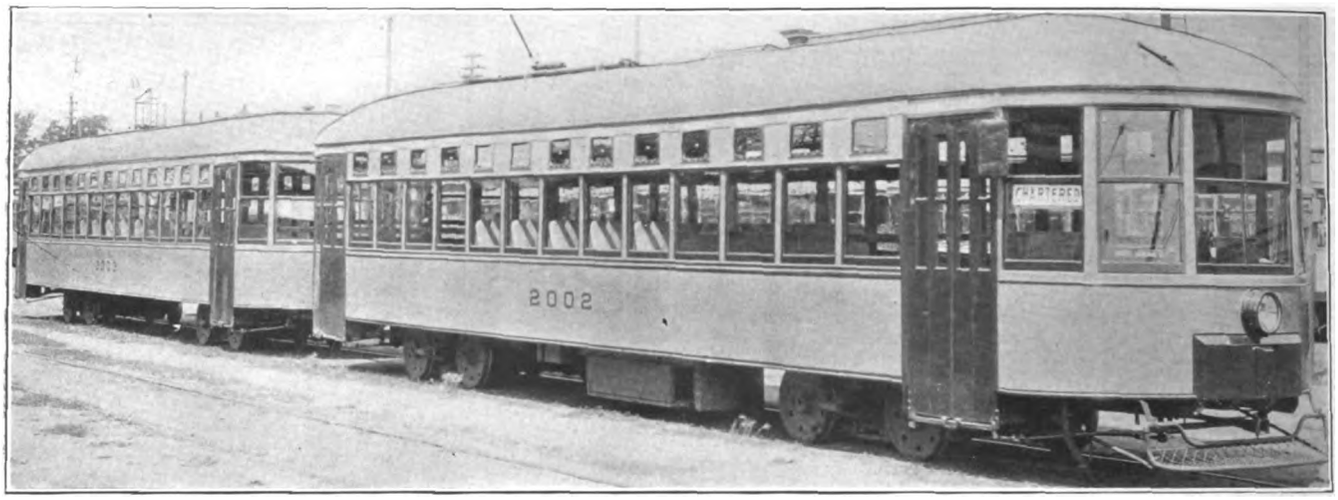


In the Light-Weight Minneapolis Train the Outside Panels and Top Sash Are Made of Plywood Fastened to Wood

side sill to side sill. Flat steel plates, $\frac{1}{8}$ in. x 10 in., are riveted across the post channels on the inside, one plate at the belt rail and a second plate at the lower side-sill angle. Diagonal flat braces, which are designed in accordance with the loads imposed and vary in size from $2\frac{1}{2}$ in. x $\frac{1}{8}$ in. to 5 in. x $\frac{1}{8}$ in., are riveted from post to post across the backs of the channels between the belt rail and side-sill angle. The belt rail is also placed on the inside and is made of $2\frac{1}{2}$-in. x $\frac{5}{8}$-in. x $\frac{3}{16}$-in. channel riveted across the backs of the side-post channels. Wood posts are fastened on the outside of the steel members and are let in between the channel flanges. A wood member along the belt rail and a wood intermediate rail are fastened on the outside of these fillers. The outside lower panels are $\frac{5}{16}$-in. plywood material and are screwed and glued to the wood rails and posts. In general appearance, with the exception of the lack of rivets, the completed side resembles a steel plate after it is painted.

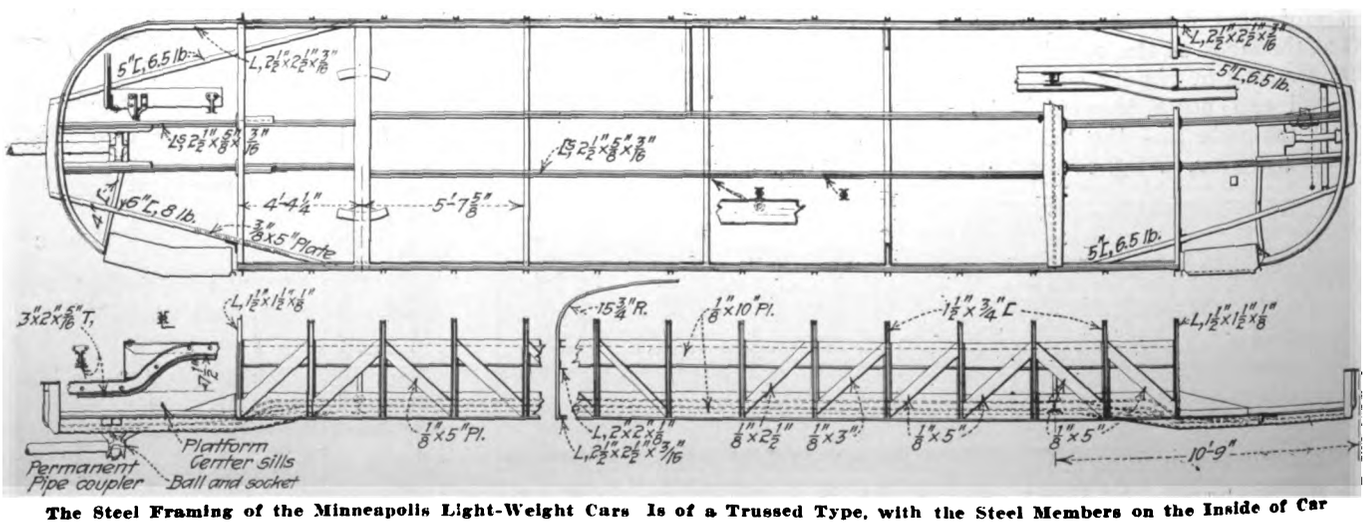
A lower side-sill angle $2\frac{1}{2}$ in. x $2\frac{1}{2}$ in. x $\frac{3}{16}$ in. forms a support for the cross sills. It will be noted in connection with the type of construction employed that an over-all width of 9 ft. allows the use of the comparatively thick wall section adopted without interfering with the provision of ample aisle and seat width.

The customary upper sash is considerably modified on these cars. No letterboard is used. A continuous panel of $\frac{5}{16}$-in. plywood is glued to the side posts between the roof line and the top of the lower sash, and rectangular cast aluminum frames containing glass openings about 8 in. x 14 in. are set into this plywood panel between each pair of side posts. The glass in these frames is arranged to slide horizontally. This enables a ventilating opening to be provided. This arrangement is discussed more fully in another chapter dealing with ventilation.

The underframe structure also presents an interesting feature in that the cross-sills are set at relatively infrequent intervals compared with general practice, and a pair of double channel center sills are run the length of the car to support the $\frac{5}{8}$-in. lower cypress floor which is laid crosswise and upon which a layer of $\frac{3}{16}$-in. insulating material and then an $\frac{11}{16}$-in. tongue and groove oak floor is laid longitudinally. An accompanying illustration shows details of the underframe structure.

New Structures Common to Interurban and City Cars

Progress in light-weight interurban car design has resulted in the employment of a number of different types of construction. Although there is nothing about these newer designs which inherently limit them to use in interurban service, they were originally developed for that use. Application of these same general designs to city cars has already been made successfully in a number of instances. This applies particularly to the curved side development which was described in detail as applied to single-truck city cars, and which with some slight modifications has also been incorporated in both light-weight double-truck interurban and city equipment.



The Steel Framing of the Minneapolis Light-Weight Cars Is of a Trussed Type, with the Steel Members on the Inside of Car

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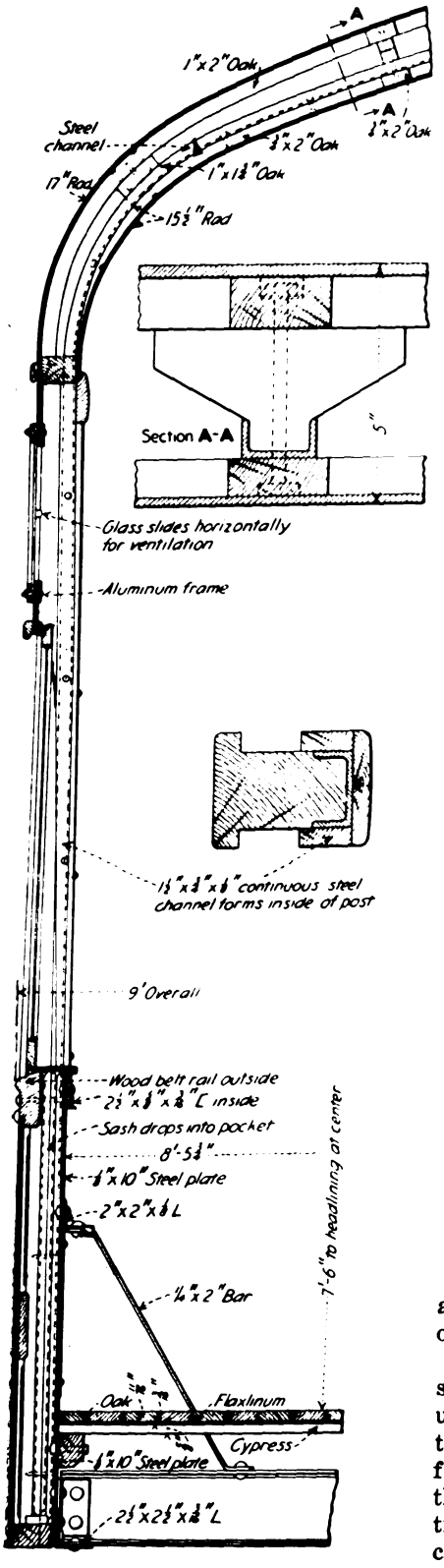


Cross-Section of Minneapolis Car Shows Channel Side Post Construction

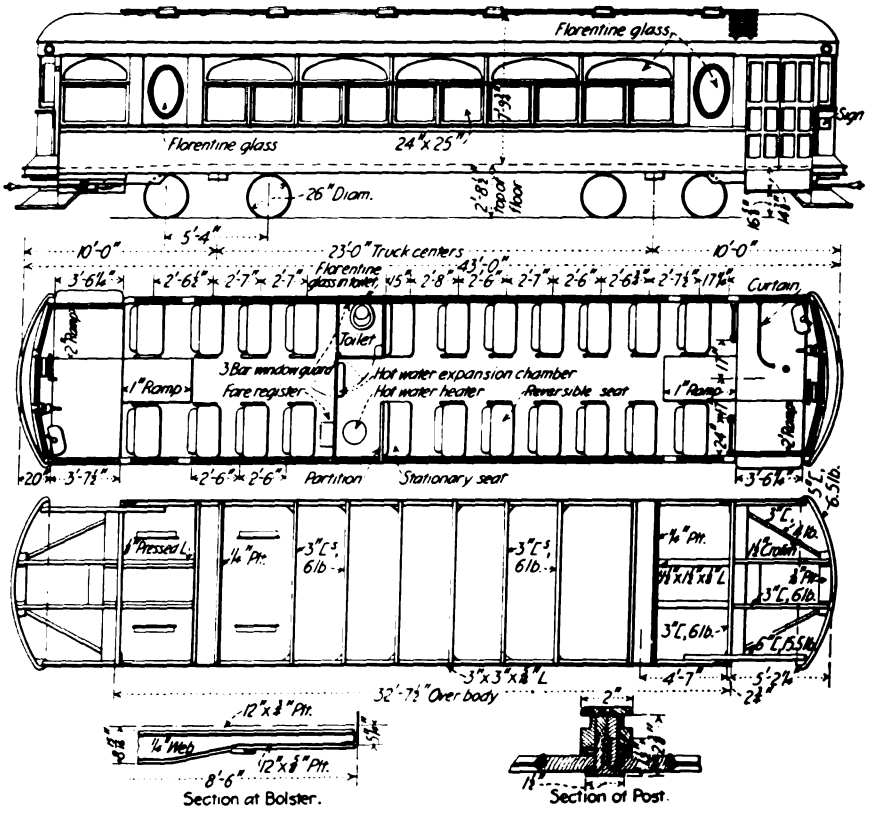
In the study of these designs, an outstanding structural practice which seems to be rapidly gaining favor, and which is applicable to the construction of both curved side and straight side cars, is that of carrying an independent self-suporting roof structure upon four substantial corner piers. These are further reinforced by carrying a continuous post structure of either channel or angle section across the car continuously from side sill to side sill at either the bolsters or end sills.

The side window posts are then made of either light wood or pressed-steel members carried between the letterboard and the belt rail, and acting primarily only as guides for the window sash. From the corner piers a vestibule top plate firmly anchored to the piers is carried out to the vestibule corner posts and assists the side knees in the support of the platform.

With the type of construction described, the roof is usually built as a unit structure and is set on top of the four corner piers and properly fastened in place. Applications of this type of construction are illustrated in accompanying pictures of car frames that are built along these lines.

An application of the corner panel type of construction to a straight side, light interurban car built for the Eastern Wisconsin Electric Company is also shown in an accompanying picture.

The light-weight interurban cars of the Youngstown & Suburban Railway are built with the corner pier design and a very unusual type of side frame construction. Short T-shaped ribs extending between the sill and the belt rail are curved into a slightly convex form. A paneling material 1/16 in. thick, made up of a plywood core with a very thin layer of steel applied to both sides with waterproof glue, is then riveted in place to the outside of the framing members with hot rivets applied through steel battens on the outside of the panels. The side posts are then formed of very light, deep, sheet metal channels riveted to the belt rail and letterboard. An accompanying view of the assembled steel frame illustrates the type of construction used.



Side Elevation, Floor Plan and Framing of Eastern Wisconsin Light-Weight Interurban Car Show New Arrangement with T-Side Post Construction

Developments in the Use of Better Materials

The construction methods described in the forgoing matter have included primarily those outstanding features which have been adopted by various properties in building new equipment. In addition a great many experimental studies are being made for the purpose of determining the possibilities of using new materials. The study of new materials and of new applications for old materials is after all one of the primary functions of the car designer. Reduced weight without impaired strength, freedom from corrosion and min-

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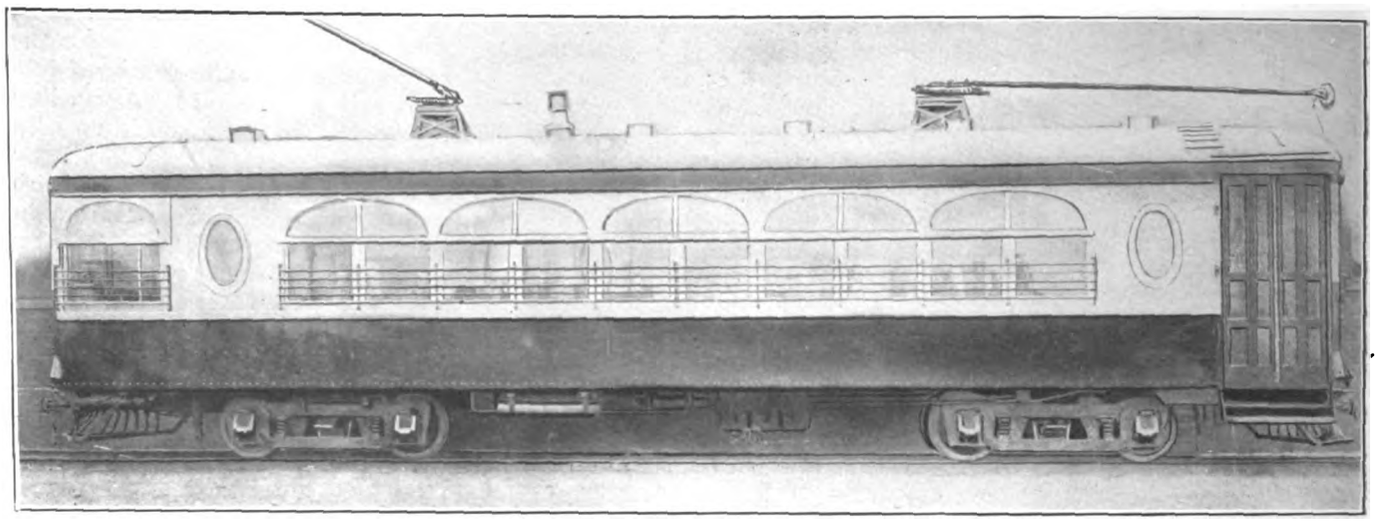


Side View of Eastern Wisconsin Electric Company Light-Weight Interurban Car Shows Appearance of Straight Side with Wide Corner Panels

imum maintenance are objectives well worth striving for.

Monel metal and various forms of non-corrosive steel are being tried for various purposes. In addition to making light pressed sheet metal sections more suitable for car structural elements, the use of this class of material for outside finish on cars prevents deterioration. It is being tried on an experimental car in Dayton as a side sheet material to save paint costs and improve the appearance of the car.

Non-corrosive steels have been recently receiving a considerable amount of attention. There are a number of products available in which the non-corrosive qualities of pure iron are utilized. Although such materials are generally slightly inferior for structural purposes, they have a wide field of application for such car parts as dash iron, moldings, post caps, anti-slip treads, splash guards, etc.

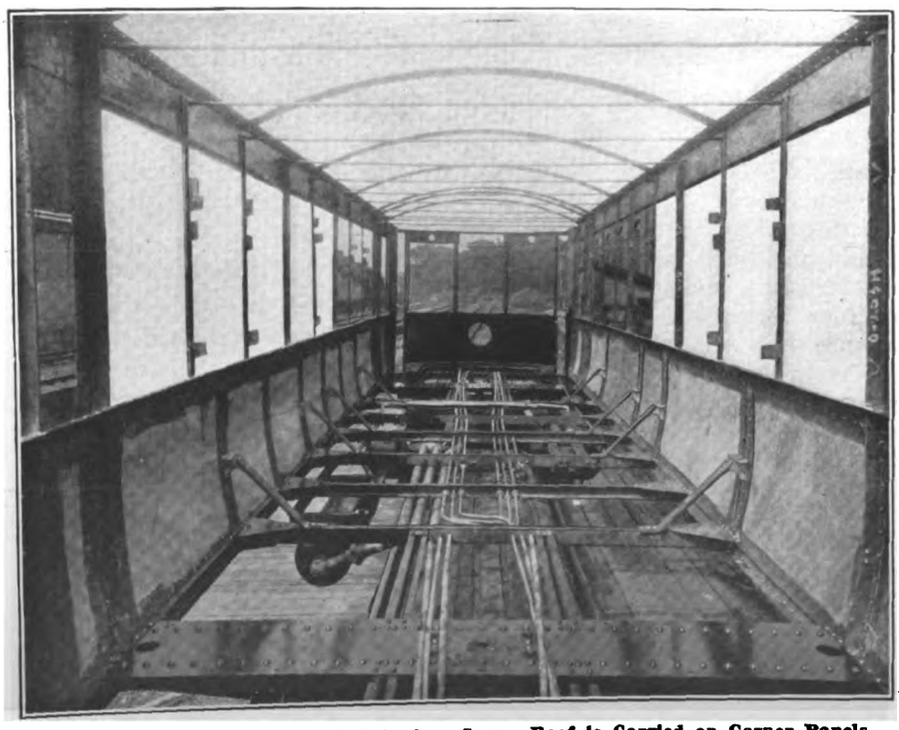
The use of copper-bearing steel has been studied by some engineers for car purposes and some of the steam railroads have conducted exhaustive tests to determine its advantages. There does not seem to be a general agreement as to the advantages of the copper content. In some instances it has been reported that the results obtained with such material were not an improvement, from the standpoint of corrosion, over the ordinary grades of commercial steels. Some engineers have held that the copper content actually increases the rate of corrosion due to the local galvanic action which is said to occur between the two metals.

"Stainless" steel, although quite high in cost, has been considered in connection with car construction. It would seem that for such parts as pressed steel posts, and even for letterboards of light section and in some cases for side sheets, it may have a possible field of application.

Aluminum in its various forms and alloys is rapidly becoming an important material in car construction. Its use for stanchions and grab handles has become fairly common. For this purpose it may be obtained in the form of a hard drawn alloy which is quite rigid. For electrical conduit, where it has been applied to a considerable degree, it may be obtained in an annealed form.

Two difficulties have been encountered with the use of aluminum. For long unsupported stanchions it is found that the 1-in. size is not quite stiff enough for the service and consequently it is usually better practice to use 1¼-in. pipe size for this purpose. It is also found that although aluminum retains a fairly good finish after continuous use and eliminates the necessity for painting stanchions and railings, it does tend to blacken the hand of a passenger. By careful cleaning after installation, this difficulty can, to a certain degree at least, be overcome.

At least one entire installation of aluminum air pipe has been made. On a sample car built in Chicago, all the piping installed was of this material. There was some difficulty experienced in cutting threads and it was also found difficult to pull the



Steel Frame on Youngstown & Suburban Cars. Roof is Carried on Corner Panels. Steel-Covered Plywood Side Sheets Are Riveted Through Battens on Outside

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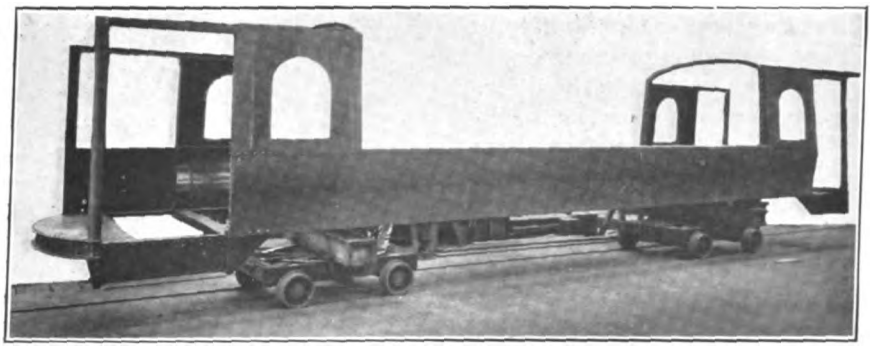
pipe up tight enough to hold the air, without frequently breaking the pipe off at the threads. Some trouble was anticipated due to the effects of vibration, but so far, after nearly two years of service, no serious difficulty has developed. Precautions were taken to prevent corrosion due to local galvanic action, where the pipe enters steel or iron fittings, by painting the threads with heavy insulating varnish instead of the customary pipe fitting compounds.

There is a wide field for the application of aluminum in other forms. Both in the form of castings and of rolled sheets its alloys have been successfully heat-treated to give really surprising physical properties. In the form of an alloy known as "Duralumin," rolled sheet aluminum is available in heat-treated form and it develops a tensile strength of 50,000 to 60,000 lb. per square inch, which is ample for many car structural requirements. The material in this form is an alloy of copper, magnesium, manganese and aluminum, containing approximately 3 to 4½ per cent copper, 0.4 to 1 per cent magnesium, 0 to 0.7 per cent manganese and the balance aluminum, with some slight traces of iron and silicon in the form of impurities. There is no question but that the ultimate production of this class of material in the form of heat-treated rolled sections will have a considerable application for car structural purposes.

Aluminum in a considerable range of alloys is available for castings, and these are being applied quite generally and to a constantly increasing extent for car body construction. The castings may be heat treated, and in that form develop physical properties which enable this material to be substituted for brass and in some cases even malleable iron, for many purposes at considerable saving in weight. When produced in permanent molds, heat treated and polished, aluminum takes a brilliant and permanent polish. It has been utilized to a wide extent for automobile hardware and is receiving a considerable amount of attention and study in connection with similar uses in street car body construction.

Seat frames, heater cases, grab handle sockets, door engine castings, motor junction boxes and many other parts have been successfully made of this material in either sheet or cast form. On a recent lot of cars in Chicago, the controller frames and tops were made of aluminum at a saving of 150 lb. per car and no increase in cost. On the recent lot of single-truck safety cars built for the Kentucky Traction & Terminal Company aluminum step castings and operating arms were applied.

Some difficulty has been experienced in machining aluminum and it is difficult to tap holes. Also, for door engine castings or other parts that are required to hold air pressure some trouble from porousness is sometimes encountered. This, however, is largely a matter of using proper alloys and getting correct foundry practice.



Curved Side Steel Frame Assembly Shows Construction of Corner Piers with Steel Channel Vestibule Top Plate

Aluminum pipe and conduit fittings are now available and several of the large conduit fittings manufacturers can supply almost any of their products in this material. Interior enameled aluminum tubing has been approved by the underwriters for conduit work and has been applied to a considerable extent for this purpose.

The Chicago Surface Lines has installed 1½-in. aluminum pipe on recent cars to carry motor control cables under trapdoors. The material seems to be entirely satisfactory for the purpose.

Application of aluminum as a side sheet material has been made to a considerable extent in bus body construction, but there is a limitation to its use for street car bodies due to the difficulty of properly fastening it to a steel frame. The use of hot rivets is desirable from the standpoint of securing a permanent and rigid structure, but the danger of corrosion and difficulty in fabrication make this form of construction undesirable. With a type of framing similar to that described for the Minneapolis sample train construction, in which the outside panels are fastened to wood, aluminum side sheets could probably be used.

The developments in plywood and in plywood with steel or some other similar material on the outside open up a wide field of possible applications. This material was first developed during the war in connection with airplane fusilage construction, and depends for its success as a structural material on the use of a waterproof glue. As a roof material it is very substantial, and in ¼-in. thickness for this purpose is considerably stronger than the customary ⅜-in. poplar tongue and groove sheeting material. As side lining or as the plate of a girder, it forms a very stiff and rigid structure. For car roofs it has been applied in the form of large panel sections. In the case of a sample single-truck car built in Chicago it was scarfed and glued in one continuous panel.

One limitation in the use of plywood, or of plywood faced with steel, is the difficulty of fastening it successfully to a steel frame. On the light-weight interurban cars built for the Youngstown & Suburban Railway this material was formed to the shape of the curved side structure and was then fastened to the steel framing with hot rivets. In order to accomplish this, however, it was necessary to apply steel battens on the outside to form a support for rivet heads. This presents a rather unsatisfactory fabrication problem and has limited the more general use of plywood material. The development of more satisfactory methods of application in car construction would undoubtedly open up a much wider field for its utilization.

The constantly widening supply of materials opens many opportunities for future development of car construction. Reduced weight with increased strength and simplified construction with decreased cost are being obtained as more and more applications for new materials are found almost daily.

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Advances in

Car Lighting, Heating and Ventilating

Look to the Comfort that the Passenger Senses

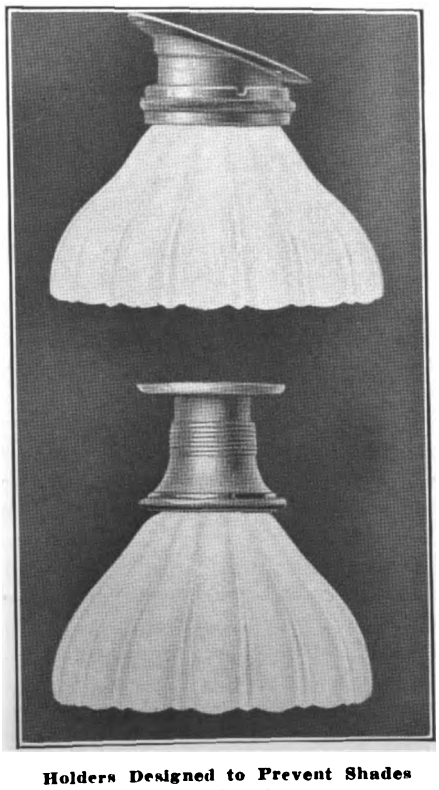
The trend of lighting practice and experience as to what makes for good and bad lighting. The advantages and disadvantages of various lighting systems. Heating development discussion gives details of some altogether new designs of both hot air and electric heating equipment and tells why future equipment will place the heaters in the floor. The treatment of the problem of ventilation shows how the psychological requirements may be met in arch roof cars. Recent improvements in heater control to conserve energy consumption are also noted

THERE are few factors connected with the subject of car design that have a more direct effect on the comfort of passengers than the performance of the lighting, heating and ventilating equipment. There are also few elements in the design which are called upon to give satisfaction under a wider range of conditions, or where the performance of the apparatus is more difficult to control. The provision of attractive and satisfactory illumination in a moving and vibrating car structure with low headroom is a subject which requires careful study and intelligent treatment. The combined requirements of keeping passengers comfortable in cold weather over long rides on interurban cars or on city cars where doors are being opened frequently, and at the same time providing satisfactory ventilation for the cosmopolitan multitudes who are handled by city transportation systems, constitute a situation which taxes the ingenuity of the car designer.

Both operators and manufacturers have been and are very much alive to the situation and to the possibilities which it presents from the standpoint of improving the service and providing for greater passenger comfort.

Development in Lighting Equipment

The greatest single step in obtaining better car illumination which has been made since the invention of the incandescent lamp has been the development of the tungsten filament to a point where it is suitable for operation under the condition of extreme vibration encountered on a moving car. Developments of units in larger sizes, and the design of reflectors and suitable holders for street car service conditions, have made possible the more scientific applications of the already highly efficient tungsten lamp. Recently completed tests have demonstrated that still further progress may be expected in the immediate future. The application of large capacity units of nitrogen-filled tungsten lamps to railway car requirements, which has in the past presented several outstanding difficulties, may in the near future be expected.



Holders Designed to Prevent Shades Dropping Out

The work of developing proper installations for car lighting has been carried on by many railway properties. In Cleveland this subject received very careful attention and study, which resulted in the adoption of the center lighting arrangement with large units and opal-type glass reflectors.

In Chicago and many other cities investigation of the effect of headlining colors on the general illumination produced with a given lamp installation resulted in the change some years ago of the headlining color from a comparatively dark shade of green to a light shade of buff. It was found that an approximate increase in illumination at the reading plane of 40 per cent resulted from this change in color. Likewise on many other properties study of the subject has resulted in the adoption of modern illuminating installations.

One of the important activities which have led to improvements in car illumination has been the development by several manufacturers of types of glass shades and holders which are suitable to car operating conditions and which can be relied upon from the standpoint of passenger safety and maintenance cost.

In the search for proper illuminating installations on street cars it was realized early that illumination design involved an appreciation of certain fundamental principles.

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One of the most important of these is that intensity is not the sole measure of proper lighting. Modern installations are designed to eliminate the uncomfortable effect of a direct or reflected glare in the eyes of the passenger. At the same time the designer has had in mind the merchandising and sales value of brightly illuminated cars. That there is an attractiveness and advertising value in bright illumination has been well recognized by most operators and there has therefore not been a tendency to cut down the amount of illumination provided to the minimum generally considered as fair illuminating intensity from the standpoint of vision. The economies made possible by the development of more efficient lighting equipment have in general been put into obtaining the merchandising advantages of cars that are better and more brightly illuminated.

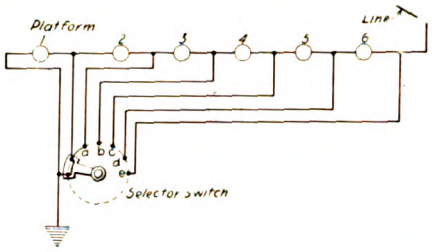
In the selection of a given type of illuminating installation a number of considerations are encountered and it may therefore be of interest to summarize here briefly some of the principles and factors which have been considered and developed by those properties which have been in a position to study the problem.

Elements to Be Considered in Lighting Design

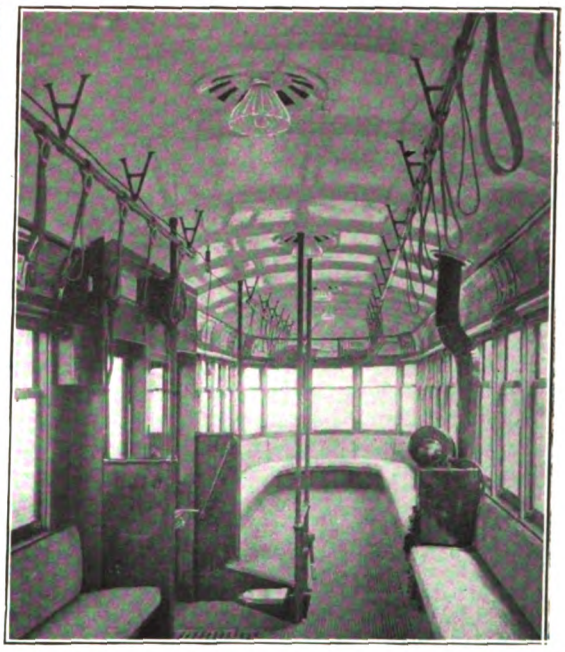
The elements to be considered in the design of a car lighting installation may be listed as follows:

Intensity of illumination at the reading plane; direct glare, reflected glare, shadows; favorable appearance of the car interior; maintenance.

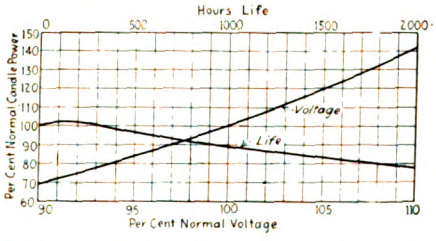
The degree of illumination provided by any installation must at least be such that newspapers or other printed matter may be read without undue eye strain under the difficult conditions encountered on a moving car. A value of between 4 and 5 foot-candles has been generally taken to represent good practice.



Wiring Diagram for Single-Circuit Lighting with Extra Lamp and Selector Switch



Left—Example of Side Lighting with Small Lamps and Deep Shades in Cars of San Francisco-Oakland Terminal Railway. Note Close Spacing of Lamps. Right—Combined Lighting and Ventilating Fixture Used in Cincinnati.



Candle-Power Regulation and Performance Curves for Mazda "B" Street Railway Lamps

The most frequent cause of bad lighting in cars is the presence of direct glare. Because of the limited height available, as compared with the ordinary room, the brilliantly lighted lamps in a car are within the direct line of vision of the great majority of passengers. The general effect of glare may also be obtained even where glass reflectors or shades are installed, as the result of too great a contrast between the bright light source and a comparatively dark background or headlining.

Uncomfortable results may be obtained from reflected glare when improper types of reflectors are used over the lamps. The eyes are especially sensitive to light rays from below. Reflectors which do not properly diffuse the beams of light allow them to strike the reading surface in such a manner that they are reflected back into the eyes of the passenger. A brilliantly polished or shiny headlining will also sometimes give the bad effect of reflected glare.

The lighting installation must provide for the elimination of shadows. This applies not only to shadows cast by the body of a seated passenger, but also to the elimination of shadows from passengers standing in the aisle. Too great a spacing of large light units installed along the center line of the car is the most frequent cause of this defect.

The importance of obtaining a pleasing appearance of the car interior requires the avoidance of any form of opaque reflector. In addition, the combination with a proper lighting installation of suitable colors for both the car walls and headlining is necessary in order to obtain the best results.

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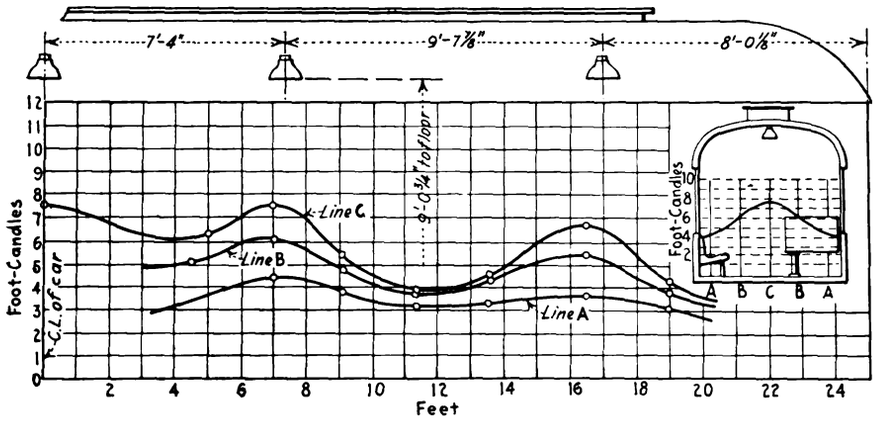


Light Distribution Curves for 94-Watt Mazda Lamps in Cleveland Car Show Variations in Illumination

The vibration encountered on a moving car makes the item of maintenance cost of illuminating equipment one to be carefully considered. It is this factor which has been the primary deterrent from obtaining general adoption of modern lighting installations. Not only is the question of breakage and renewal of lamps and reflectors involved, but also the element of cleaning cost becomes of importance in connection with the use of any form of glass shade. The increased liability of personal injury from the use of defective shades or holders is also an important item to be considered. It is suggested that the art of car lighting has now developed to the point where further experimenting might well be done with indirect lighting equipment with the lamps and reflectors concealed along the two sides of the headlining. The fact that the light pockets collect dust should not deter us from getting the fine effect possible, when this drawback is so easily corrected.

The various types of lighting installations in use may be roughly divided into two general classes, namely, center lighting or side lighting. In some cases a combination of these two methods has been used as designers have sought to obtain better light distribution and the elimination of shadows.

Center lighting has the advantage of simplicity in wiring and reduced installation cost. By the use of proper reflector equipment and the avoidance of too large a spacing between lamps, it has given very satisfactory results from the standpoint of lighting intensity and distribution. This system lends itself readily to the use of large lamp units with reflectors. By the use of such large units the number of outlets is reduced, adding further to the saving from simplified wiring.

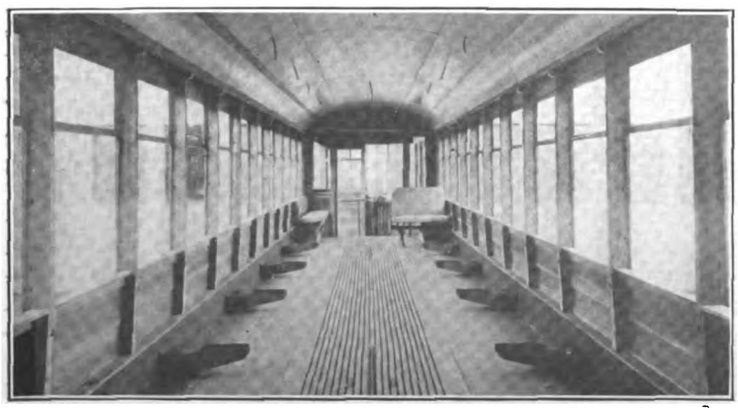
There are other advantages in favor of this plan. One of the most costly items connected with car lighting maintenance is the factor of stolen lamps, and although various forms of lock sockets have been designed and applied with varying degrees of success, the use of larger lamp units largely eliminates this difficulty. This is due to the fact that the large units are not so readily applicable to other uses. The number of lamps to be handled and the consequent loss from breakage also should be less with large lamps. This is further influenced by the heavier and more rugged filament in the larger lamp.

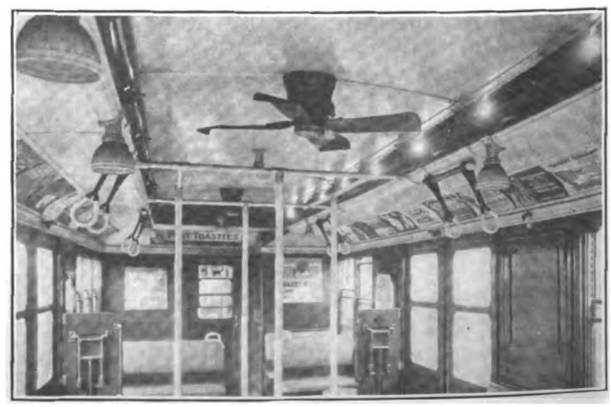
From the standpoint of the desirability of shades or reflectors for obtaining pleasing effects, the large units have an additional advantage. Since the cost of shades and holders is a material item an installation which reduces the number required is a desirable arrangement. This advantage also applies relative to the maintenance and cleaning of shades.

There are, however, certain disadvantages connected with the use of large lighting units spaced down the center of the car. In order to provide auxiliary lighting for signs, headlights, doors and vestibules where large unit lamps are not necessary, one or more circuits of small lamps must be used. This immediately introduces two different sizes of lamps to be carried in stock. The larger lamps are also considerably higher in cost per unit, and carelessness in handling at carhouses soon causes their use to be very expensive.

Still another disadvantage in the use of large units is that the failure of one lamp, by putting out the circuit, leaves all or a large part of the car body in darkness. This possibility is usually provided for by the installation of an auxiliary lamp which normally is not used, but which can be thrown into the circuit by means of a selector switch to replace the burned out lamp. The selector switch is arranged so that the auxiliary lamp is quickly shunted around the defective one by turning the handle of the switch from contact to contact until the defective unit is located.

The necessity for such a switch adds considerable wiring and nullifies to a certain extent at least the simplification in wiring obtained by spacing the lights down the





Left—Arrangement of Air Intake Ducts Around Heaters as Used in Chicago. Right—Ceiling Fan in New York Subway Cars Help to Solve Difficult Ventilating Problem

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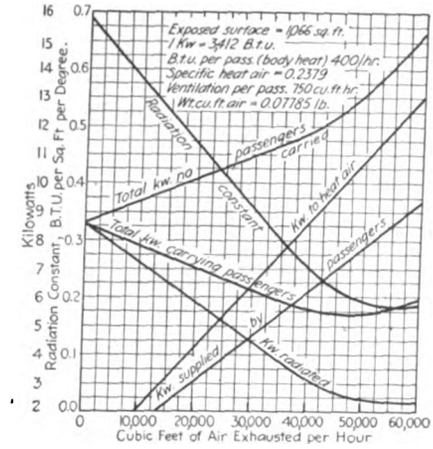
center of the car. The auxiliary lamp also represents a large extra unit to be carried in the car, and requires that defective lamps be promptly replaced through frequent inspection or careful reporting by train crews to avoid the entire car being left in darkness when a second lamp fails. The failure of two lamps in any trip will leave the car in darkness even when care is exercised in replacing promptly all defective lamps. When a number of circuits of smaller units are used this difficulty is avoided by arranging the circuits so that failure of one lamp still leaves fair illumination.

Each system therefore has its advantages and disadvantages, but the requirement of affording comfort to passengers by the provision of proper shades or reflectors tends to favor the larger-unit, center-lighting arrangement. The tendency seems to be toward the adoption of this form of installation on a large proportion of the recently constructed cars where reflectors are installed.

Heating and Ventilating

Recent progress in the design of heating and ventilating installations and in the development of apparatus by manufacturers has been largely due to a gradual awakening of the industry to an appreciation of the fundamental principles involved in meeting the perplexing combination of conditions and the apparently opposing requirements presented by the general problem. By careful study and experiment the factors which have the greatest direct bearing upon passenger comfort have been determined, and apparatus has been developed for controlling these factors and for properly co-ordinating the operation of the heating and ventilating installations.

It has been found that although the temperature within the car is a general measure of the total amount of heat supplied and the CO_2 content of the air is a measure of the total quantity of air supplied, the temperature within the car body is not an accurate measure of the comfort provided for the passenger by the heating system, nor is the CO_2 content an accurate measure of the actual effect produced by the ventilating system. Experience has demonstrated that the provision of much less heat in the proper manner and the interchange of much smaller volumes of air, but with equipment arranged with more attention to the



Curves for Heating Calculations, Based on Supplying 750 Cu.Ft. of Air per Hour to Each Passenger in a Car

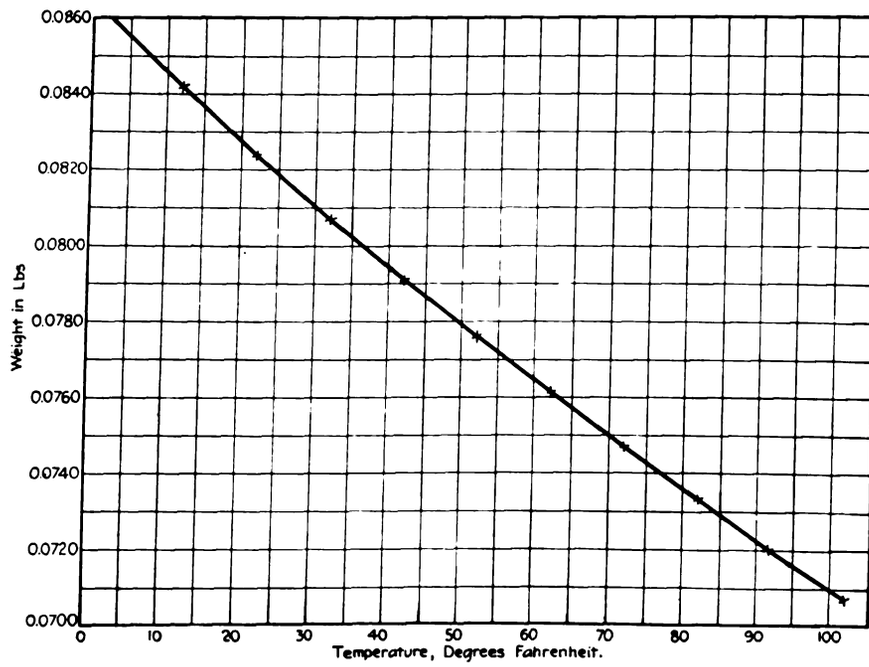
effects produced, will give eminently more satisfactory results.

Progress in Ventilation

The primary disadvantage in the arch roof type of car construction which has probably had the greatest effect in retarding its rapid universal adoption has been the psychological effect of the arch roof on the passenger's judgment of the effectiveness of the ventilation. The arch roof with a comparatively low ceiling height produces an impression of "stuffiness" regardless of what the actual air conditions may be. A comparatively high car temperature tends to increase this effect, while a lowering of the temperature tends to decrease it.

Study and experiment have demonstrated that it is the introduction of small quantities of fresh air, or rather cool air, in such a way that it strikes the faces of passengers, that gives the impression of good ventilation in monitor deck cars. It has further been demonstrated that it is the lack of this cold air which generally produces the unfavorable impression of the ventilation in arch roof cars, even when the actual air condition measured in terms of CO_2 content may be much better than in a monitor deck car where the ventilation would be judged good.

Several ingenious and effective devices and construction methods have been introduced during recent years to overcome this unfavorable result of arch roof construction. A compensating type intake, similar in appearance to the other ventilators which are used for exhausting air through the roof, is so arranged that by means of a movable vane provided in the ventilator an automatic adjustment for car speed is made so that an approximately fixed volume of outdoor air is allowed to enter the car near the front end regardless of the speed. This cold air is then deflected as it enters, so that it spreads back and diffuses under the headlining and gradually reaches the breathing zone and the faces of passengers. In this way the stimulating effect of cool air directly in contact with the face produces the effect of good ventilation, and the compensating feature of this device prevents obtaining unpleasant chilling draughts at high car speed.



Curve for Determining Weight of Dry Air at Various Temperatures

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Several arrangements have been devised for providing small movable sash in the arch roof car which give the same results as are obtained in the monitor deck construction. One of the more common forms of construction is to arrange the top side sash so that it is hinged at the bottom and can be tilted in at the top through a small angle, to form a ventilating opening. Side guards are provided at either end of this tilting sash to deflect the incoming air upward and prevent objectionable direct draughts.

Another method which is represented by the type of construction adopted on the light-weight sample train built in Minneapolis, is to carry the top sash practically to the roof line, eliminating the customary letterboard. The top sash glass is arranged so that it will slide horizontally for a short distance to provide a ventilating opening.

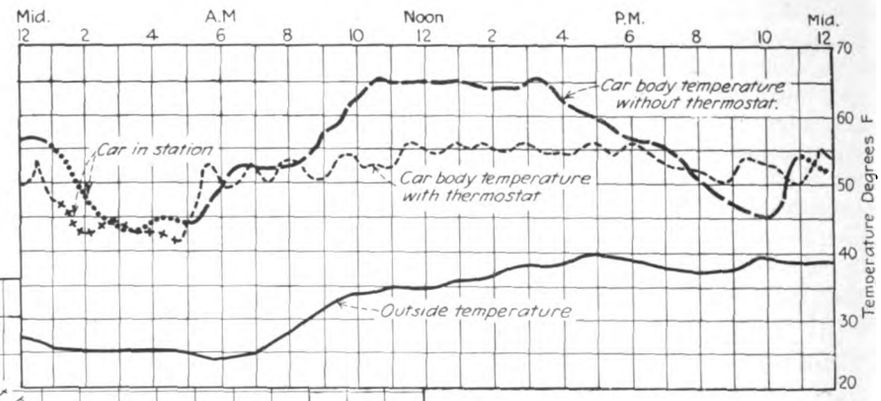
All of these devices accomplish the general result of allowing small quantities of cool air to enter the car directly. They produce generally the same effect that is obtained from the deck sash construction on monitor deck cars. It is probable that a still further extension of the lighter weight arch roof construction will result from a further development and perfection of these recent ventilating improvements.

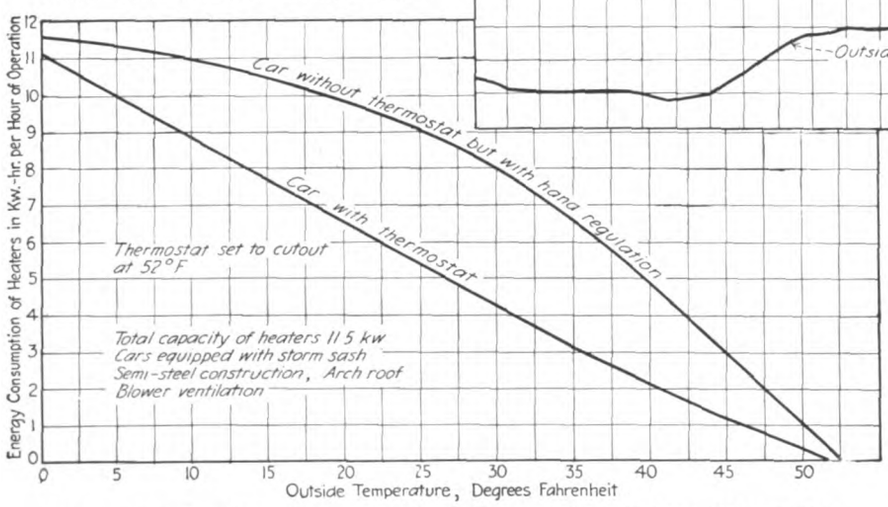
The difficulty with the original ventilating systems which were installed was that such systems were designed for the purpose of producing relatively large interchanges of air, and of combining the ventilating system with the heating system so that the "fresh" air would be heated before coming in contact with the passenger's body. The most extensively used systems operating on this principle are the "vacuum" type and the "blower" type.

In the vacuum system an air duct is arranged between the car headlining and the roof, opening through registers to the interior of the car body. A blower fan mounted under one hood and inclosed in an appropriate housing is designed to draw air from the end of the duct and exhaust it through louvers provided in the vestibule hood. Outside air was at first drawn into the body through holes located in the car floor. This arrangement was quickly demonstrated to be very unsatisfactory due to the large amount of dust which was drawn into the car. As a result of this experience, and still with the idea in mind that the large quantities of incoming air should be preheated, some cars were constructed with intake louvers in the side girder, which opened into carefully constructed sheet metal housings entirely inclosing the electric heaters. Careful tests have demonstrated that with any such fan system or with the "aspirator" type of exhaust ventilators, there is usually ample provision for air intake around doors and sash, even with storm sash in place. Under the conditions encountered on high speed interurban cars, the provision of special intakes may in some cases be necessary to obtain proper distribution.

The usual blower arrangement is a combined system for heating and ventilating, in which the blower is not only utilized for producing a circulation of air, but is also used to distribute the heat from a coal fired or electric heating unit located at some one point in the car. In such an installation the ventilation is provided incidental to the matter of getting proper heat distribution throughout the car.

An outstanding difficulty in providing satisfactory ventilation in a car is that the condition of the air is largely judged by the passengers through the sense of smell. The odors resulting from a large number of people in a comparatively limited inclosure tend to produce, through the unpleasant effect on the sense of smell, a mental predisposition to judge the air "stuffy." This is particularly true when the air is not maintained in a sufficient state of motion so that this fact is definitely felt by the passengers. This is one of the most difficult factors to handle in connection with car ventilation. The presence for a comparatively short period of a few passengers who have partaken of garlic, for example, or who represent members





Below—Test Results Showing Effect of Thermostat on Energy Consumption. Above—Graphic Test Record Showing Effect of Thermostat in Regulating Car Temperatures

Modern Type of Car Thermostat with Flexible Mounting and Spring Contact to Cut Off Heat if the Thermometer Is Broken

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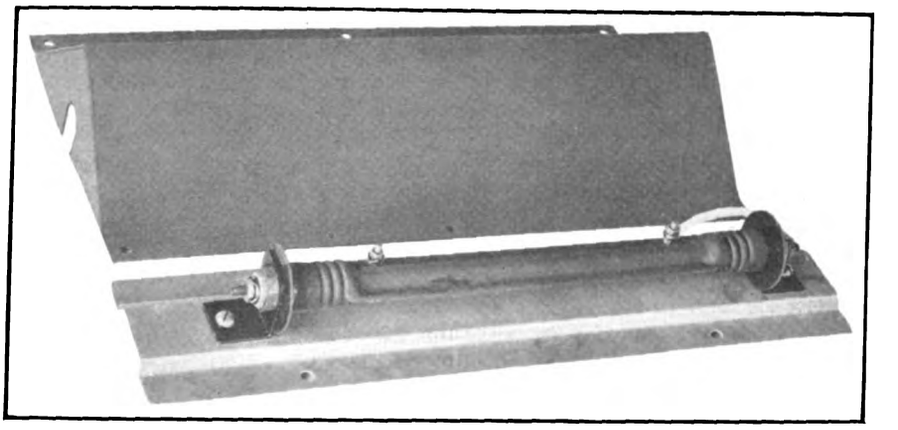
of that portion of our population who are said to receive a bath twice during their lives, namely, at birth and at death, will quickly put the car atmosphere in a very uncomfortable condition for succeeding passengers, regardless of how low its CO_2 or bacteria content may be.

In addition to the methods which are used for the purpose of obtaining air dilution and interchange, it would seem, on consideration of this phase of the matter, that railway operators might also find certain applications for some of the various devices that have been developed to overcome unpleasant odors in buildings, under conditions where the congregation of large numbers of people in one inclosure makes it otherwise impossible to prevent a "stuffy" sensation by the mere supply of large quantities of outside air. The use of some form of deodorizer or perfumer seems to be at least worthy of experiment in connection with this difficult problem in car ventilation.

The human body is at all times radiating heat and giving off moisture through the skin, and unless the combination of temperature and humidity of the air in any inclosed space is such as to allow the maintenance of a normal rate of evaporation and radiation, a feeling of discomfort will result. Where other methods in themselves will not produce the desired result, or where particularly difficult conditions make it impossible otherwise to provide effective ventilation, it is possible by simply agitating the air contained in a car with a fan greatly to improve the situation. In this case the agitated air, coming in contact with the skin, more rapidly absorbs bodily heat and moisture than when it is stationary.

A very good example of the installation of fans for ventilation is that in the New York subways. Although the combination of conditions encountered there is particularly difficult to handle, and while the ventilation results that are obtained may not be held up as an example of the ideal, there is no question but that the simple expedient of installing these fans has very greatly helped matters.

Under certain conditions encountered on heavily loaded city surface cars a modification of this arrangement, consisting of several small, comparatively low speed fans, set up into recesses in the headlining for use during extreme rush hour conditions, might give more satisfactory results at less cost of installation than some of the more elaborate blower systems which have been used in the past. With this form of installation the required air interchange could be provided with existing types of natural exhaust ventilators, and the auxilliary fans would be used only when the car was heavily loaded.



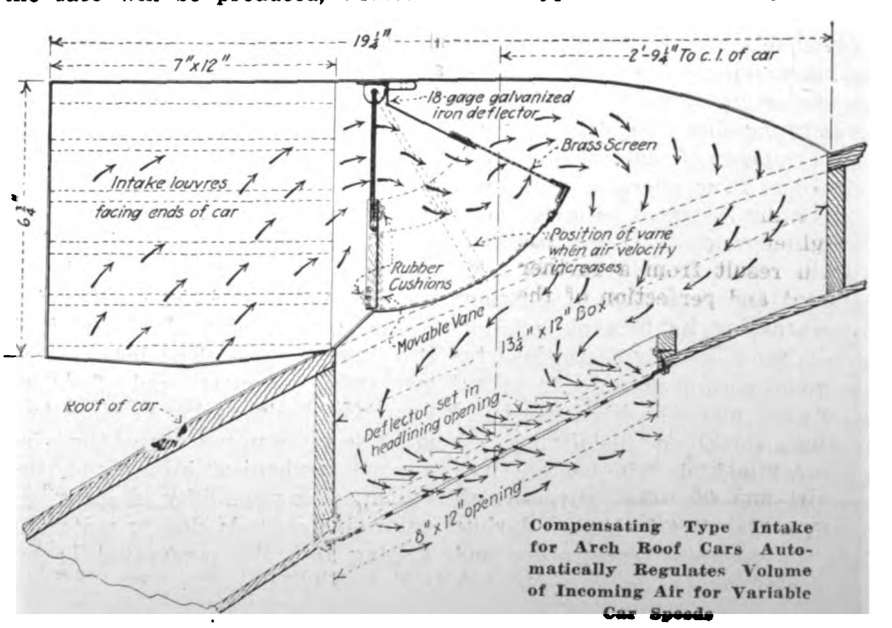
A New Type of Inclosed Heating Element Is Made of a Helical Wire Coil Inserted in an Insulating Tube and Then Tightly Compressed in a Metal Covering. It Has Been Provided with a Light Rugged Case Designed for Mounting on the Car Floor

It may be profitable to summarize here the primary function which must be performed by a proper ventilating system, from the standpoint of adequately providing for passenger comfort. The system must maintain the air within the car in a sufficient state of motion to insure proper radiation of bodily heat and moisture. Its efficacy may be increased by the introduction of small quantities of cool air in such a manner that the invigorating effect of such air in contact with the skin of the face will be produced, without the volume becoming so great as to produce "chilling" of the entire body. A sufficient rate of air interchange and dilution within the car must be provided to carry off the objectionable odors resulting from a large number of people in a comparatively small space that is entirely inclosed.

THE SELECTION AND INSTALLATION OF CAR-HEATING SYSTEMS

Just as the problems of ventilation may be said to be physical rather than chemical, so also may the problem of heating be said to be as much a matter of proper distribution and control as of the maintenance of high enough temperatures. Modern practices and apparatus show a gratifying recognition of the importance of control, but there is still a great deal of work to be done in connection with the matter of proper distribution.

The type of heater used by various



Compensating Type Intake for Arch Roof Cars Automatically Regulates Volume of Incoming Air for Variable Car Speeds

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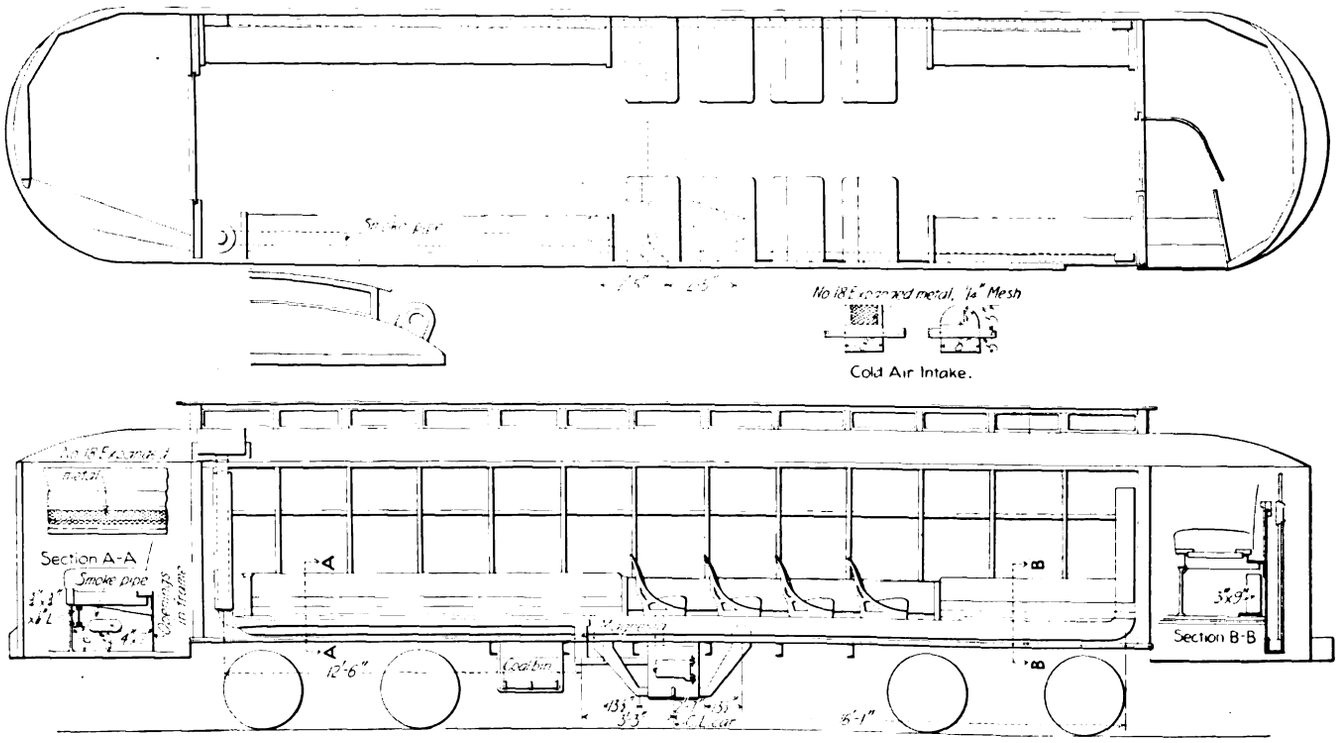
properties is determined largely by the conditions existing on the individual property, consideration of first cost as well as maintenance and operating costs, the type of service in which the car is used, and the climatic conditions existing in the district in which the property is located. The relative advantages of coal and electric heat are largely determined by these conditions. A northern location in which long and severe winters are experienced tends to favor the coal heater on the basis of economy. Likewise, limited power supply feeder capacity, or a high cost for electrical energy, tends to favor this type of heater. Electric heaters have the great advantage of cleanliness and freedom from fire risk, together with flexibility of control and ease of regulation as well as freedom from odors or coal gas. In some few instances both coal and electric heaters have been installed with the object of utilizing the coal heater during the periods of extreme temperature so as to avoid adding the maximum electric heater load to that required for power. In other cases, particularly on high speed interurban lines, an installation of both coal and electric heaters has been made for the purpose of utilizing the electric heater during days of moderate temperature and adding the coal heater when the temperature becomes so severe that an excessive capacity would be required in the electric heaters to maintain the car in a comfortable condition.

There have been a number of important developments in the design and manufacture of heating equipment. The increasing availability of high grade resistance wires which allow the construction of inclosed heating elements for operation at comparatively high wire temperatures have resulted in the development of several types of inclosed heater elements. One of the difficulties experienced with this type of element has been to obtain an insulating material which would stand the high temperatures developed on the interior of the unit without deterioration and without the formation of conductive gases which produce destructive short circuits. The advantages of an inclosed type heating element are obvious. The inclosure of the wire within a rigid covering or case gives both better mechanical support and freedom from wire failures due to vibration, and also gives protection of the wire against mechanical injury and corrosion. The possibility of short circuits and grounds due to materials getting into the perforated heater case is also largely reduced with the armored or inclosed type of unit. A recently perfected type of inclosed heater is designed with a helical coil inserted in a porcelain tube and then covered with a metal case which is tightly pressed over the completed assembly.

A New Development in Hot Air Heating

An interesting development in coal heaters has been made in Minneapolis. Here the heater is carried under the floor of the car. With a draft from below the smoke pipe is carried across under the floor and thence back and up, running horizontally under the longitudinal seat at one rear corner of the car in an appropriately protected duct to a vertical pipe leading overhead to a smoke hood on the roof. The heat radiated from the horizontal smoke pipe under the seats is allowed to enter the car through an expanded wire grill set into the front of the seat box. A sheet metal housing surrounds the stove and intakes lead up through the floor and terminate under two cross seats on the same side of the car on which the heater is located. A horizontal duct leads from the housing surrounding the stove up through the floor and along the truss plank to the forward cor-



Coal Heater Developed in Minneapolis Installed Under the Car Floor

Warm air ducts along the truss planks distribute the heated air through the body. Vertical stacks in the front corners of the car body help the circulation and distribution. The smoke travels in a flue, inclosed in an air duct, across under the car and back to a longitudinal smoke pipe located under the side seat and then up through the roof at the rear.

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ner of the car, where it rises vertically in the corner to a point just below the headlining. A second duct surrounding the smoke pipe leads from the stove housing across under the floor of the car to a second horizontal duct running the entire length of the car body on the opposite side from the stove. The rear end of this second horizontal duct terminates on the floor near the rear corner of the body and the front end turns up into a vertical stack in the same way as the duct on the opposite side of the car. The chimney action of the two vertical stacks in the front corners and the circulation produced by the heat from the stove causes air which enters at the floor intake under the two cross seats to move forward and up through the vertical stacks from which it then spreads into the car body.

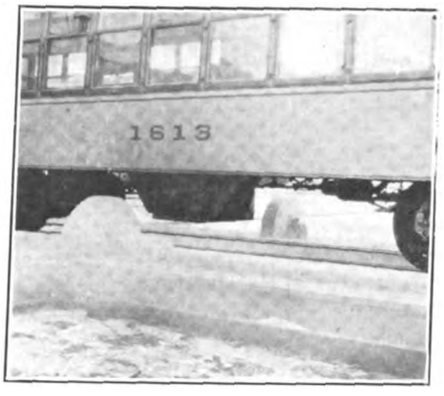
A portion of the air which crosses under the car in the duct previously described also finds its way backward into the rear end of the car. Openings are cut through the car lining under longitudinal seats to the sash pockets which have openings below to the outside, so as to produce both a fresh air supply and a circulation over the hot air ducts to help distribute the heat in the car. Accompanying illustrations show the appearance of the heater under the car and the arrangement of apparatus in and under the body.

This same general arrangement of housing and ducts has also been utilized in an experimental installation in Minneapolis for the purpose of conducting the energy lost in the control rheostat to the car body interior for heating purposes. It would seem that the Minneapolis type of coal heater construction would have material advantages for use in installations on interurbans where it is desired to have an auxiliary coal heater available in connection with the electric heaters as previously mentioned.

Reducing Peak Load by Cutting Off Heaters

In connection with the subject of reducing peak power demand where electric heaters are used, an interesting experiment was conducted some years ago in New York and was described in the ELECTRIC RAILWAY JOURNAL of Aug. 17, 1918, on page 292. In this test the thermostat and car controller were interlocked so that the heat would be off when the power was on. Further investigation of the possibilities of such an arrangement might be warranted. A refinement of this idea is suggested on page 438 of the Sept. 22, 1923, issue of the JOURNAL wherein it is proposed to use a relay to cut off the heaters during the accelerating periods.

Since the advent of the self-ventilated motor, there is also available a type of blower and potential heat source to which some attention may profitably be given. It is a well known fact that the effect of dust in poorly ventilated motors is the cause of some limitations in performance. Although the problem of maintaining a flexible duct connection to the car body is not at all a simple one, the possibilities of drawing dust-free air from the car body for motor ventilation and discharging it through ducts built into the car floor or along the truss plank are at least worthy of mention in this age of progressive thought regarding car construction and operation.



Location of the Coal Box and Heater Under the Floor on Minneapolis Cars.

Possibilities for Development in Electric Heating

After the type of heater to be used has been determined upon, the results which will be obtained may be largely affected by the way in which the heaters are installed. The general use of electric heaters makes possible certain advantages in the location of the heating unit which have not been generally recognized by either car designers or heater manufacturers. The practice has been to mount such heaters either along the truss planks of the car, under longitudinal seats, in longitudinal seat risers or upon the bulkhead or the vestibule dash. In any of these mounting positions no provision is made for warming the floor of the car.

From the standpoint of passenger comfort, here is the opportunity for a desirable development. The availability of inclosed type units and the further opportunity for the construction of entirely inclosed housings for heaters which is possible by virtue of the high grade resistance wire coming into use make it practicable to develop a form of inclosed heater case which can be mounted directly on the car floor under cross seats and in recesses in the floor in front of longitudinal seats so that passengers can put their feet directly on the heaters. It is common experience that a passenger clothed in outdoor wearing apparel will be more comfortable if he feels warmth at his feet, even with a reduced car body temperature.

Electric floor heaters might be inclosed in cast aluminum housings which could be designed with ample strength to stand the service to which they would be subjected and which could be equipped with radiating fins for the purpose of giving them increased wattage capacity. The possibility of greatly improving the effectiveness of the heater equipment by schemes such as this makes the development of such forms of heaters a much needed and desired undertaking.

The usual form of forced-draft stove used for car heating purposes more nearly provides for proper floor temperatures than do the usual installations of electric heaters. Where the duct along the side of the car is arranged with outlet openings close to the floor surface, the floor itself is usually maintained in a fairly comfortable condition. Proper installation of such systems, however, must provide a hot air duct on either side of the car. Even with this arrangement no provision is made for the comfort of passengers standing in the aisle.

Factors in Determining Heater Capacity

In determining the heater capacity required in a car, the temperature rise used in the calculation is fixed by the difference between the interior car temperature desired and the minimum outdoor temperature at which it is desirable or practicable to maintain this car temperature. The heat losses from a car consist of

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two parts, namely, the heat radiated through the walls to the outside atmosphere and that required to heat the incoming air for ventilation from the outside temperature to that desired on the interior. In calculating heater capacity, consideration should be given to the amount of heat supplied by the passengers themselves. A normal adult passenger will supply at least 350 to 400 B.t.u. per hour, and this heat will be effective for maintaining the desired car temperature.

The heat lost through the walls of the car is a function of the difference in temperature between the interior and the exterior, and of the total square feet of radiating area exposed to the outside atmosphere. The so-called radiation constant is a factor which represents the effect of the type of construction and material in the car structure upon the heat loss through the walls. For any given car structure, the quantity of heat lost to outside atmosphere is a constant for each degree difference between the interior and exterior temperatures, providing that conditions within the car remain comparable. In other words, the total heat loss when the exterior temperature is 0 deg. F. and the interior temperature is 40 deg. F. will be the same as the loss when the exterior temperature is 30 deg. F. and the interior temperature is 70 deg. F.

Determination of Heat Losses by Radiation

The radiation constant is usually expressed as the number of B.t.u. loss per square foot of exposed area per degree difference in temperature between the interior and the exterior. Experiments have demonstrated that the interchange of large volumes of air through the comparatively small inclosed space represented by the interior of a car results in a movement of the interior air relative to the surrounding surfaces and causes a considerable variation in the heat loss for any given difference in temperature, as the volume of air drawn through the car is increased or decreased. The accompanying curves represent this variation in the radiation constant for a conventional type arch roof car with ¼-in. thick headlining and steel side girders lined below the belt rail with wood panels for interior side lining. An accompanying set of curves also illustrates the complete heat balance calculations for this car, and includes all of the factors which enter into the problem of heater capacity calculations.

Operators who have studied the subject are rapidly coming to the opinion that some form of regulation of the car heater must be provided to prevent excessive car temperatures in mild weather. Too much heat is as uncomfortable as, or more uncomfortable than, insufficient heat. The importance of proper regulation cannot be overstressed from the standpoint of passenger comfort. In addition the economies to be derived from the installation of regulating devices in connection with electric heaters have been demonstrated repeatedly by carefully conducted tests to be well justified as an investment on the basis of savings in energy effected.

Developments in Electric Heater Controls

There have been available for a number of years various forms of reliable automatic heat regulating devices or thermostats. Developments in such apparatus have been steadily going forward and have been in the nature of simplification and consequent reduction in cost and maintenance. Such devices usually consist of two primary parts, namely, a thermostatic or regulating element and a form of contactor for cutting the heaters on and off when the car temperature rises above or falls below a point that has been previously determined.

Modern car thermostat elements have been made exceedingly sensitive in their operation. In a type illustrated herewith several interesting features are incorporated. In addition to a carefully designed flexible mounting to absorb vibration and prevent separation of the mercury column, a spring contactor is incorporated so that the heat on the car will be cut off if the glass stem is broken by malicious tampering. This is to prevent a difficulty which has been encountered in the past due to trainmen breaking the thermostat in order to allow the heat to remain in the car continuously. In the contactor portion of this thermostat equipment, which is now available, development has been along the lines of eliminating as many moving parts as possible to prevent failures and at the same time reduce the maintenance cost.

An accompanying set of curves illustrates the effect of thermostatic control on car temperatures as determined by very carefully conducted tests carried out in Chicago, where the surface cars have been entirely equipped with thermostatic control.

Preheating Desirable for Comfort of Early Passengers

Although the efficiency of an electric heater might be 100 per cent, it requires considerable time to raise the temperature in the car body 30 or 40 deg. Consequently if in cold weather the heaters are not turned on until the car goes into service, it will take a considerable time before the car interior is at a comfortable temperature. It is important therefore, in cold weather, to preheat the cars in the station in order that they may be at proper temperature for early passengers. It has been found upon investigation of complaints relative to cold cars that neglect of this requirement sometimes results in cars being cold for three or four hours after going into service. This is due to the fact that after the car is in service the opening and closing of doors or operation of the ventilating system dissipates a large part of the heat supply and consequently does not allow the car temperature to come up to normal.

The data shown in the accompanying curve represents the heating characteristic for a type of city car with monitor deck, standing in the open with all heaters on and doors closed. The time required to preheat cars so that they will be comfortable will vary materially with the capacity of the heaters and the type of cars, but for an average city car, a tabulation herewith shows in round numbers the minimum period of preheating required to insure that cars which stand in an unheated carhouse over night will be warm enough upon going into service to avoid complaint by passengers. This tabulation is based on a 10-kw. total heater capacity in the body of a city car and presupposes the switches arranged in steps so that the first step will give approximately 3.3 kw., the second 6.6 kw. and the last step 10 kw. of heating energy. If cars are stored in the open, the time of preheating indicated below may have to be increased approximately 20 per cent.

Temperature in Carhouse	Points Heat	Length of time of Preheating
45 deg.-40 deg. F	1	20 min.
40 deg.-35 deg. F	1	30 min.
35 deg.-30 deg. F	2	30 min.
30 deg.-25 deg. F	2	40 min.
25 deg.-20 deg. F	3	40 min.
20 deg.-15 deg. F	3	50 min.
Below 15 deg. F	3	65 min. or more

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Mechanical and Electrical Equipment Keeps Pace—I

Making a Pound of Material Do More Work

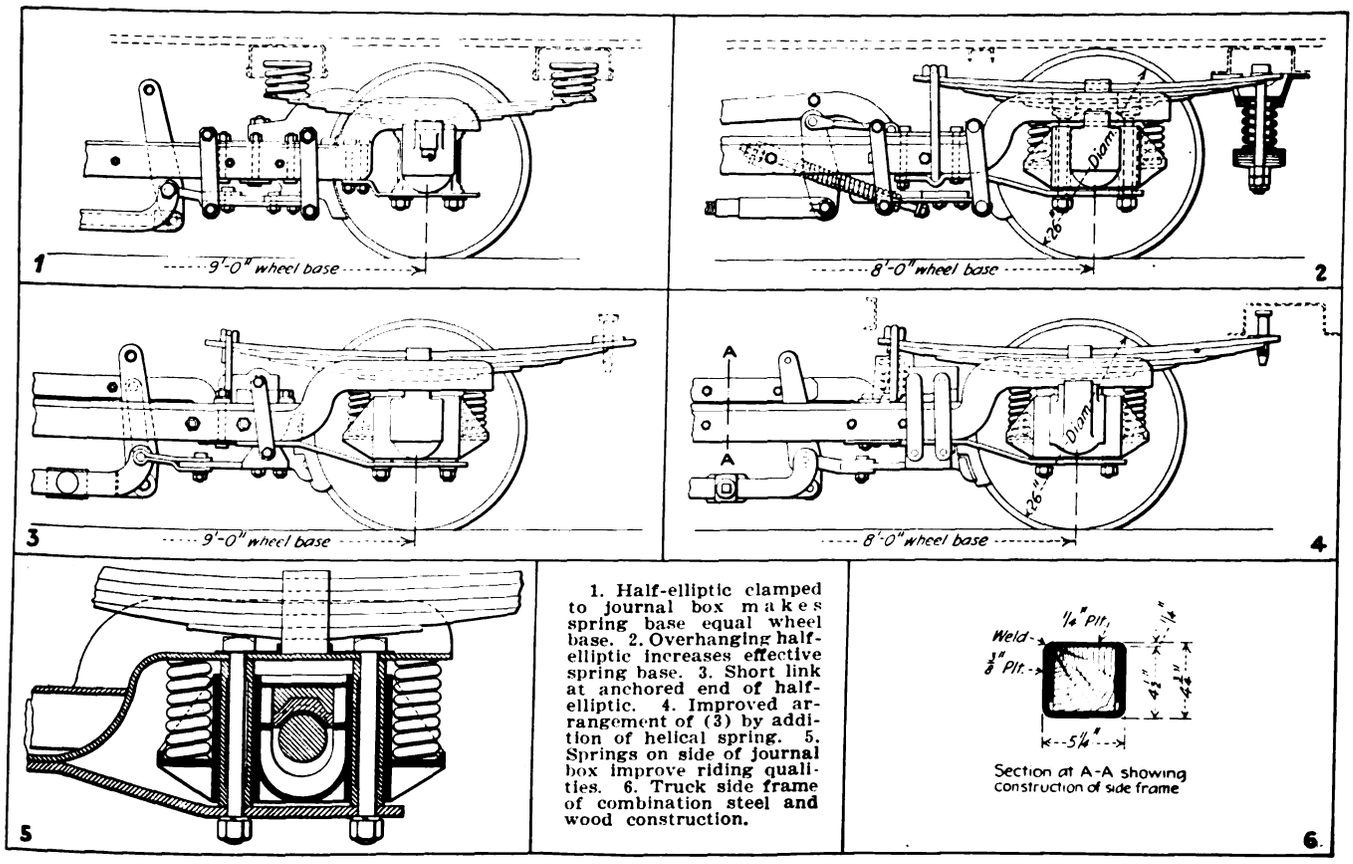
Motors show lighter weight per horsepower; trucks are improved as to weight, riding qualities and brake arrangement; wheels, gears and other parts have received attention in the development work that has been going on recently. This chapter tells the story of how all the equipment is being improved to meet present-day service requirements and points out the prospects for future development

As THE performance of the modern car depends very largely upon the mechanical and electrical equipment installed the developments made in this equipment properly form a very important part of any discussion of the general subject of car design. The mechanical and electrical equipment on a car also play a very important part in the success achieved by the complete design in furnishing rapid, convenient, comfortable and safe transportation.

The manufacturers of motors, control, trucks, wheels, brakes, gears, etc., have made such varied and persistent efforts to anticipate the operators' requirements and to bring out more efficient and more reliable apparatus that it will be possible here to discuss only the high spots in the story; and possibly to indicate some few of the desirable future developments for which progressive manufacturers and operators are both striving. A great amount of energy, thought and expense is being directed in an effort to make the electric rail vehicle still more capable of meeting the extremely severe combination of conditions with which it has to contend in its present-day use.

Progress in Motors Largely a Matter of Refinement

The railway motor of the past few years has been a most efficient and reliable machine. Recent developments, therefore, and also the developments that may be expected in the future, consist primarily of refinements in design. These have been and will be for the purpose of reducing weight and cost, either by the application of higher grade materials or by the careful reproportioning of parts as a result of detailed study of the stresses involved.



Single-Truck Side Frame with Various Spring Arrangements

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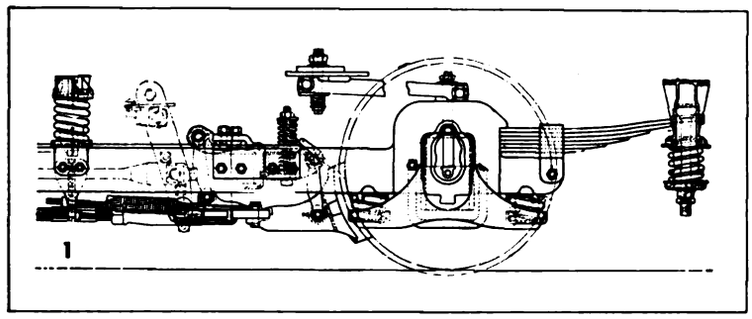
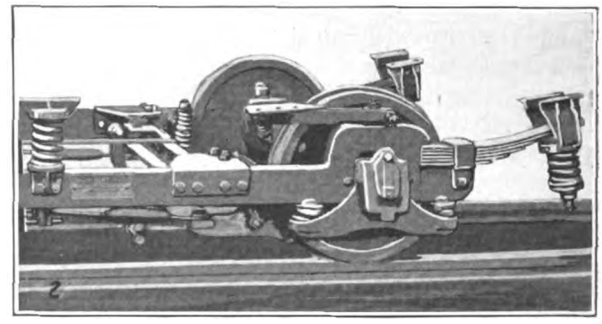
The wide use of the fully ventilated type motors having air intakes opening direct to the atmosphere has resulted in very careful attention being given to the question of waterproofing the armature. In the design of armature shafts and bearings, application of higher grade materials and more liberal dimensions are outstanding present tendencies. There also seems to be a tendency at the present time for manufacturers to give the modern light-weight fully-ventilated motor a more conservative application rating, in comparison with its actual one-hour rating, than has previously been the case.

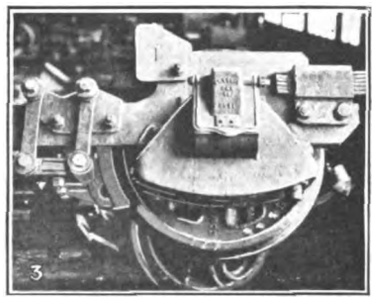
In attempting further reductions in motor weight, the possible applications of light-weight alloys are very limited, due to the inherent necessity for maintaining the magnetic circuit. This is true, at least, for the armature core and motor frame. The use of aluminum for electrical conductors is being tried by a number of properties, particularly in connection with field coils, and it is apparently proving satisfactory. The very large saving in unsprung weight which this makes possible has aroused the interest of many railway men.

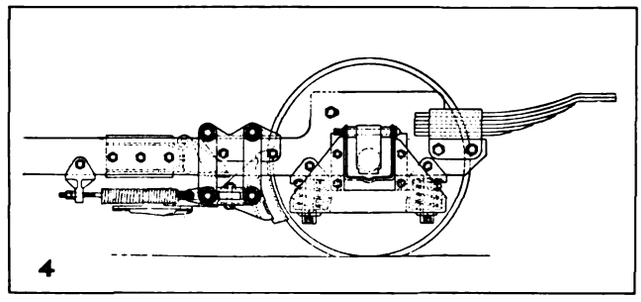
In the development of small-sized motors having a minimum possible weight, for use on safety cars, the subject of anti-friction armature bearings has been receiving continued study. The object sought in the installation of this type of bearing is not only the elimination of friction and reduction in the size of the bearing housing, but is also a means of maintaining a uniform minimum air gap, which reduces the reluctance of the magnetic circuit, with a consequent reduction in the volume of magnetic material required to obtain a given output. The usual form of construction at first employed utilized ball bearings at both the commutator and pinion ends of the armature. Although many motors with such bearings have been giving satisfactory service for a number of years, some difficulties have been experienced with hot bearings, due to the lack of adequate provision for difference in expansion between the armature and the housing frame. Experience has also demonstrated that extreme care must be exercised in the application of this type of bearing to provide against the flow of electric current through the bearing, which quickly destroys the surface of the balls and results in early failure.

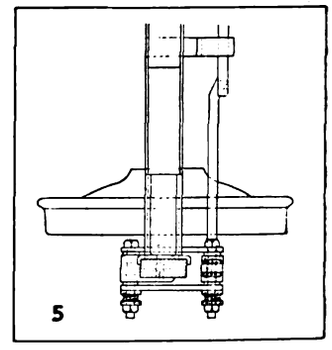
The advantages of using anti-friction bearings are so great that very serious study is still being given this subject. Present thought along these lines contemplates the use of ball bearings at one end of the armature to provide for end thrust, with a tapered type of roller bearing at the opposite end to allow clearance for expansion of the armature. Engineers who have been studying the problem are optimistic as to the results to be obtained by this procedure. The prospects seem to be very favorable for early culmination of development work along this line and a general improvement in electric motor performance resulting from utilization of better bearings.

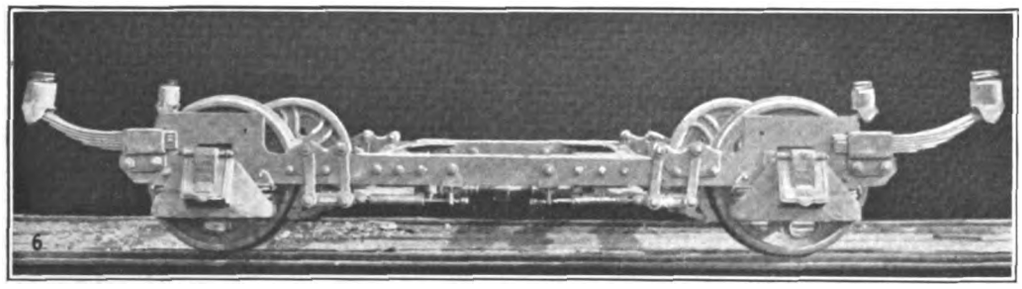


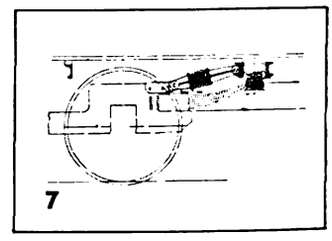












Construction of Single Trucks

1 and 2. Forged steel side frame with quarter-elliptic springs and auxiliary helicals.
3. Parallel link brake hanger.
4 and 6. Machined steel side-frame construction.
5. Cross-section of side frame in (4).
7. Detail of body connection.

REDUCTION IN MOTOR WEIGHTS

The remarkable development of the railway motor is best illustrated by the reduction in the weight per

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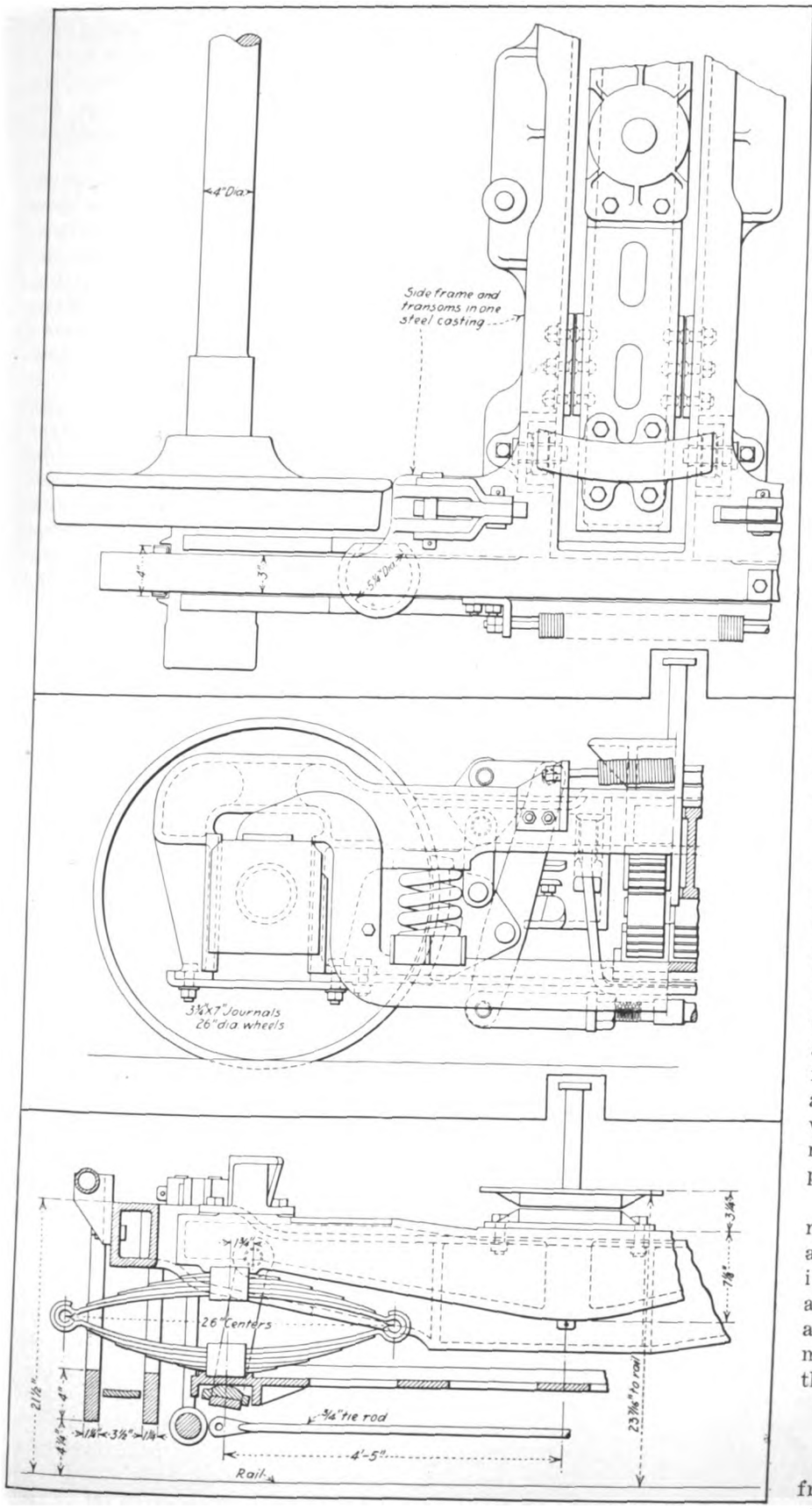
horsepower. Although the ratings of early type motors on a basis comparable with present ratings are very difficult to determine, it is of some interest to compare, at least in a rough way, the results obtained. The problem of comparison is rather complicated by the fact that since the introduction of commutating poles and other refinements which made possible operation at higher voltages, railway motors have come to be rated on a 600-volt basis, whereas the earlier types were rated at 500 volts. It is fair, however, to assume that although a comparison of horsepower output at the same voltage would give a true indication of the results obtained from the introduction of ventilation and higher grade materials, the refinements which made possible reliable operation at 600 volts should be credited with the increased output in calculating weights per horsepower for modern motors. In determining these figures for modern motors it must also be borne in mind that manufacturers have shown an increasing tendency to make commercial motor ratings considerably below the actual capacities shown on test. One reason for this is the fact that modern ventilated motors will not show an overload capacity comparable with earlier and heavier designs, and hence a larger margin between commercial ratings and actual capacities is necessary to avoid abuse in service and consequent excessive temperatures. Another factor, particularly in the smaller sizes operating at comparatively high armature speeds, has been the fact that the capacity is limited by the mechanical structure rather than temperatures.

On the above basis, therefore, the early forms of electric railway motors weighed approximately 120 to 130 lb. per horsepower judged by present methods of rating, whereas this has been reduced in the recently developed types of modern motors to a weight per horsepower as low as 32 lb. By still further refinement in design and possibly by the general application of anti-friction bearings we may expect an ultimate development along existing lines to 30 lb. per horsepower output.

The introduction of improved methods of driving the car, such as are discussed below, and more flexible motor suspensions, would probably allow higher armature speeds and reduced mechanical requirements. This would enable still further reductions in the future.



M.C.B. Type of Pivotal Truck with Transoms and Side Frame Cast Integrally of Steel. Full Elliptic Spring Arrangement Under Bolster Shown Below

Methods of Driving Cars

The method of transmitting power from motors to car wheels is a field so well standardized that any important development must be of a funda-

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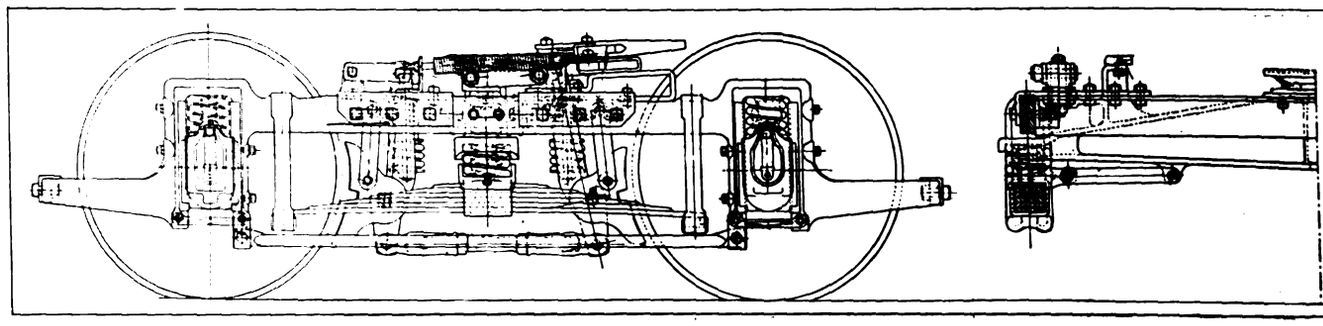


Forged Side Frame Truck with Longitudinally Mounted Half-Elliptic and Light Load Helical Mounted Above

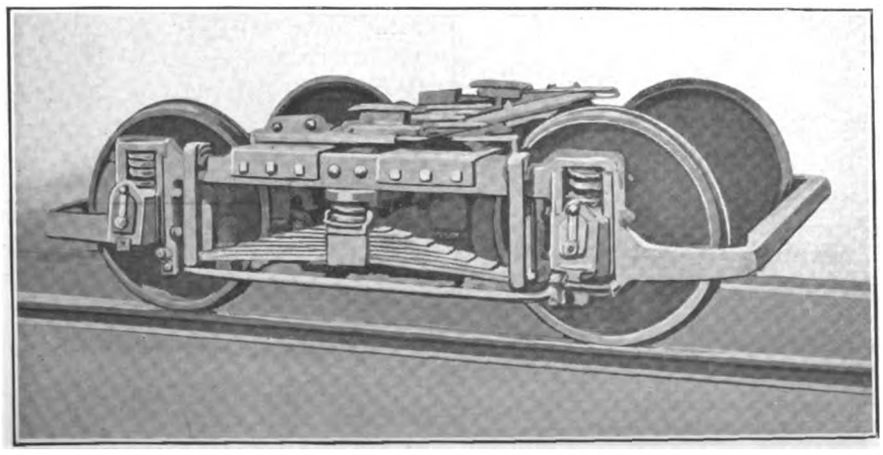
mental character and therefore embody radical departures from present practice. Some tendency in this direction is noted in later paragraphs. The developments in present driving mechanisms consist mainly in improvements as to materials and performance.

Developments in materials used for gearing as well as in their treatment, and developments in the design of teeth, have accomplished marked improvements. As a result, the mileage of the ordinary fifteen-tooth motor pinion has been increased from between 15,000 and 20,000 miles to an average of approximately 90,000 to 100,000 miles. The application of large capacity motors in the form of two-motor equipments was handicapped by the limited strength of the teeth in the common form of Brown & Sharpe 14½-deg. type of gearing. With this generally used tooth shape, and with the comparatively large diameters of armature shafts that were required, the strength of the pinion also became a limiting factor in obtaining maximum desirable gear reduction.

The recent development of the long and short addendum type of gear tooth, both in the form of spur and helical gears, has been a marked advance in the solution of this problem. In addition, certain types of compromise pinion teeth have been designed, which enable the advantages of the long addendum pinions to be obtained and still make them operable with Brown & Sharpe contour teeth on the gear. This compromise design utilizes one tooth less on the pinion and consequently gives a greater gear reduction.

Helical gears are being used in large quantities by a number of properties. They not only give the advantages of the long and short addendum tooth contour, but also give what amounts to a longer tooth face with the same width of pinion or gear. In addition some railways report that they decrease vibration and gear noise materially and hence tend to reduce maintenance costs. On the other hand, some railway men feel that the helix angle has been decreased so much by the necessity of overcoming end thrust that much of the effectiveness of this design has been lost.

Spring gears, which have been used in connection with large power units on steam-line electrification work for the purpose of introducing a slight cushion in starting, do not seem to be practical for single light car drive, due to the limited space available as well as the probable high first cost and maintenance expense.



Side View of Truck Shown at Top of Page. Swing Links for the Half-Elliptic Are Designed to Dampen Side Oscillations

There has been in the minds of progressive engineers, both in this country and abroad, for a number of years a conviction that a basic improvement in the method of driving from the motor to the car wheels could and should be effected. A number of designs have been developed for the purpose of supporting the motor directly on the car body instead of on the truck frame and axle as at present, so as to support this weight on the truck springs instead of having it largely unsprung, and several sample cars have been constructed, principally in Europe. One experimental car built in Paris, which illustrates this line of development is shown in an accompanying illustration.

In most of these designs there is a tendency to follow to a large extent automotive types of constructions, mounting the motor longitudinally on the car body and driving through a shaft and universal joint to either a bevel or worm drive differential, arranged on the axle assembly. A secondary result which is looked for in this construction, and which is by no means unimportant, is the accomplishment of quieter operation. This should of course result from a type of drive in which the gears could be inclosed in an oil-tight housing.

There are many problems to be overcome in connection with this general type of design. The use of any form of automotive rear axle construction involves a higher quality of maintenance workmanship than is at present available in the average railway shop. The construction almost necessitates the use of either ball or roller bearings, particularly between the gear housing and the axle, in order to make the housings oil tight and at the same time maintain the parts in accurate alignment. The use of a differential involves a split axle and raises the question of the proper maintenance of wheel gage for operation on track.

The possibilities that would come

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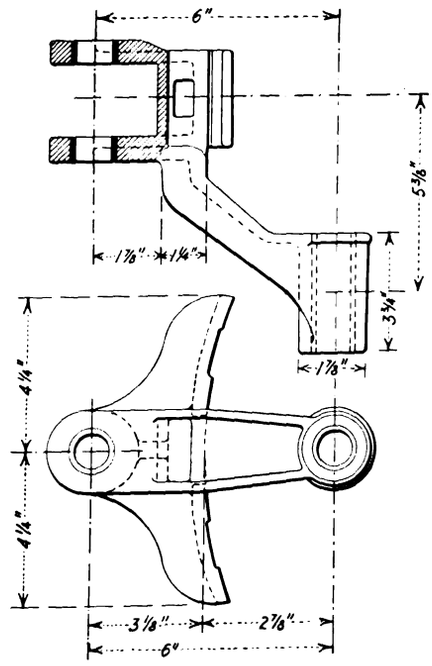
from the successful consummation of development in this direction are so fundamental and all-embracing from the standpoint of improving the entire performance of electric rail vehicles that both operators and manufacturers are justified in the expenditure of a great deal of time and effort on the subjects. Although bevel gear drives were at one time unsuccessfully tried in the early development of electric railways, the remarkable advances that have been made in the design and manufacture of such equipment for automotive vehicles make present consideration of this type of drive for electric rail vehicles an altogether different matter than when tried fifty years ago. This is particularly emphasized by the reported development in the automobile field looking toward the elimination of the differential and the substitution of solid axles. As the present type of electric railway drive is a solid axle construction, the application of worm or bevel gears without the use of a differential does not seem such a remote possibility.



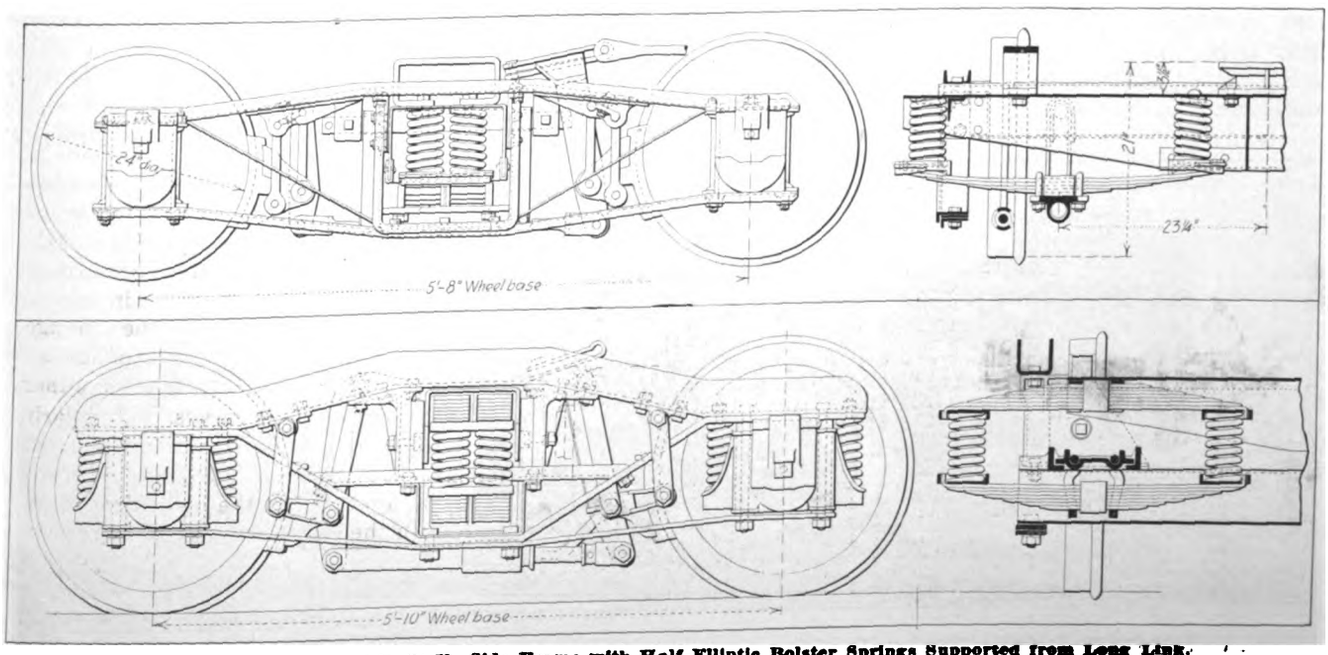
Brake Head with Offset Arm for Parallel Link Hanger—Designed to Maintain Uniform Shoe Wear

Wheel Design Progressing Too

A consideration of car wheels leads immediately to mention of the markedly increased popularity of small diameters. This has been due to the saving in weight accomplished and also to the desire for reduction in floor height for the purpose of facilitating passenger interchange. Although cast-iron and cast-steel wheels are used to a considerable extent, the high mileages obtained and the freedom from flat wheels with the rolled-steel wheel has resulted in wide adoption of this type. The steel wheel is particularly popular in congested city service, where frequent stops are required. Rolled-steel tires are in some cases applied to a cast center construction, but the problems encountered in maintaining the tires tight have increasingly limited the use of this type of wheel. There has been a constant effort by both operators and manufacturers to reduce to a minimum the weight of rolled-steel wheels, and the demand for still further reductions in weight has resulted in the recent development of improved rolling methods for fulfilling this requirement.

The importance of decreasing noise in operation and also of eliminating vibration as far as possible has resulted in some experimental work in connection with the introduction of a sound and vibration absorbing material between the tread and body of the wheel. Attempts to introduce rubber at this location by means of ingeniously arranged types of flanged treads, constructed so that the rubber would be solely in compression and relieved of all transverse and circumferential stresses, have not been particularly successful. This has been due primarily to the fact that the bearing area available, with the comparatively narrow tread width used on street car wheels, subjects the rubber to excessive compression stresses and results in its rapid disintegration. The possibility of utilizing some other material than rubber which will possess the necessary vibration absorbing qualities offers an interesting field for investigation.

Standardization in the design of both rail head and wheel contours has occupied the attention of committees of the American Electric Railway Association for a number of years. It is to be hoped that the work of these committees will culminate in the formulation of a com-



Above—Arch-Bar Type of Built-Up Side Frame with Half-Elliptic Bolster Springs Supported from Long Link.
Below—Modified Construction with Helicals at Sides of Journal Boxes and Two Half-Elliptics Under the Bolster

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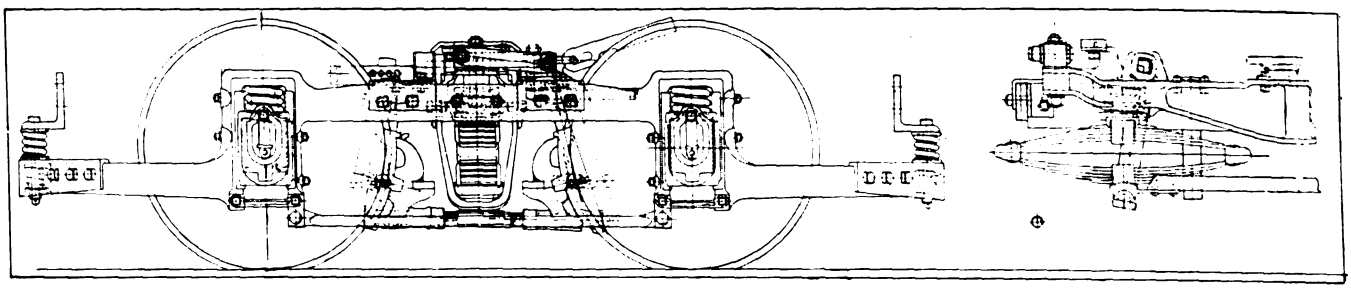


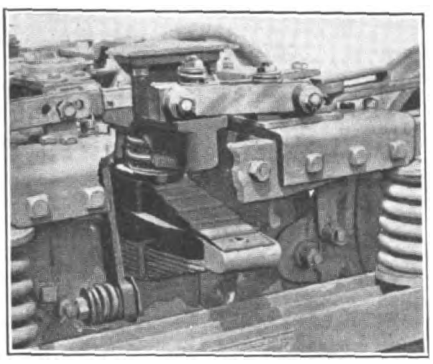
Forged Steel Side Frame Truck with Full-Elliptic Springs Under Bolster

paratively small number of standard designs, which should in turn result in decreased cost to manufacturer and railway.

How Truck Development Is Shaping

The construction of car trucks has maintained a steady and progressive development. Reductions in weight as well as in maintenance, together with improvement in riding quality, have been the outstanding objectives. The latter requirement has been particularly pressing, due to the rapid developments made in light-weight car construction. The sudden return to the single-truck design with the Birney type of safety car, and the light-weight construction demanded, produced a marked development in this form of truck.

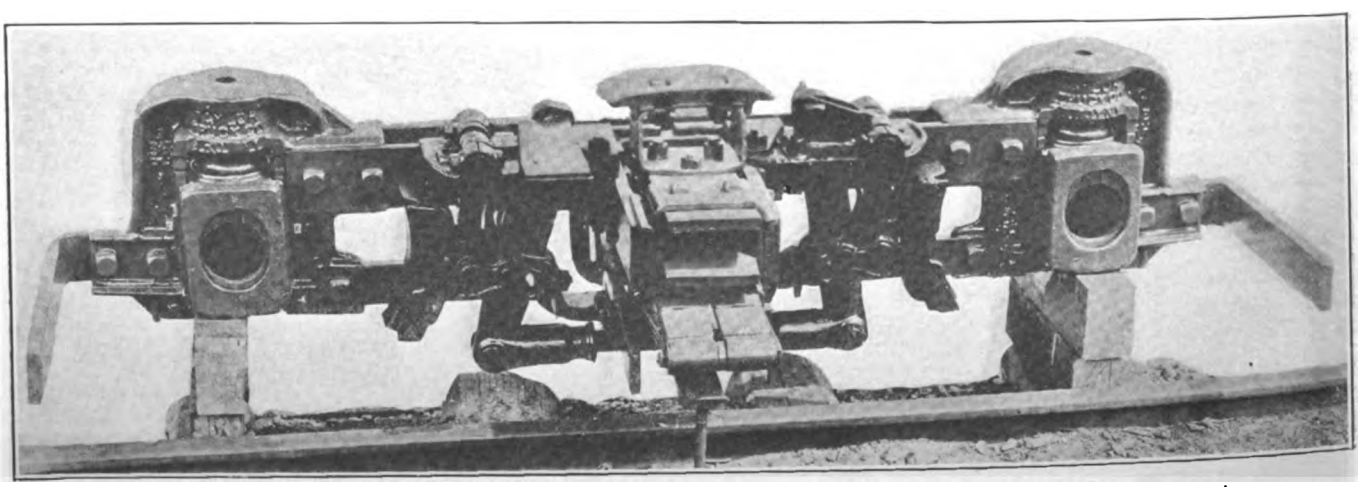
The principal differences in present types of construction found in the trucks built by various manufacturers are largely centered in the methods of constructing the side frame and in the arrangement of springs to produce easy riding. In addition, the layout of brake rigging and design of brake hangers for the purpose of eliminating chattering and excessive maintenance represent important variations in construction. Combined with the arrangement of springs to provide vertical flexibility, various methods and devices are utilized for the purpose of allowing lateral movement of the bolster and at the same time limiting the amplitude of its oscillations. Further refinements in design which are incorporated in the products of various manufacturers are primarily for the purpose of increasing rigidity and durability of the structure and decreasing maintenance costs. Rather wide departures from conventional designs have recently been made by several operators who have felt the need for more fundamental developments than were available in the products of the equipment manufacturers, and this work is at the present time undergoing still further evolution.



Sectional View of Above Truck Showing Arrangement of Full-Elliptic and Light Load Helical Mounted Above. Guides for Bolster Prevent Rubbing

Considerable Improvement in Single Trucks

In the construction of single trucks a number of very interesting designs are in use. The demand for reductions in weight and at the same time the requirement of minimum maintenance and easy riding are reflected in the variations in the structures employed. A tendency to avoid built-up side frames and to secure the rigidity and freedom from maintenance offered by a one-piece side structure is manifest. A tendency to avoid heavy castings wherever possible and to substitute lighter weight forgings is also evident in the designs. For the purpose of obtaining minimum weight, however, a type of construction utilizing two deep channels of high-grade steel assembled so as to form a closed box structure filled with wood and welded together along the upper corners of the box is illustrated in an accompanying cut. Of the manufacturers utilizing a one-piece side frame, one type of construction is machined from a solid flat billet and the other is forged to the required shape under heavy hydraulic pressure.



Side Frame Assembly, Showing Direct-Action Brake and "Y"-Shaped Hangers to Maintain Shoe in Alignment. No Brake Beam Is Used

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Still another construction employed is to press the side frames out of a comparaively thin plate, providing flanges and ribs at the critical points in the structure in order to reinforce the pressing to withstand the stresses imposed and to give the desired stiffness.

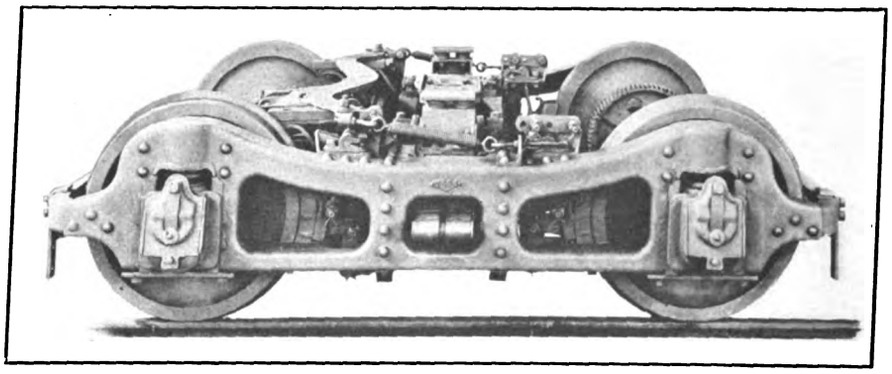
The application of brake rigging parts to the single truck is accomplished by several interesting arrangements designed to improve the performance of the brake by the elimination of chattering and by insuring a true and square contact between the shoe and the wheel. The method of employing two parallel link hangers, applied either directly to or adjacent to the side frame so as effectively to guide the shoe in its movement back and forth, is apparently considered best by several manufacturers, although the center hanger back of the brake beam with a single brake hanger for each shoe head at the side is also widely used. The objective in all forms of brake hanger construction is the elimination of chattering and the insurance of a uniform bearing each time the shoe is brought in contact with the wheel.

The arrangement of springs has a particularly important significance in connection with the results obtained in the operation of single trucks. With axles supported squarely in the truck frame at the journals, the requirement for negotiating the sharp curves existing in most cities limits the allowable wheelbase to between 8 and 9 ft. as a maximum. Since the car body on the usual type of single-truck car extends considerably beyond these lengths, the overhang each side of the wheel line is comparatively large and results in a tendency toward teetering and nosing in operation. Various methods are employed to overcome this condition, and practically all center around the general idea of increasing the effective spring base by the extension of the truck side frame itself a considerable distance beyond the wheel line at each end so as to act as a support for springs mounted at this point. By the use of overhanging half-elliptic springs secured at one end to the truck side frame, or again by the application of quarter elliptic springs rigidly secured to the side frame close to the pedestal, the same effect is obtained. All three of these types of construction are illustrated in the accompanying drawings and pictures.

In the illustration on page 511, No. 1 shows a simple spring arrangement utilizing a half-elliptic spring fastened rigidly to the journal box, with short helical springs at either end extending to the car body support. In this construction the effective spring base is equal to the wheelbase of the truck. No. 2 illustrates the next step in providing a more flexible spring construction. In this arrangement the truck side frame is supported on helical springs mounted on extended ears on the journal box, and the half-elliptic is, as in No. 1, again supported on the journal box, but its inside end is fastened by a long link to the truck side frame instead of to the body. The outside end of the half-elliptic is connected to the body through a comparatively long helical suspension spring, which allows considerable lateral and longitudinal motion. The long link employed for fastening the inside end of the half-elliptic to the truck side frame also contributes to a comparatively free movement.

No. 3 illustrates the next step in the development of this type of truck, in which the loose and flexible connection to the body at the outside end of the half-elliptic is eliminated, and the link connecting the inside end of the latter to the truck frame is materially shortened. The final development in this design to produce easy riding and at the same time limit excessive oscillation is shown in No. 4, where the construction is similar to No. 3 except that a comparatively short compression spring is interposed in the link connection to the truck frame for the purpose of reducing somewhat the strains imposed on the parts at this point and giving a little added vertical flexibility.

The type of construction utilizing a machined one-piece steel side frame is shown in illustrations on page 512. Here the side frame is carried on short helical springs also resting upon ears extending from the sides of the journal box. The main body supporting spring consists of a comparatively short and stiff quarter-elliptic rigidly fastened to the side frame adjacent to the pedestal. The connection to the body is usually made through a short helical spring, flexibly connected to the end of the quarter-elliptic. A flexible device for absorbing lateral strains between the body and truck and for maintaining the body and truck in alignment is also shown in the illustration. The details of the quarter-elliptic spring fastening to the side frame are shown and also a good view of the brake hanger arrangement and of the journal box construction. A general view of this same type truck equipped with ball-bearing journals is included.



This Truck Has Pressed Steel Side Frames. A Volute Spring Inside the Full-Elliptic Limits Deflection so that the Elliptic Can Be Made More Flexible

A forged-steel side-frame single truck, illustrating still another method of supporting the side frame on short helicals set on extension ears on the side of the journal box, is shown on page 516. The quarter-elliptic spring is fastened with a strap and projects under a lip on the pedestal frame to secure a firm anchorage. The method of connecting to the body is clearly shown by the link and helical spring fixture illustrated. This type of truck employs a centrally supported brake-beam hanger with the brake hangers supported from gusset plates bolted to the side frame. The brake hanger is of the half-ball type, in which a semi-ball and socket arrangement with a compression spring on the connecting bolt is utilized to compensate for wear, and thus to prevent vibration and chattering as far as possible.

Modern trucks of the swivel type show a wide diversity in construction. The side frames are either

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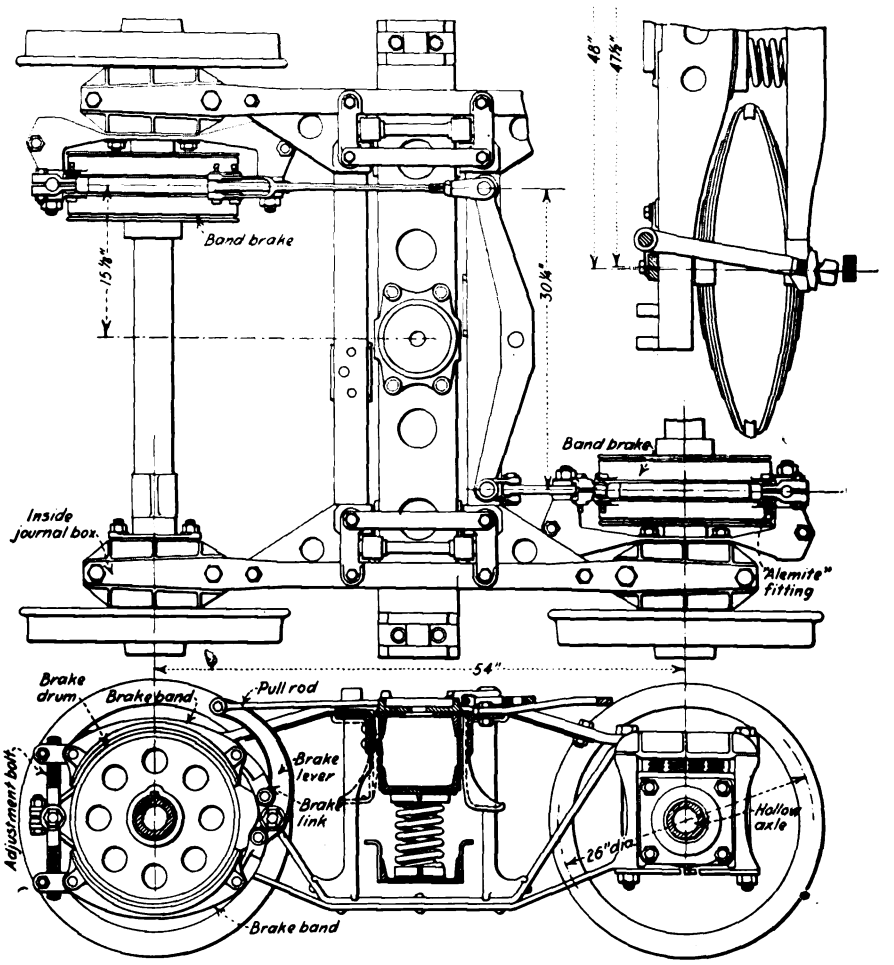

Minneapolis Light-Weight Truck with Band Brakes and Hollow Axles

forged in one piece, made of a steel casting, built up of the conventional diamond arch-bar construction, or built up of structural shapes. The side forged frame has the advantages of a one-piece rigid structure, in which by proper design the metal in the forgings can be distributed accurately in proportion to the stresses imposed. This type of structure gives a very rigid truck and freedom from maintenance trouble on the side frame structure.

In the application of cast steel to modern trucks, the M.C.B. equalizer bar type of construction lends itself to the elimination of the heavy pedestal castings, which were used with earlier trucks of the cast-steel type. In recent construction the truck side frame and transom have been cast in one unit, giving an extremely rigid structure from the standpoint of maintenance of alignment, and also allowing the patterns to be designed so that brake rigging parts and spring suspension parts can be conveniently applied.

The arch-bar type of truck gives both low weight and first cost. In this type of truck high grade heat-treated steels of either high carbon or alloy composition are being used to increase the structural strength of the built-up side frame. In some cases the arch bar is of the conventional flat section, while in other trucks a channel-shaped member is used for the bar in order to obtain the maximum sectional rigidity with minimum weight.

As in the case of the side frame, so also in the spring suspension and brake rigging arrangement do the products of different manufacturers show a variation over a considerable range of design. The customary full-elliptic spring under the bolster appears in a number of constructions, but various additional features have been added for the purpose of obtaining improved riding performance. The heavy spring plank formerly used under springs arranged in this manner has in some cases been entirely eliminated. The full-elliptic spring is carried in a swinging hanger or swing link provided with an appropriate socket at the lower end to form a seat for the lower spring band, and the two hangers or stirrups are tied together across the truck with a comparatively light structural member.

The introduction of light helical springs mounted on top of the full-elliptic and set into an upper and lower spring cap, which is provided with lugs which come in contact after the capacity of the helical is exceeded, are utilized for the purpose of absorbing light road shocks and vibrations, while the car is operating under comparatively light load. This light action spring goes out of operation when the spring cap lugs come in contact, and from that point on the total load is carried by the full-elliptic. Bolster guide links fastened between the truck transom and the bolster are utilized in some trucks of this general type for the purpose of preventing the bolster from rubbing against the transom sides.

In addition to the simple arch-bar type of construction with the bar resting directly on the journal box, some recent trucks utilize a type of construction in which comparatively long helical springs are provided between the arch bar and projecting ears on the sides of the journal box. The side frame, instead of being clamped down around the box by the long bolts between the top and bottom bars, is clamped to tubular struts which ride through openings cored in the journal box structure, so that the equivalent of a pedestal construction is provided.

The use of half-elliptic springs carried longitudinally in links or stirrups hung over the top of the side frame has been customary for a number of years. The light-load helical spring described above is utilized with this construction and is imposed between the top of the half-elliptic and the truck bolster. The design of link in which the half-elliptics are carried is such that the amplitude of the lateral swing is rapidly checked by the angularity which these stirrups assume. In modern trucks the entire theory of securing easy riding from the standpoint of absorbing lateral oscillation seems to be the provision of relatively short suspension links in the spring system, which are comparatively free at the beginning of an oscillation, but which quickly assume an angularity that checks the amplitude of the swing.

Another type of spring arrangement which has been used to a considerable extent, particularly in trucks of the modified arch-bar con-

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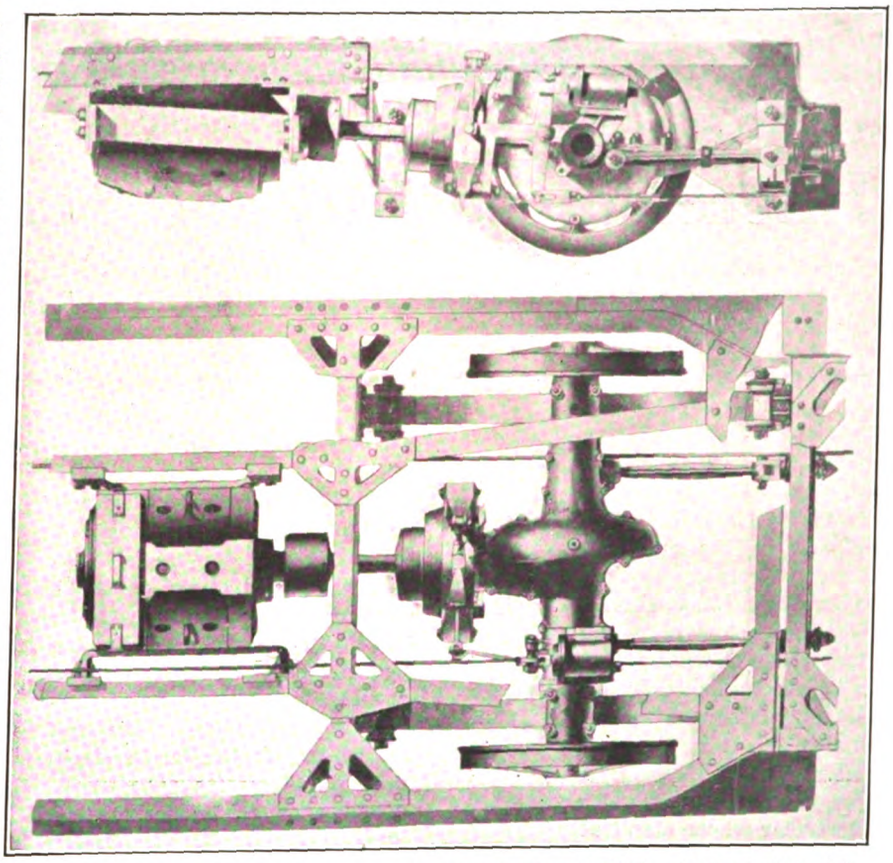
struction, is a type in which a half-elliptic spring mounted crosswise is carried independently at either side of the truck in a long stirrup supported from the transom. At the ends of the half-elliptic comparatively long helical springs are set up vertically and directly support the truck bolster. This same general type of construction is represented by two half-elliptics mounted crosswise at either side of the truck, one fastened to the truck bolster above and the lower fastened in short swinging links carried on a comparatively large structural member extending across the truck. This lower structural member is used to tie the two sides of the truck together, and the usual transoms above are largely made of wood. Between the ends of the half-elliptic springs described vertical helical springs are set so as to hold the two half-elliptics a considerable distance apart.



Design of Automotive Drive Applied to Experimental Car in Paris. Motor Is Mounted Longitudinally on Car Frame and Drives Through Shaft and Universal Joint

Truck Brake Rigging

In addition to the conventional type of brake arrangement and brake hangers, the desire to eliminate uneven brakeshoe wear and chattering has led to the use of a number of interesting constructions designed to overcome these difficulties. In an accompanying drawing, page 515, a detail of an offset brakehead is shown, in which an arm is brought out beyond the face of the head a considerable distance and forms a pivotal point for a parallel link hanger, one link being back of the head and the other in front of it, so as to guide the shoe toward the wheel with a support both in back and in front of the shoe. The hangers used with this type of head consist of two slightly bent springs with the convex faces together, so that when the pins are inserted in the head and in the hanger support the springs exert a slight outward pressure. It is stated that they effectively prevent any looseness or chattering.

Another type of brake arrangement is constructed with "Y"-shaped brake hangers, and the brake levers, as shown in the illustration at bottom of page 516, are made without offsets. The construction employed gives two bearing points at the top of the hanger where it is suspended from the gusset brackets and prevents lateral movement of the head and shoe. This insures proper alignment between the shoe and wheel. It will be seen from the illustration that no brake beams are used, and the arrangement of levers produces a straight action in the whole brake mechanism which is designed to eliminate the possibility of excessive piston travel resulting from slack. The levers are equipped with large diameter hardened steel pins, which are made with a driving fit so as to avoid looseness and prevent noise in service. The truck side frame is made of wrought parts bolted to cast-steel pedestals, which are carried on the journal boxes by graduated springs.

The development work being carried on in Minneapolis represents a considerable departure from existing truck construction methods. The two outstanding innovations in this type of truck are, first, the use of automotive-type band brakes, arranged with one brake drum on each axle at diagonally opposite corners of the truck, and second, the placing of journal boxes inside of the wheels for the purpose of narrowing up the entire truck structure and therefore reducing its weight. In addition to these two departures the axles are being bored throughout their length to reduce weight. This practice is said not to materially affect the strength of the axle.

A considerable number of trucks of the type just described have been in service in Minneapolis for a long time with apparently satisfactory results. The band-brake construction is said materially to decrease noise and chattering of brakes in service and in addition eliminates a considerable amount of wear on wheels. The entire truck structure is made as light as possible, utilizing high-grade heat-treated steel wherever practicable. The development work is still going forward and some of these trucks have also been equipped with roller bearings in the journal boxes.

The idea of boring out axles is being tried by other operators and if the cost of boring is not found to be excessive for the advantages obtained, the practice looks well worth considering.

Considerable Progress Made in Truck Springs

In the development of modern cars and trucks an increasing amount of attention is being given to the subject of truck springs. Appreciation of the importance of easy riding cars from the standpoint of good merchandising, together with a gen-

(Continued on page 536)

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Important Economies to Be Had in Greater

Interchangeability and Standardization

More Standards Make Fewer Parts

The cost of car maintenance over a long period of years is as important as if not more so than first cost. To obtain the advantage of standardization in the purchase of stock cars all the various forces in the industry would have to be organized to produce one or more models having interchangeable parts. By the adoption of standardized repair parts on its own property for all of its equipment and adherence to association standards for manufactured parts, each railway property can make large individual savings and at the same time support the common cause. Competent engineering organizations are required for this program

PARTICULARLY since the advent of the automotive industry, electric railway operators and car builders have been confronted with the somewhat disconcerting object lesson of what great economies can be accomplished by standardization of parts and manufacture of vehicles on a quantity production basis. This inspired much talk about the development of a standard railway car whose manufacture could be carried out by automotive manufacturing methods. Out of this came the Birney safety car as the first attempt to build cars that would be purchased off the sales room floor as is. The pressure of financial necessity overcame the reluctance to relinquish individualism in design and the car was widely adopted and put to successful use.

But the circumstances under which this "stock car" was put out to the railway field involved certain fundamental differences from those surrounding the manufacture of automobiles. With automobiles, and to a certain extent with buses and trucks, the purchaser is an individual, or at most the owner of only a comparatively small number of vehicles. The manufacturer is able to show certain complete designs manufactured on a quantity production basis at an attractive selling price, and the purchaser selects the vehicle which suits his requirements best, just as it is delivered to the sales floor. The useful life of the car is comparatively short and maintenance parts are required for only a comparatively short period. Standardization is carried out on only a very few types. The great majority are changed in design from year to year. The economies obtained in manufacture are the result of the production of an enormous number of vehicles each year which are built exactly alike and sold "off the shelf."

In the case of electric railway cars, an entirely different condition exists. Here the car is purchased by a large operating organization which is engaged in the business of transportation and which therefore has preferences in regard to certain types of design and construction for particular service requirements. The factors of life of the vehicle and cost of maintenance are given very serious consideration, and the design of the car is carefully specified in accordance with the ideas and experience of the engineers and officials of the operating company. These cars are designed for continuous operation over a long period of years. Although very substantial savings in first cost would be made by accepting cars built by manufacturers for stock, the items of maintenance and operating cost are of paramount importance.

Cars purchased from different manufacturers require entirely different maintenance parts. Assuming for a moment that it were possible to carry out the extremely difficult organization problem of obtaining universal acceptance of one or even ten different models of cars, all the forces of progress would be against the maintenance of such standards after they were once adopted. An industry which does not move forward will move backward. The constant development of ideas is the natural result of increasing experience. Failure to put these ideas into practice will result in stagnation and ultimate degeneration. The public looks for and demands progress. Almost any change from that to which it is accustomed is frequently accepted as progress, whether or not such is actually the fact. The popularity of the motor bus in some places under conditions where actual physical comfort and safety are inferior to those furnished by rail vehicles may be largely attributed to this cause.

There is an additional difficulty in the establishment and maintenance of standard car models. The competition among manufacturers striving to improve their products and decrease their costs would quickly tend to develop new designs or models for "stock" cars. As between the cars manufactured by various car builders, standardization of dimensions, arrangement and general construction have little if any advantage from the standpoint of maintenance. It would be only by the accomplishment of complete interchangeability of mill parts, castings, forgings, trimming material, truck parts, and miscellaneous mechanical and electrical equipment between the cars manufactured by the

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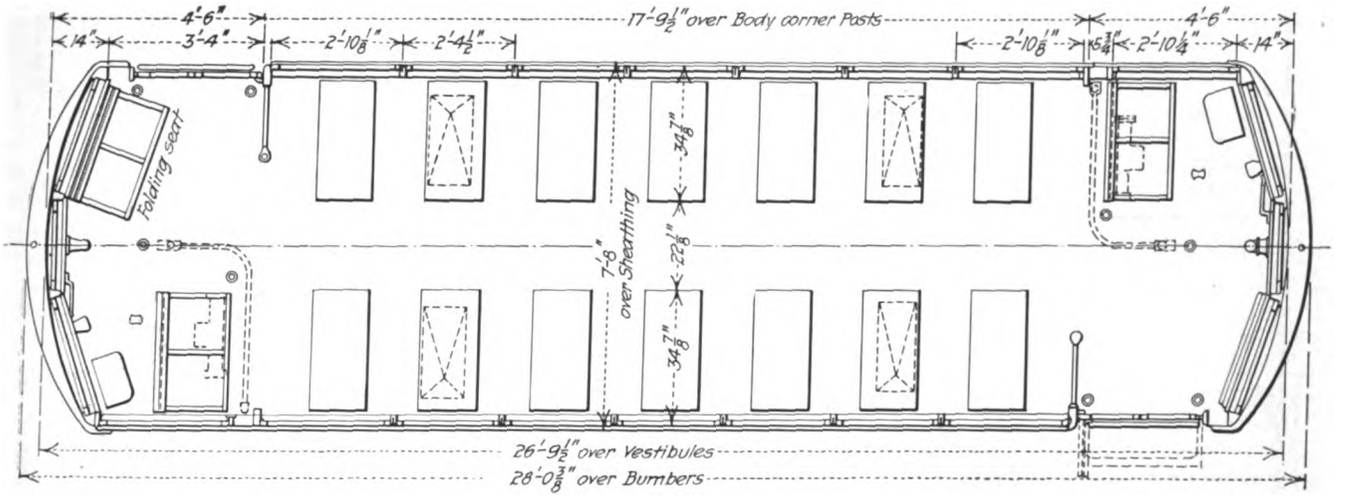
different builders that any advantage from the standpoint of operation and maintenance could be obtained.

Consequently, when the reason is examined for the apparently increasing sentiment in favor of changing in some one element or another the Birney type of one-man single-truck safety car, an underlying cause of the lack of continued approval of this car in its original form is found to be not only the general tendency toward improvement, but also the fact that this car, with the exception of giving lower first cost due to quantity production, did not fulfill many of the other requirements of a standardized car. Not only was the car built by each manufacturer an entirely different and distinct unit so far as the miscellaneous maintenance parts are concerned, but in the cars built by different manufacturers there are at least three different sets of dimensions. At no time during its history did this car ever approach a stage in the development where an operator purchasing the same type of car from different manufacturers was able to obtain in any sense an interchangeable car. It is also obvious that to obtain such interchangeability would present a very serious organization problem indeed.

In spite of the above described difficulties in the path of obtaining standardized cars, there are opportunities in electric railway practice to effect very important economies through application of the principles of standardization. This can be partly accomplished by the adoption, as far as the requirements for progress will permit, of standardized types of vehicles on individual properties. This of course is possible only on the larger properties. With this practice carried out, however, the smaller properties would not be at a disadvantage, because car builders would be in a position to furnish duplicates of the standard cars of any of the larger properties. Even under present conditions, the smaller property purchasing a limited number of cars usually selects a design which has been prepared for a larger order.

A still more important step in obtaining the advantages of standardization can be made. This consists in the adoption of standardized construction details and interchangeable maintenance parts. Here is the opportunity for an important advance in practice by most properties, and for effecting very material savings in maintenance costs. Even for different designs and models of cars there are almost innumerable parts that can be made interchangeable. Large reductions in the stock of parts on hand and in the cost of pattern equipment would be made. In addition, there would be a saving in time and cost and the elimination of a great deal of wasted effort in the purchase and transportation of maintenance supplies. The possible savings include not only the cost of repair parts but also the elimination of many delays in the repair of equipment while special parts are being made or purchased.



Standard Type of Birney Single-Truck One-Man Car Has Seating Capacity of Thirty-two with Full Cross-Seat Arrangement

ENGINEERING ORGANIZATION REQUIRED

After a careful study of the equipment on a property and the institution of a definite program along these lines, the problem becomes one of careful supervision. This calls for the organization of carefully trained engineering organizations in the equipment departments of operating companies. The personnel of such an organization should not only be competent to analyze the requirements and select standards, but also, by the preparation of specifications and inspection of incoming materials, assure the maintenance of such standards after they are adopted. By a check on the activities of maintenance forces in carhouses and shops, it should prevent unwarranted deviation from established standards in the manufacture of repair parts.

Standards of the type discussed may be established for a great variety of parts. Door and step mechanism parts, foundation and hand brake rigging, grab handles, folding seat parts, gongs and bells, fender parts, register operating mechanism, hand strap brackets, draw bars and heads, catches, locks, door handles and miscellaneous items of trim, motor junction boxes, wiring fittings and many other parts come within the classification of parts to be standardized. But there is an even wider application for this practice. The dimensions and design of posts, doors, sash and a multiplicity of wood mill details offer many possibilities for standardization even when used on entirely different types of cars. This would reduce the number of parts to be carried in stock and effect important savings in maintenance costs.

In the design of new equipment it is possible to apply a great many existing standard parts. With a competent engineering organization available, it is also possible to assure the use of standard methods of construction by furnishing detailed drawings of cars. In recent cars built for the Chicago Surface Lines this practice was carried out, and cars built in three different plants were completely designed by the operating organization to include entirely duplicate parts and construc-

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tion details. A great many parts already standard on the property were applied in the construction of these cars, and consequently maintenance parts were in stock when the cars were received and the necessity for augmenting existing stocks by the addition of a great many new parts was eliminated. Under the usual conditions existing on most properties, these new cars would have required three entirely new sets of parts, one for each group built in a different plant.

In the development of steam railroad rolling stock equipment, there is one automatic checking condition which has been primarily responsible for the very much wider degree of standardization and interchangeability, which is found in the rolling stock equipment of the steam roads, as compared with the electric railways. This is the necessity for interchangeability of equipment and the repair of equipment on foreign roads. Through the activities of the American Railway Association a great deal of progress has been made in standardizing the more important parts made by various manufacturers.

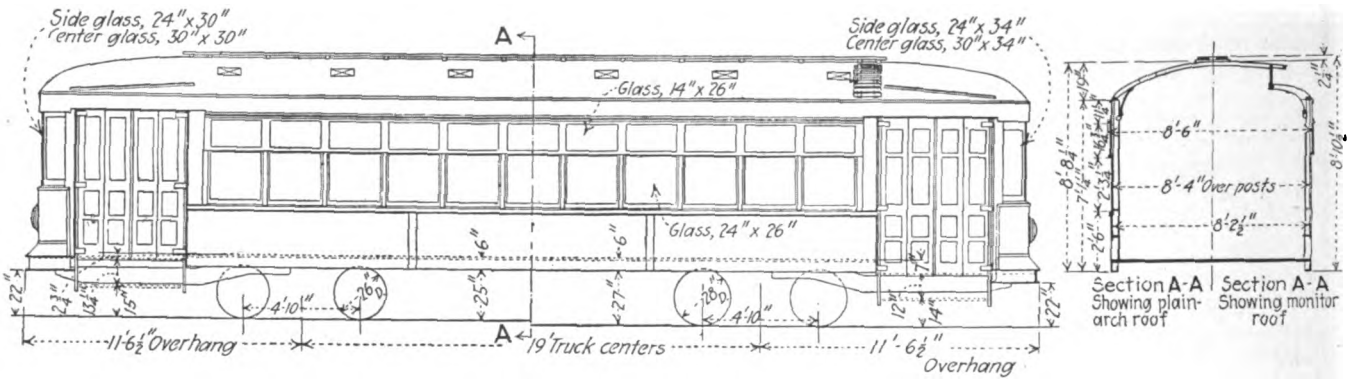
Greater Adherence to Association Standards Required

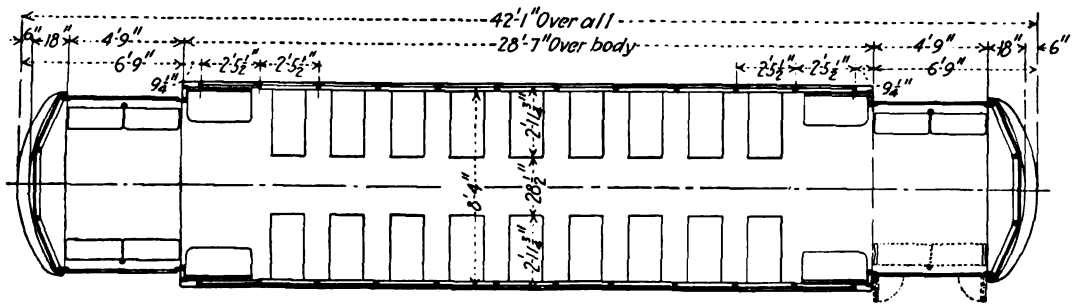
Marked progress along these lines has also been made by the electric railway industry as a result of the work done by committees of the American Electric Railway Association. Active interest and participation in this work by all operating companies is necessary for the accomplishment of further standardization. Also greater degree of adherence to these standards by operating companies will result in substantial savings in manufacturing and maintenance costs.

The A.E.R.A. is just now engaged in the work of a thorough revision of its standards and is also revising its manual for the purpose of eliminating superfluous material and making it what it should be—an authoritative guide to the standards set up by the various committees of the association after a very careful study of the practice on various properties. It is to be hoped that this revision of the manual may be made the occasion for fostering a closer adherence to these standards on the part of operating companies. In the case of rolling stock equipment especially, non-adherence to association standards is particularly evident, and it is very important, if the advantages of standardization are to be obtained, for each individual property to cooperate in the general task of submerging its own particular ideas by the adoption and adherence to association standards where these can possibly be applied to its property.

Our industry has seen and has talked but has been exceedingly slow to relinquish individualism for the common good by an active campaign of support and adherence to association standards. It is only by this policy that the advantages and economies resulting from standardization can be obtained.

In this same connection, it is imperative that committee procedure in the association be so carried out that regularly adopted standards will not be arbitrarily and frequently changed. It is only for the purpose of obtaining the advantages of some real basic development or a very marked and evident decrease in cost or improvement in performance that a regularly adopted standard should be changed. Nothing will destroy the confidence in association standards, or prevent their widespread adoption by operating companies, quicker than the practice of indiscriminately changing these standards in accordance with the ideas of various members of standing committees as the personnel of these committees changes from year to year.





Drawing Prepared by Committee on Unification of Car Design for the Study of Proposed Standardized Dimensions

Unification of Car Design an Important Step

The work started by the committee on unification of car design is also a step in the right direction. Studies for the purpose of establishing certain groups of dimensions for car widths and heights, post centers, seat widths, door openings, etc., are in the direction of obtaining greater uniformity in practice.

An accompanying drawing gives the dimensions and car arrangement prepared by this committee, which shows the type of body standardization that can be successfully carried on by the association. Another drawing showing a floor plan of the Birney type of single-truck one-man car is published here for comparison with the changes in design which have been discussed in preceding chapters.

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Incorporating

Merchandising Features in the Design

Cars that Make You Want to Ride

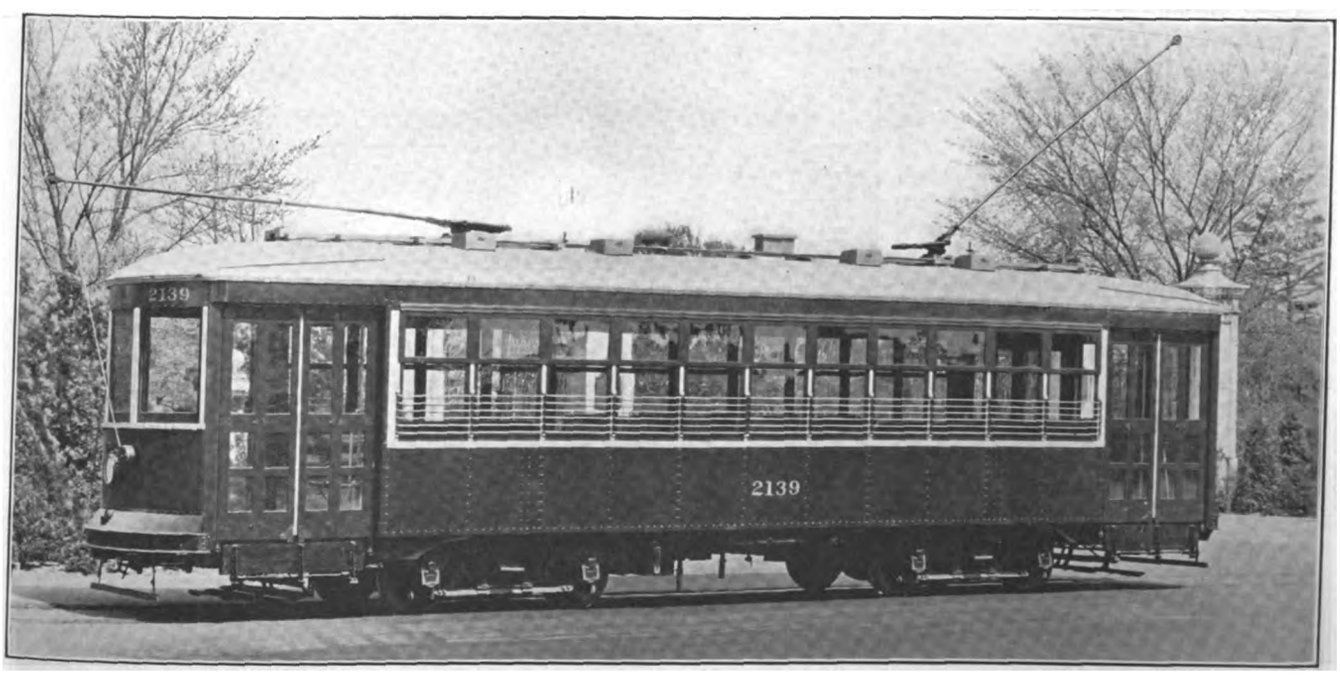
Streamline bodies are helpful in getting good appearance. Good painting is extremely important, and here is told how to get the best results in color and protection. The kind of seats used and the interior trim and finish have much to do with making the ride a pleasure. Some new ideas in this direction are pointed out

THE effect of car design in selling transportation is twofold. The outside appearance of the vehicle should be such as to invite one to ride, and the interior arrangements should be such as minister to the comfort and convenience of the passenger in every practicable way. An attractive car exterior will stimulate in the man on the sidewalk a desire to ride, and a pleasant, quiet, comfortable trip will encourage the passenger to repeat his journey. By giving careful attention to these matters, many electric railways are regaining some of the non-necessity riding.

In connection with the exterior appearance of the car, the body lines are of primary importance. In early car construction curved sides were the almost universal practice, but subsequently, with the advent of the steel car, a straight side came into vogue. More recently, however, there has been some tendency to return again to the curved side design. Among the examples of this are the cars of the Kentucky Traction & Terminal Company, those of the City Railway of Dayton, the new cars of the Cincinnati Traction Company and those built for the Youngstown & Suburban Railway and others. Whether or not the curved side presents a more pleasing appearance than the straight steel side is largely a matter of taste. With a single-truck car, or with a double-truck car having a comparatively short body, a curved side seems to prevent the vehicle from having the dumpy appearance sometimes resulting from short flat surfaces.

Closely connected with the matter of body lines is the design of the roof. In recent construction the old-fashioned monitor roof has almost entirely disappeared, nearly all of the more modern cars being built with arched roofs. There can be no question but that the latter gives the vehicle a more graceful appearance than can possibly be achieved with the former. There is opportunity for considerable display of skill on the part of the car designer, however, in getting a graceful curvature of the roof and adapting it to a particular car body. Two practices are in common use. The ends of the arched roof may follow a short radius curve in changing from the horizontal to the vertical or may follow a flat parabolic curve. The latter practice tends to accentuate the stream-line idea.

It is a well-established fact that long continuous lines from end to



A Modern Car of the United Electric Railways, Providence. It Is Painted Dark Green and Trimmed with Very Light Green

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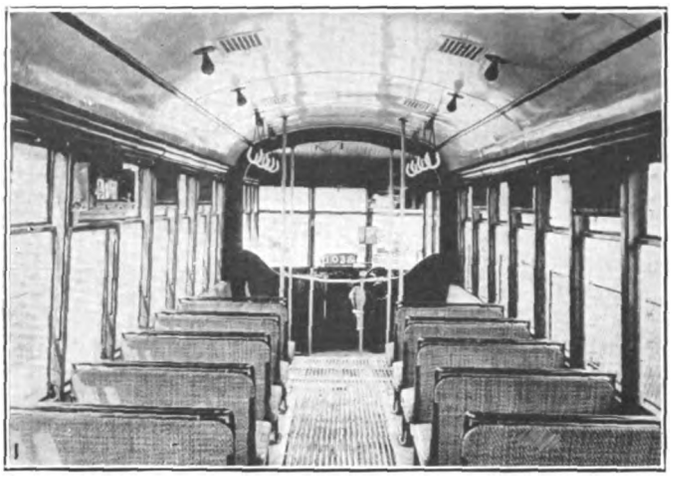
These Cars Show Various Ideas in Merchandising Transportation



1.—Cross-seats have grab handles extending the entire length of the back in the new cars of the Kansas City Railways.

2.—The light-weight interurban cars of the Kentucky Traction & Terminal Company have upholstered arm rests.

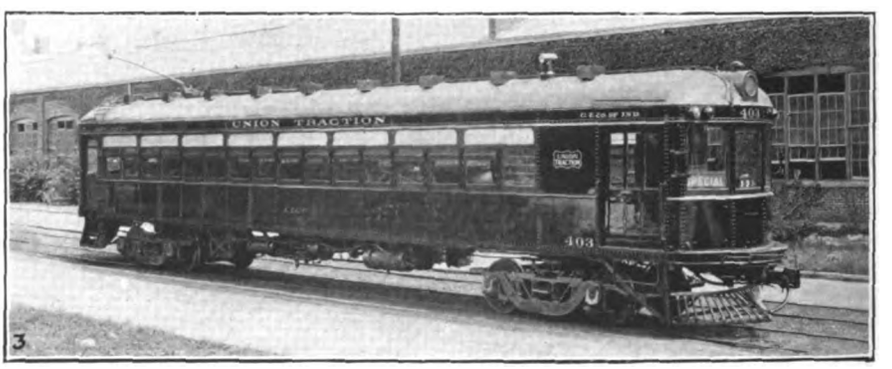
3.—The Union Traction Company of Indiana has realized upon the merchandising value of this type of all-steel coach.

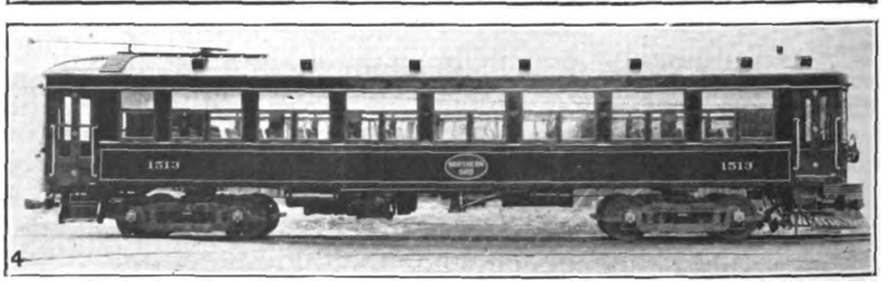
4.—In exterior appearance the high-speed interurban car of the Northern Ohio Traction & Light Company rivals the best steam railroad cars.

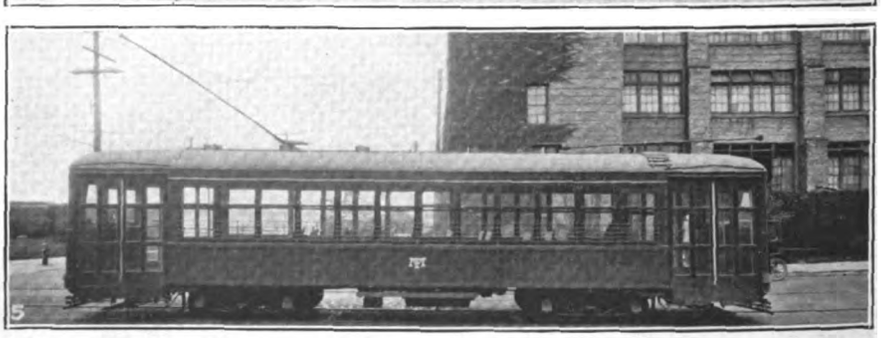
5.—The monogram of the Muskegon Traction & Light Company is the only decoration on this attractive car. This practice is being widely adopted.

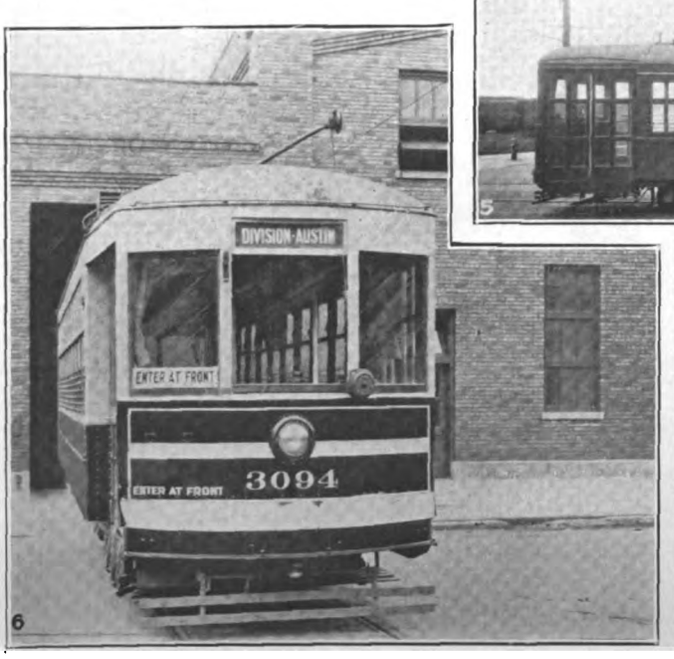
6.—A broad aluminum band across the dasher is used by the Chicago Surface Lines to designate a front-entrance car.

7.—Frequent and careful car painting increases the popularity of the Binghamton Railway.









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end of the car body produce a much more pleasing result than is created by short broken lines. This principle, which has been so successfully applied in the automobile industry, has been borne in mind in the body design of many recent cars. A vigorous attempt has been made wherever possible to bring short horizontal lines to a uniform height. The platform windows are at the same level as the windows in the car body, giving the artistic effect of continuous lines. This cannot always be done, however, because the size of the controller may have to govern the height of the dash. The tops of the entrance and exit doors and tops of the windows in the car are at the same level. Moreover, the lines along the bottom of the car body are made continuous wherever possible. The result of such an arrangement is to emphaize stream lines and it is pleasing to the eye.

Painting for Appearance and Protection

Painting is an influential factor in the effect created by the car exterior. The predominant color is a matter of extreme importance and deserving of the greatest care in selection. Moreover, the striping and decorating can either make or mar the appearance of the vehicle. Among all the available colors, only six are widely used by the railways in this country. These are Pullman green, Traction green, Tuscan red, a red half way between carmine and vermilion, orange, and yellow.

Although the entire subject of painting cars is more or less in a developmental stage at the present time, a few general principles can be set down. Painting is carried out for two distinct purposes, namely, to secure a pleasing appearance and to protect the car structure from the elements. Each of these considerations must be given its proper weight in selecting colors. It is poor merchandising to use any paint, no matter how attractive in appearance, if its life is so short that it becomes impracticable to maintain it in good condition. Durability must therefore influence the selection of colors, even from the merchandising standpoint, and then the protection of the structure will be automatically taken care of.

Paints vary greatly in the matter of durability. The so-called natural colors, which are made from various earths and metal ores, are unaffected by long exposure to sun and rain. Artificial colors, on the other hand, are made synthetically from chemicals, especially from coal tar, and are generally less durable than the natural colors. Modern methods of manufacture, however, have been improved to a point where many artificial colors are sufficiently durable for all practical purposes.

Painters classify colors in seven groups: Black, brown, blue, green, red, white, yellow. The black group are practically all composed of pure carbon and are therefore indestructible. They are very useful to the car painter for certain parts of the equipment, but of course have no value as body paints. The brown group, which are derived from raw umber, are fairly permanent, but brown is not an attractive color for cars and is seldom used.

Blue colors are all artificially made except a few very high-grade and extremely expensive paints which are manufactured from lapis lazuli. Those which are made chemically are susceptible to sunlight and fade quickly. For this reason they are of little value to the car painter. Green paints are generally produced by a combination of blues and yellows. The presence of the yellow makes green a more durable color than pure blue. For the same reason, light greens retain their original luster longer than do dark greens.

All red paints become dingy with age. The basic ingredient of these colors is the red oxide of iron. The natural state of this oxide, however, is in the hydrated form, which is yellow, and the red oxide tends always to change into the yellow hydrated form. Hence red paints invariably lose luster as they grow older.

Yellows may be divided into two main groups: Yellow ochre and chrome yellow. The former is a natural color whose chief ingredient is the hydrated oxide of iron already mentioned and is practically permanent. Chrome yellow, on the other hand, is a chemical color derived from lead chromate and is not very durable.

Colors of the white group are derived from earths, of which decomposed lime rock is the most important, or from oxides of lead and zinc. Their chief utility in car painting, however, is for the interior of the vehicle, for limited exterior trimming, or for mixing with other colors to brighten their tones.

It will be seen, therefore, that from the point of view of durability the natural yellows and oranges are good colors for car painting. Visibility is another advantage claimed for them. Reds also are natural colors and are fairly permanent, although in time they always fade somewhat. As a combination of durability and pleasing color, however, red should rank high with the car painter. Greens are less permanent than yellows and reds, but the lighter shades last well enough for most purposes.

Single Color for Entire Car Body

In recent painting practice the use of a single color for the entire body predominates. When this is combined with a harmonious secondary color for trimming, the result is very pleasing. The effect thus achieved is generally more satisfactory than when two principal colors are used. For practical reasons the letterboard should be painted a dark color. Unless this is done the dirt which accumulates on the roof will be washed down by the first rain and the letterboard will soon present a grimy, streaked appearance.

A second principal color, lighter in tone, is sometimes used on panels below the wagon rail on the older curved-side cars. This effect is usually not so pleasing as when one solid color forms the background for the entire car. It is important, however, that where only one principal color is used, the striping and decorating be harmonious in color and tasteful in design. In other words, there must be more trim when only one main color is used.

Paint may be utilized to good advantage in emphasizing horizontal lines or in correcting breaks in the lines of the structure which are due to unavoidable mechanical requirements. To accomplish this, striping on the sides of the car body has been continued at the same level on the platform and dashers. When the body and platform windows are at the same level, the trimming around them presents another opportunity for the painter to make a continuous line of color. A problem sometimes arises due to the platform posts running between the roof and floor. There is no natural division on these posts and the tendency is therefore to paint them a uniform color from top to bottom. As this is usually the lighter of the two colors, it creates a prominent vertical line which detracts from the streamline effect. Posts should be painted to conform to the adjacent portions of the car body.

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Roof colors are sometimes the same as the lighter of the two colors used on the body, but they are more often neutral shades of gray or brown. An important consideration in connection with roof painting is that too many colors introduced into the design spoil the effect. If the roof is painted in a color that is used elsewhere on the car, or in some neutral tint that does not attract the eye nor present a sharp contrast to the rest of the painting, the result is satisfactory.

Besides outlining the window frames in some lighter color in the way that has already been described, it is the practice of most companies to decorate the sides of the car body with various sorts of striping. A particularly pleasing combination is an aluminum stripe on a light green background. Gold or aluminum striping on a red background usually looks well. Simplicity is a great virtue in this matter. A single stripe forming the perimeter of a rectangle on the side of the body has been widely adopted and is probably as satisfactory a design as can be found. When stripes are used on the dash they should line up with the body striping whenever possible, even though there may be some difference in height between body and vestibule belt rails.

Special painting is occasionally used for informative purposes. An example of this is the practice in Philadelphia, where all front-entrance cars are painted Pullman green, in contrast with the rear-entrance cars, which are bright orange. The purpose of this arrangement is, of course, to inform waiting passengers which type of car is approaching. The Chicago Surface Lines accomplishes the same object in a slightly different way. Its front-entrance car is differentiated from other types by the presence of a broad aluminum band across the front dasher. The body color being red, this aluminum band stands out prominently and attracts attention to the fact that it is a front-entrance car.

Some railways have a habit of painting short legends on the exterior of their cars. "Have Exact Fare Ready," "Enter by Front Door," and other similar signs are not infrequently to be found lettered on the outside of cars. It may be doubted if this is the best way to accomplish the desired end. Such lettering certainly detracts from the appearance of the car and many companies have found it more satisfactory to convey the desired information by means of small signs in the windows. The latter plan probably makes the message more conspicuous.

For many years it was common practice among electric railways to display the name of the company prominently on the sides of the cars. Although this practice is still followed in a number of localities, it no longer has the vogue which it formerly had. In fact, many railways have gone to the opposite extreme and now have no indication of ownership on their cars. A happy medium appears to have been struck, however, by those companies which place on the sides of their vehicles an attractive monogram in the same color as the striping. This serves both to relieve the monotony of a plain side and also to acknowledge to the public the ownership of the car.

The requirements of economy sometimes clash with the requirements of merchandising transportation in the matter of car painting. That, of course, is an issue which each railway must decide for itself. If economy is to be the sole criterion, then the company should not deceive itself that at the same time it is achieving an artistic success.

The financial benefit from the introduction of special merchandising features in the car painting program is very difficult to measure. Such a step frequently forms but a part of a larger merchandising program on the part of the railway, and there is no way to determine which particular feature has appealed to the public and has brought about increased riding. However, it has been the experience of numerous railways which have replaced dull exterior car colors by lighter, brighter tones that the public has been quick to notice the change and has been warm in its praise of the improved appearance of the cars.

Small items often affect the exterior appearance of the car. The modern lifeguard which is partly concealed below the floor of the platform gives a much trimmer look to the car than do the various types of fender which extend out in front beyond the bumpers. The improvement is particularly noticeable in the case of double-end cars which require fenders or lifeguards at both ends. The rear fender when folded up usually detracts from the neatness of the car appearance.

The new cars of the Brooklyn City Railroad are equipped with wagon buffers. These are raised vertical strips of rounded metal at the corners of the car body and beside the center doors. They are intended to prevent other vehicles from scraping off the paint along the car sides.

Destination signs, in addition to facilitating rapid loading of cars, play an important part in selling transportation. The prospective passenger who can readily determine where the car is going may ride the car instead of taking a taxi. Considerable skill has been displayed by the car builders in locating destination signs where they do not detract from the exterior appearance of the car. This can be done as the accompanying illustrations indicate without breaking the continuity of body lines. The Detroit car pictured on page 484 is excepted in this statement.

Making the Interior Pleasing

Probably the most important merchandising feature of the car interior is the seating arrangement. There is no question that passengers prefer cross-seats to longitudinal seats. In spite of the fact that the total carrying capacity of the car is reduced by this arrangement, nevertheless most railways have adopted it in their newer cars. In the pay-as-you-pass car, which is becoming increasingly popular, a combination is effected between longitudinal and cross-seats, the forward half of the car being fitted with longitudinal seats and the rear half having cross-seats. This arrangement appears to be entirely satisfactory inasmuch as the passenger has his option of the two plans and the more desirable cross-seats invite him to pay his fare when he gets on. The number of cars recently built with only longitudinal seats is so small that this arrangement may now properly be called obsolete or at least behind the times.

A foot rest is an important detail which adds to the comfort of a passenger riding in a cross-seat. Upholstered arm rests on the aisle side of cross seats have been installed on some recently built cars. While they look attractive and add to the comfort of the passenger while sitting, they make ingress and egress more difficult. Any arm rest tends rigidly to limit the seating area. In interurban service, therefore, arm rests have advantages, but in city service they are undesirable. In some new cars the cross-seats have grab-handles extending along the entire length of the back. The car of the Kansas City Railways is an example.

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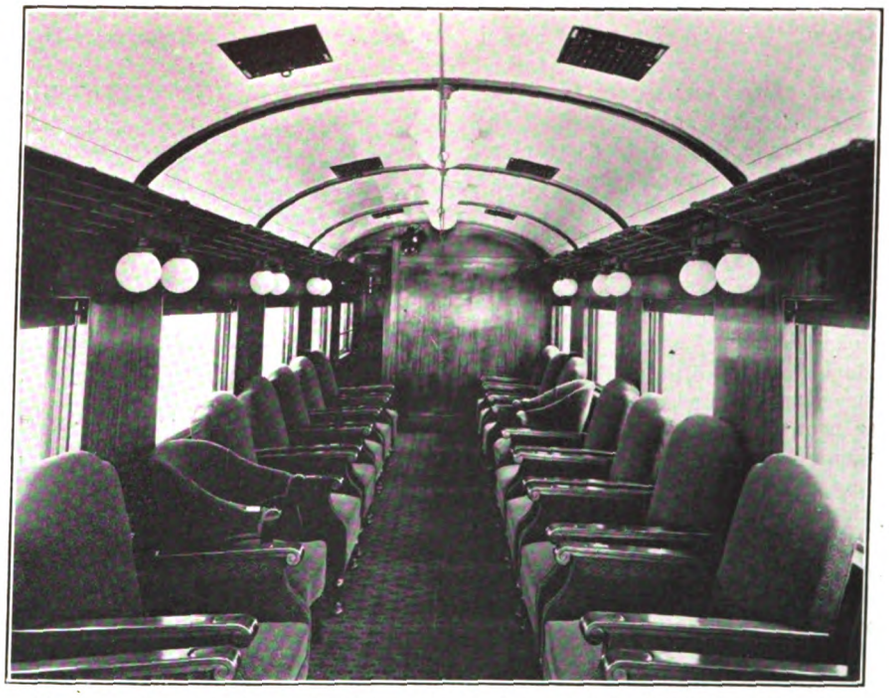
This is no doubt an added convenience though not essential. But where this device is not used, at least the usual type of handhold at the aisle end of the seat back should be provided.

In regard to the proper material for seats there is still diversity of opinion. Some railways cling to wooden slat seats. It is claimed that short-haul passengers do not care upon what material they sit, and the sanitary and economic advantages of wooden seats dictate their use. Rattan-covered spring seats, however, are today rather more widely used, and wisely so, than are the wooden seats. In some cases the former have spring backs, but some railway men think that the springs in the seat back are of less importance than its shape, which should closely conform to that of the human body. However, there is much to be said in favor of the spring back for its cushioning of the shocks of starting and stopping.

In an endeavor to improve the merchandising value of new cars a few properties have turned to the use of mohair plush upholstered seats. These installations have usually been made on interurban lines, but seats of this kind have in a few cases been installed in cars for city service. Various fabrics, mostly in imitation of leather, have also been tried as seating material. From the standpoint of sanitation, first cost and maintenance expense, the use of these materials is a questionable practice for city service. Furthermore, there is some basis for doubt as to whether the main value of their use has not been more a matter of improved appearance than actual increased comfort. The possibility of getting the same pleasing effect without the drawbacks of the more expensive materials by staining the ordinary rattan in some attractive shade of gray, brown, mahogany or green does not seem to have been given much consideration. Judging from the effects produced with wicker household furniture stained in various colors, the prospect of applying the same idea to rattan car seats is worthy of some thought and experiment.

Several suburban lines have built cars with individual chairs. The Lehigh Valley Transit Company operates a parlor car with wicker chairs on its "Liberty Bell" route between Allentown and Philadelphia. A combination parlor and buffet car is run on the Chicago, Aurora & Elgin Railroad. For luxuriousness and comfort the observation parlor cars of the Chicago, North Shore & Milwaukee Railroad is not excelled by any other vehicle.

The question of step height, which is an important one from the viewpoint of selling transportation, is discussed more fully elsewhere in this issue. In general it may be said that anything which decreases the climb of the passenger and makes it easier for him to board the car may properly be classed as a desirable merchandising feature. Methods of facilitating passenger movement in the car have distinct merchandising value. Entrance and exit arrangements, location of doors and bulkheads, the position of fare box and railings all affect the comfort and convenience of the passenger. Any unnecessary obstruction to his free movement should be avoided. These items, however, are discussed at length in another chapter.



The Luxurious Interior of the Observation-Parlor Car of the North Shore Line Is a Most Valuable Merchandising Asset. Its Exterior Is Likewise Inviting

Features Desirable in Interior Trim

No particular recent changes are noticeable in the method of treating the interior woodwork of the car. Cherry and mahogany stains predominate now as heretofore. The new interurban cars of the Pennsylvania-Ohio Electric Company have interior woodwork made of African mahogany. More attention is also being given to the matter of metal trimmings. Statuary bronze, aluminum and various alloys are being used for this purpose with good effects.

It is now almost universal practice to paint the headlining a light color. In some cases pure ivory white is used and in other cases the color is a cream or light buff. Blues and greens, which were at one time popular, are now entirely dispensed with. The reason for this, of course, is the desire to brighten up the aspect of the car interior as well as to provide a better reflecting surface for the electric illumination at night. For the creams and buffs it is claimed that nearly as much light is reflected as is the case with a pure white, whereas the maintenance cost of the former colors is much lower and they look better than dead white.

The questions of lighting, heating, and ventilating are important ones, from the viewpoint of selling transportation. Each of these, however, is a problem by itself and deserves careful consideration. Details of developments in these subjects are given in another chapter.

In line with the other efforts to make the interior of the car more attractive to the passengers, linoleum is being used for a floor covering to a limited extent in interurban service. This has been done even on cars recently rebuilt, such as those of the Tri-City Railway, which paid particular attention to merchandising features. In a few cases, primarily on interurban cars, grass carpet strips are used and even plush carpet.

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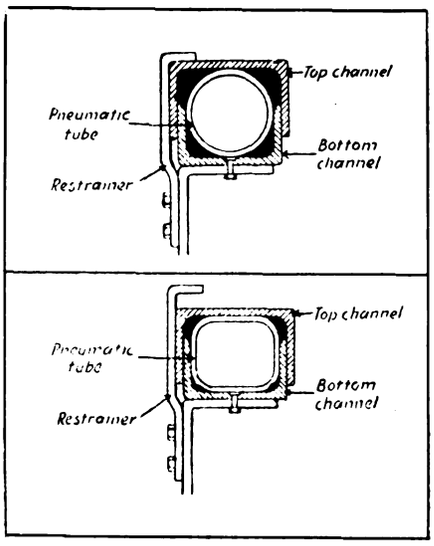
Stanchions, grabhandles and straps are still used in much the same way that they have always been used. The general practice today, however, is to utilize white enameled metal, aluminum or composition materials for these purposes. This is a practice which greatly improves the appearance of the car interior. The straps in many of the new cars are suspended directly from the roof. The old-fashioned rod from which the strap hung, and which ran from end to end through the car, is no longer in general use. Occasionally, however, grab rods have been substituted for the straps, and the latter have been done away with altogether.

One of the most important recent tendencies in car designs, so far as the impression created in the mind of the passenger is concerned, is the elimination of unnecessary paraphernalia inside of the car body. This tendency is clearly shown in several of the cars illustrated in this chapter. The straps are supported directly from the roof as already mentioned. The bell cord runs through a tube inconspicuously placed. Register rods have been either eliminated or else carefully concealed. Apparatus has been so located that it is inconspicuous. Some railways have even gone so far as to remove the advertising racks and placards inside the cars. This particular idea may not find wide favor, but nevertheless the general plan of simplifying the car interior, and eliminating every unnecessary device, has improved the vehicle very much from a merchandising standpoint.

There is a tendency to use better quality glass for car windows, even plate glass in some cases. This is all in line with the general policy of improving the appearance of the vehicle wherever possible.

Metal window posts are popular and there have been developed several spring slides for the window sash so that the window is held firmly and does not rattle. Closely spaced catches on the window posts are more convenient for the passenger and also safer, because there is less danger of the sash falling on his arm. Another advantage of the metal window posts, particularly the spring equipped type, is that there is less tendency for windows to stick than with wood posts.

Noise reduction in the operation of electric railway cars is being studied. Interesting investigations along this line were recently made by the London Underground Railway. It was found there that the noise can be divided into three classes, namely, that from wheel and rail shock, the rattling of brakes and other apparatus under and on the car, and motor and gear noises. Although such noises are particuarly disagreeable in the inclosed space of an underground tube, even in the open they also detract greatly from the pleasure of riding in an electric railway conveyance. Among the recommendations made by the investigating engineer in London, which would doubtless prove useful on any electric railway property, are the following: The use of fiber or fiber-supported wheels, increased length of springs, lubrication of springs, the use of stiff, double sides, and packing of the entire side wall space with sound absorbing material like slag wool or asbestos compound. After the London tests it was recommended that the wheels and all parts below the stepboards be heavily shrouded to deflect the sound. This of course appears to be a difficult matter to carry out on surface cars. A double flooring with ⅛-in. asbestos or felt between the thicknesses was also recommended. It was found that the floor was not such an important factor in the transmission of sound as were the sides and roof of the car. An unusual point mentioned in the report of the tests was that cross-seats have a tendency to reduce the noise inside the car by breaking up the sound waves.



A Pneumatic Supporting Arrangement for Single-Truck Car Bodies

Another interesting British experiment is a pneumatic supporting device for the body of single-truck cars. This is accomplished by means of two pairs of steel channels, one fixed to the body proper and the other bolted to the truck. Inside of the square space formed by these two channels is an inflated rubber tube. The device operates by shock dispersion, as any shock received by the truck is distributed over the whole body through the elastic medium of the air cushions. The wear on the tube is said to be almost negligible.

Value of Open Cars

One method of encouraging non-necessity riding that has in the past proved very successful is the use of open cars in summer. Due partly to the cost of changing over equipments and partly also to the greater accident hazard, many railways have abandoned the use of this type car. Those which still use it, however, are practically unanimous in the belief that it stimulates the riding habit. In Los Angeles, a combination car has been in service many years, the center part of the body being closed and the ends being open. Street railways in New York City and New England operate many convertible cars in which the panels between the window posts are removable for summer, and may be inserted during the winter. At the present time, few railways are willing to tie up money in unproductive equipment and hesitate to undertake the additional investment necessary for providing cars that could be used only during a few months of the year. For this reason it appears that development in the direction of open-car operation is necessarily limited to scenic routes where pleasure travel may be stimulated by their use. It has been suggested that a satisfactory solution of the question could be found in the Los Angeles type car, with panels possible of insertion between the posts in the open sections. Such a car would be quite suitable for either summer or winter operation.

From the viewpoint of selling transportation, it is not desirable that a car should remain in service too long. No matter how carefully we overhaul and remodel an old car, it always remains an old car. It is impossible to conceal the fact from the riders, and they recognize the car for what it is—an old-style vehicle. It stands out in painful contrast to every modern car operated. In considering any car rebuilding program, therefore, the advantages of new cars from the merchandising standpoint should be given due weight.

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Cars for Use in Train Operation

More Capacity by Intensive Use of Track and Men

Use of cars in trains increasing, with some activity in the direction of a car suitable for one-man or two-man single operation and in trains. The trend in trailer design with special consideration for reducing the standing time is treated. The distribution of the motors among various cars and several schemes of permanently coupled or articulated units are discussed. Newer developments in these directions largely experimental. Tendency is toward use of completely automatic couplers

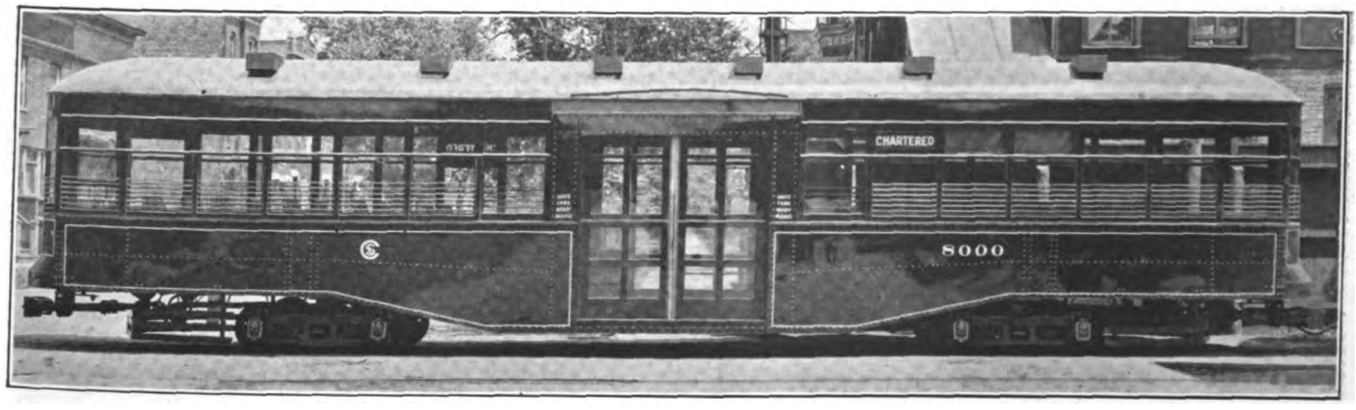
THE application of trains in electric railway work has become widespread. Not only are they advantageous on extremely heavy city lines, but for certain types of suburban service where regularity of headway is more essential than frequency they have advantages too great to be overlooked. They can be applied particularly well to various types of express service, and of course for rapid transit lines no other method of operation is considered. In interurban service, also, trains furnish a means of providing additional capacity for handling unusual crowds without the necessity of running extra sections, with the consequent complications of special train orders, unfamiliar meets and possible danger of collisions.

Two distinct methods of train operation have been developed in recent years. The first makes use of motor cars with sufficient power to haul one or more trailers, while in the other method all cars are motor equipped and are handled by some form of multiple-unit control. Considerable experimental work is now in progress along various lines, chief among them being development of articulated trains and trailers equipped with a portion of the motor capacity but without control.

Among outstanding recent developments in train operation are the production of types of trail cars particularly suited to the demands of mass transportation, and means of coupling them in such a manner that the train may be made up or broken without serious loss of time on the road. In urban service two-car trains with trailers rather than multiple-unit motor-car trains seems to be the preference. Motor and trailer trains have been adopted in many cities where congestion is severe in rush periods.

There is, however, a growing tendency toward the use of light cars, with simplified multiple-unit control, so that they can be used for train service in the rush hours and as individual units the remainder of the day. Some recent one-man two-man cars are also being equipped with multiple-unit control for train service. In this way the benefits of the one-man car can be obtained during the lighter hours, and three men can handle the train in the rush. Units of this type, to be efficient as one-man cars, usually are too small to give the best results in heavy rush-hour train service. Where the need for trains is felt acutely the better practice seems to be to use the largest units practicable for the purpose.

The transportation problem has been made more difficult due to the marked accentuation of peak loading. As the larger cities have grown in population and area, there has come great concentration of business and manufacturing districts, and residences have been forced farther and farther out. While this, of course, has increased remarkably the number of workers who have to be transported twice a day, there has not been a corresponding increase in the off-peak riding. Prominent among the causes for this change are the development of the automobile and its use by women and the leisure classes, and the establishment of community centers, so that a large number of the daily purchases of the family may be made near by. The



Light-Weight Double-End Chicago Trailer with Adjacent Entrance and Exit at Center

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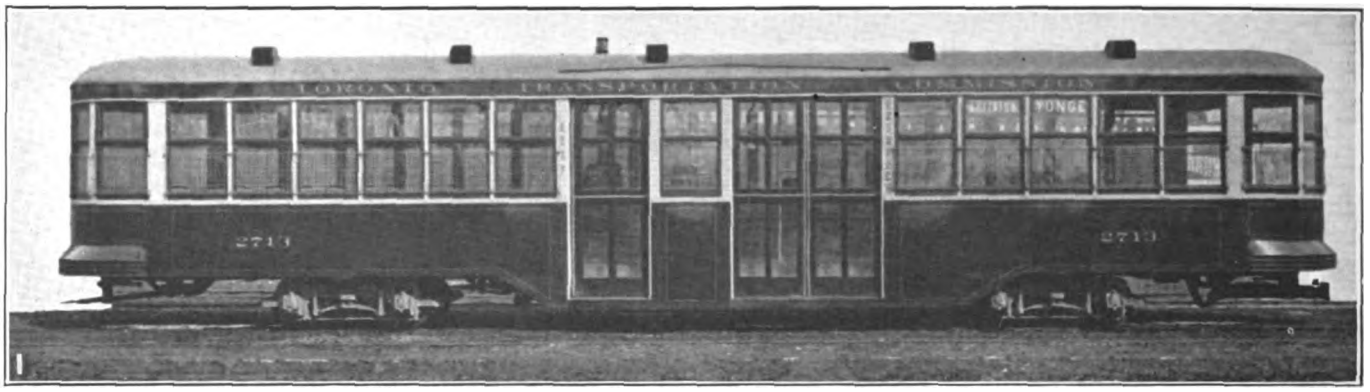
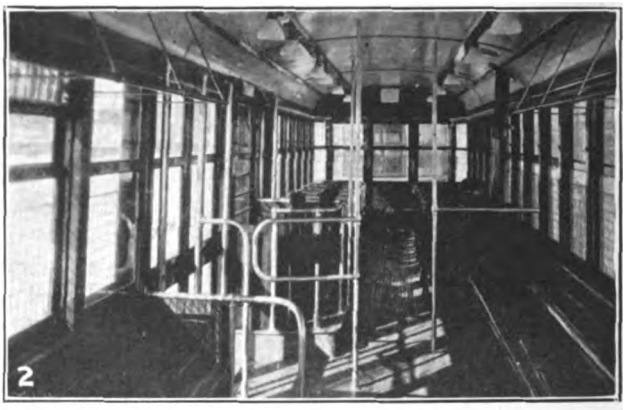
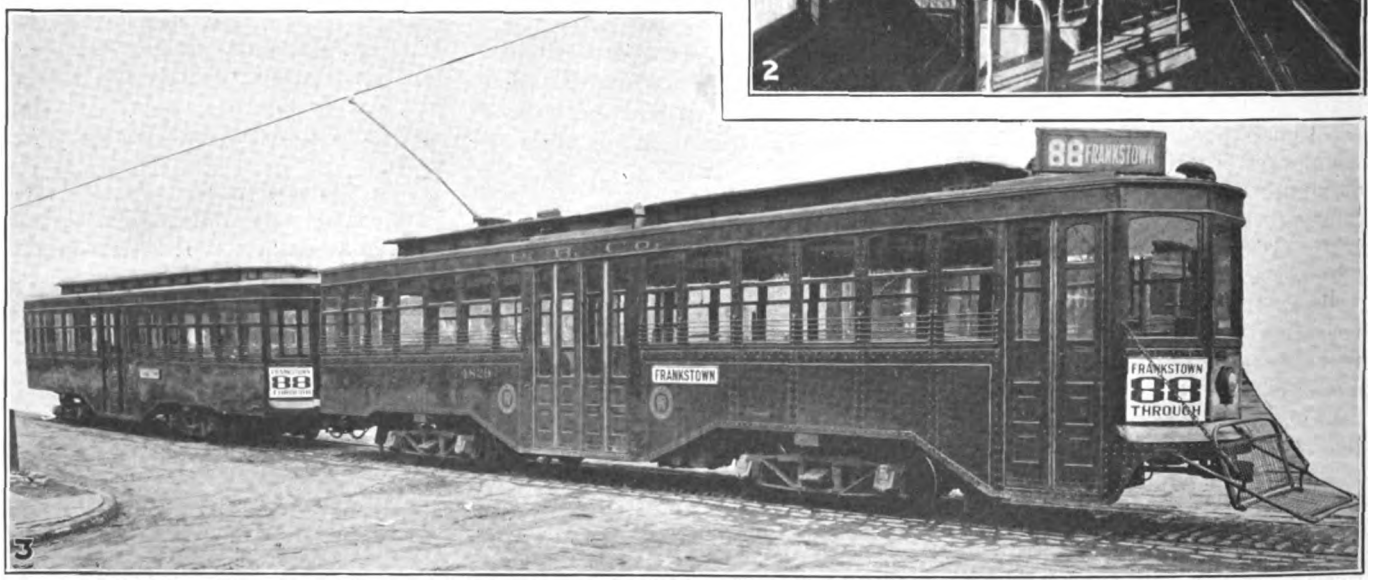
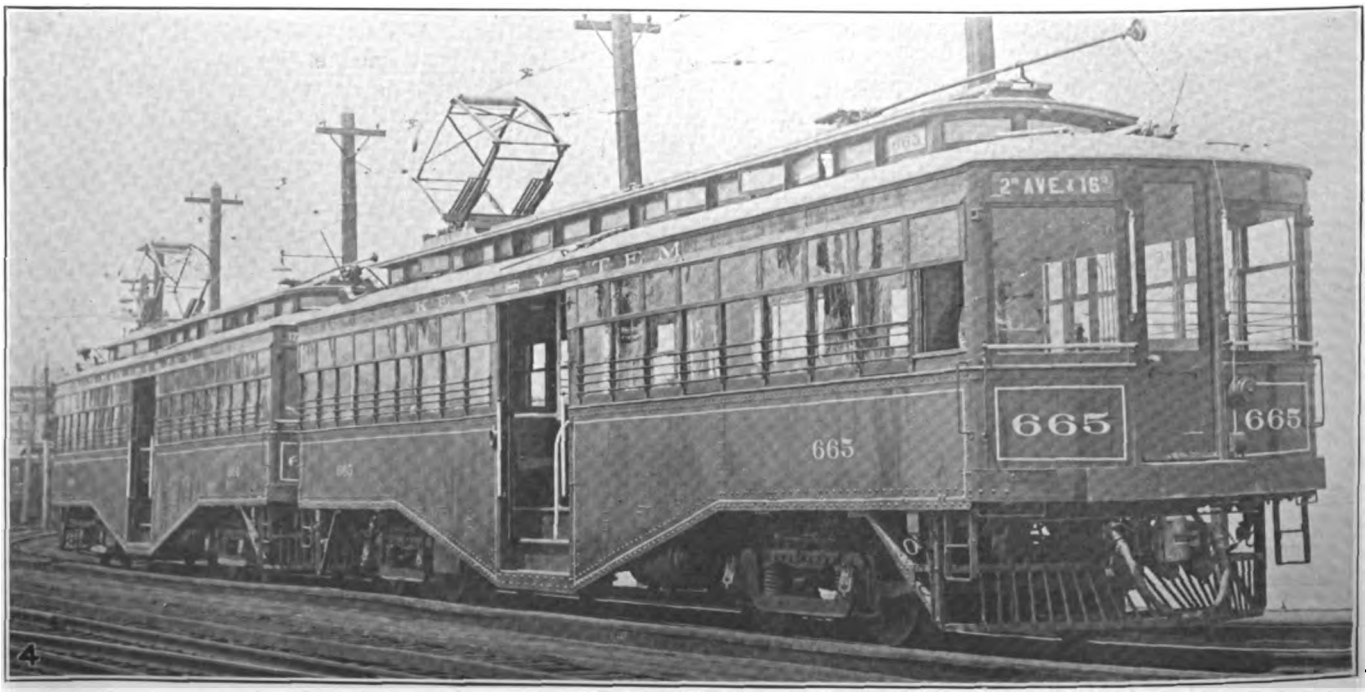


Special Features of Cars Used in Train Operation

1. Toronto three-door trailer for pay-as-you-pass fare collection.
2. Interior of Toronto trailer, showing adjustable barrier for directing passenger movement.
3. In the latest Pittsburgh train two motors are installed on the trailer.
4. Center-entrance trains of this type are used for high-speed interurban service on Key System in California.







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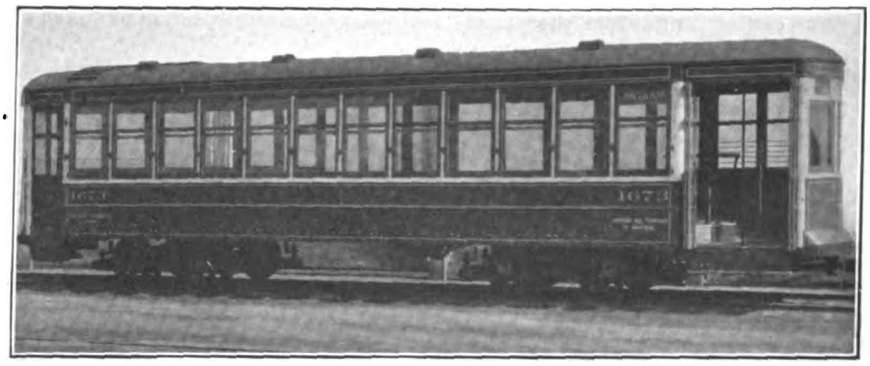
use of the telephone for ordering all sorts of merchandise and for conducting business generally also has cut down off-peak riding. Whereas the loading in the maximum hour ten years ago was perhaps twice that in the base, it now is more likely to run from four to ten times as great in the rush as in the mid-day.

Another factor that enters into the rush hour problem is the change in hours of labor in many of the trades. The general adoption of the eight-hour day has resulted in the workmen beginning their day's work so near the hour at which office workers start that it is not possible to get the cars back from the one load to take care of the other. In the afternoon the workmen are stopping work just before the office workers, and a similar difficulty arises.

Train Operation Reduces Congestion

Combined with these factors that have brought an accentuation of the peak demands, there has been a great increase in the movements of vehicles at the same hours that the maximum street car traffic is being handled, causing congestion far beyond what the original designers of the streets could have realized. This has resulted in the formation of congested points, usually at or near the business centers, but occasionally at other localities, where all traffic is slowed down. The street car, on account of the necessity for loading and discharging passengers, has been forced to bear the worst of the trouble. Regulations designed to keep the tracks free of interference frequently have been of little or no avail, and the difficulties incident to car movement have increased enormously. Operators are thus going more and more to train operation to reduce the number of units that must pass a given point.

Train operation is an excellent means of reducing congestion at intersections. Frequent tests have shown that the time taken by a two-car train in going through a street intersection is only about 30 per cent more than for a single motor car, although the carrying capacity is twice as great. That is, the use of trains, if properly spaced, can increase the capacity of an intersection as much as 50 per cent over what it would be were single units used exclusively. When the limit of capacity of the street is being approached closely, this is an advantage of no small importance. Of course, to get the most out of this, every movement must be co-ordinated with the others, so that there is no waste of time at the intersections. The stopping places should be chosen carefully so that a continuous stream of trains will be ready to pass through the intersection as soon as the signal is given by the traffic officer.



Montreal Front-Entrance, Single-End Type of Trailer

A number of railways have available cars that are either new or in good condition, which were designed for operation singly, but which have many of the characteristics essential for successful train operation. In general it has been the plan to utilize such equipment as far as practicable when installing train service, so as to reduce the required investment.

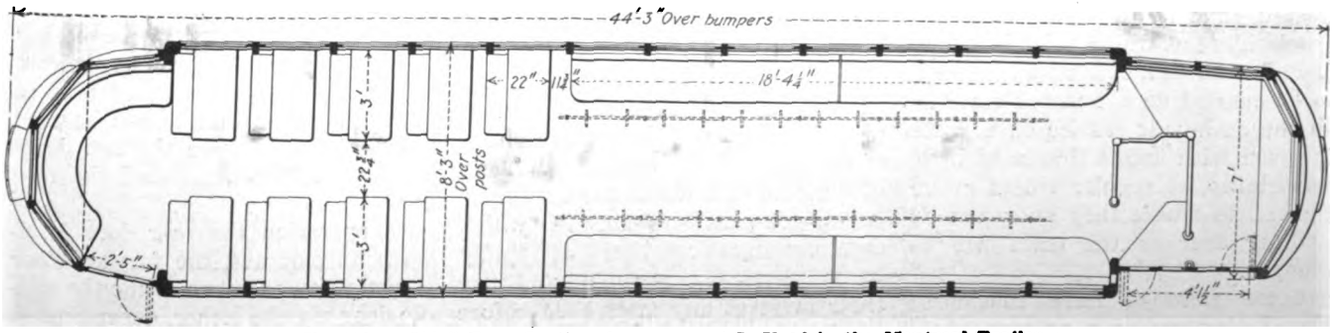
Many of the motors which were built a number of years ago have greater capacity than was anticipated in the design, especially since changes, such as the use of forced ventilation, have made it possible for them to carry excess loads for considerable periods of time. It frequently has been found possible to use these existing motor cars to haul trailers of light weight during the rush hours and thus provide large additional capacity for a few trips at reasonable cost. In many cases the motor cars have been used without change, except to add proper coupling equipment, while in some other instances they have been redesigned especially for train service.

For best results, however, the motor cars for train service should be designed for the purpose. Structurally, there need be little difference in the car design from cars operating singly, except that the sills and bolsters should be strong enough to stand the added strains. The major changes are in the arrangement of entrances and exits.

Facilitating Movement of Trains

The cars of a train, as nearly as possible, should all take the same time to load and unload. It is of little advantage to have the two cars equipped with time-saving devices if all the persons boarding or alighting at a particular stop use one or the other car alone.

Some persons have objections to riding in the trailers, engendered from the days of the old single-truck trains without adequate couplers, and in which the passengers bobbed around with little chance for comfort. For this reason particular attention must be given to the design



The "Near Side" Type Seating Arrangement Is Used in the Montreal Trailer

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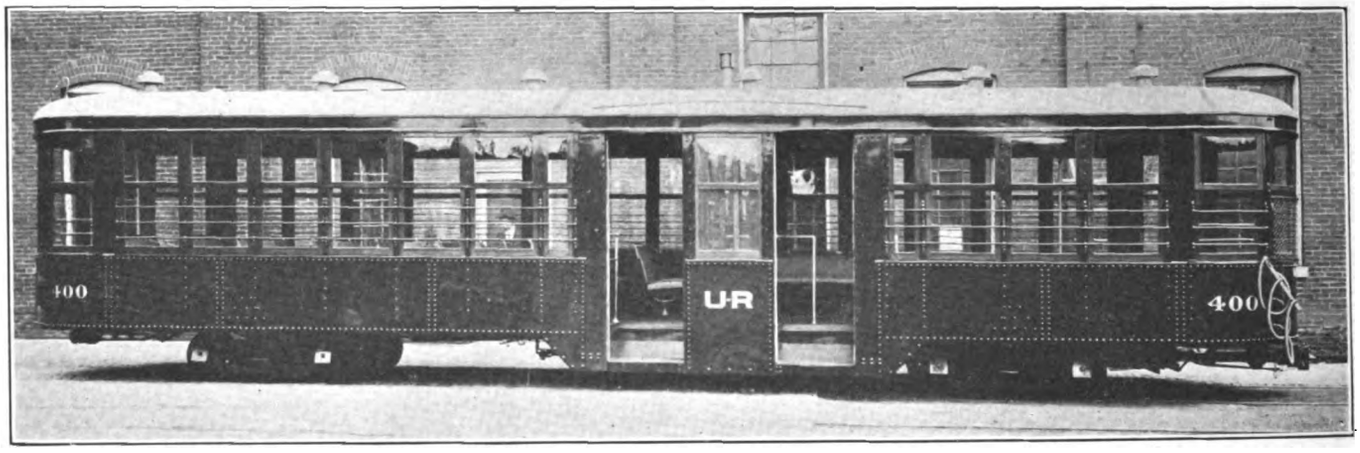
of the trailing unit from the standpoint of comfort, by making both exterior and interior attractive, providing cross-seats wherever possible, and mounting the car on easy-riding trucks. By proper publicity, attention may be called to the fact that the trailer is really an easier riding car than a motor car, since it has no motors and electrical equipment, and nearly all the weight is spring-borne. There is also the absence of noise from motors or gearing. It readily can be seen that the trail car is, if anything, safer than the motor car, particularly in the event of head-end collisions.

Since a fundamental idea in train service is to provide greater track capacity than is possible with single-car units, everything must be done to facilitate the movement of the trains. Also, it is essential that the control of the second car be in the hands of one man in order to save labor cost. This ordinarily leads to the use of one door, or group of doors, close together. Many disadvantages that have been cited against the center door for a motor car disappear when it is used on the second car of the train. The only remaining valid objection is that the location of the center door of the trailer is a considerable distance from the rear door of the motor car, so that where but a few passengers are waiting to board the train there is wasted time while the passengers are deciding at which point to enter, and also the bulk of the load is likely to be carried on the motor car. If all the rush-hour service on a route is given with trains this is of little importance, as regular riders group themselves where they know one or another door of the train will be stopped.

Some railways have considered that better loading results were obtained by making the trailer a front-entrance car so that the loading doors of motor and trailer would stop at practically the same place.

Door Arrangements for Trailers

It is even more desirable to have ample entrances and exits on train units than on cars designed for single operation only. Two designs of trailer are in general use, that with doors at the front end only, and that with center doors. Originally a single door was used at the center, but with cars seating fifty to sixty persons, and proportional standing space, this was found entirely inadequate, and double doors were substituted. Two distinct arrangements are now used for center-door trailers. In the first one the two doors adjoin, in general being operated by one engine or pair of engines working together. In the second arrangement there is a space between the two doors 1 ft. to 3 ft. wide, the doors usually being arranged for independent operation.



The Doors on This St. Louis Trailer Are Separated so that Pay-as-You-Pass Operations Can Be Used

"Pay-as-You-Pass" Plan on Trailers

One of the limitations of either of these designs is that with prepayment the passengers must board the car only at a rate such that fares can be collected. Hence it may not be desirable to open both doors at once. The rate of fare collection, then, is the real limitation to speed of loading. It is much slower than in the case of a motor car using the pay-as-you-pass system, in which case passengers can board as rapidly as is physically possible, and pay their fares at any later time before leaving the car.

This latter principle has been applied in several types of trailer built in recent years. An example of this is the St. Louis trail car. The two doors, which are located slightly forward of the center, are separated by a distance of about 3 ft., the conductor's position being between them. The forward door normally is used as an entrance and the rear one as an exit. Fares are collected as the passengers pass by the conductor in going from the front to the rear section.

It is possible to use both of the doors as exits at heavy unloading points, by blocking the passageway between the front and rear portions, and collecting from unpaid passengers as they leave the car from the forward portion.

A similar door arrangement was used in the first type of trailer built by the Toronto Transportation Commission. An interesting improvement has been made in the latest type of Toronto trailer. In this car there are three doors near the middle of the car, two of which adjoin, while the third is located toward the rear a distance of some 3 ft. In the space between these doors is the conductor's stand, containing the door control, fare box and change counter. The door control valves are so arranged that the conductor can operate the three doors independently of each other so as to control passenger movement.

A stanchion is placed on the car floor between the two forward doors supporting a gate made of pipe in such a position that it can be used as a barrier between the two doors or between the doors and the fare box.

In operation the rear door is always an exit and the forward door is always an entrance, while the middle door may be either, depending on the ruling direction of the passenger-

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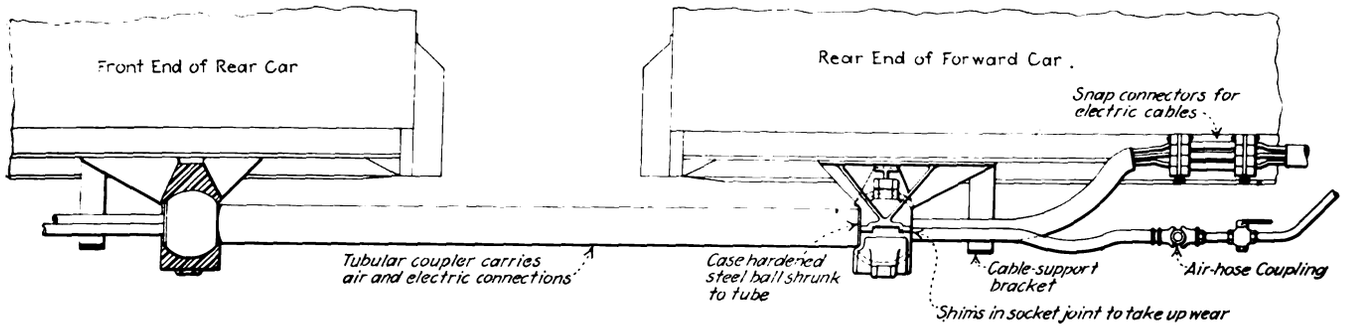
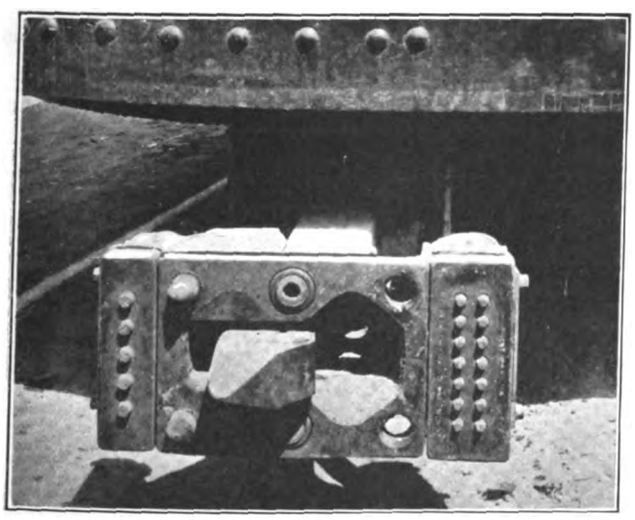


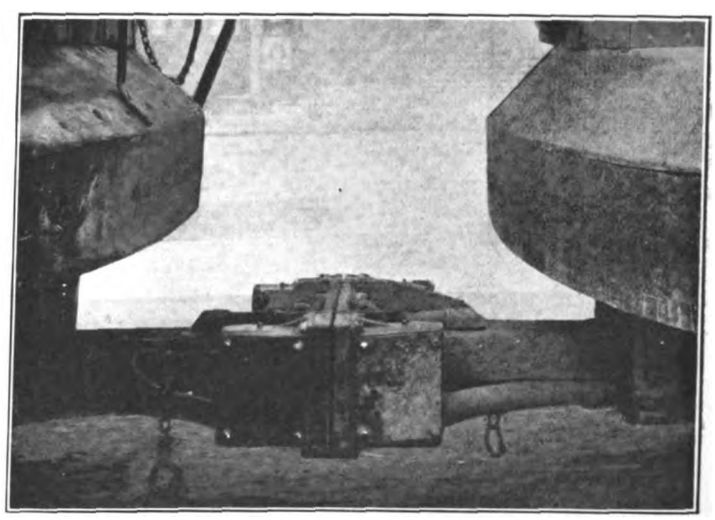
The Minneapolis Train Is Coupled Permanently with a Hollow Tube Drawbar Containing Air and Electric Connections

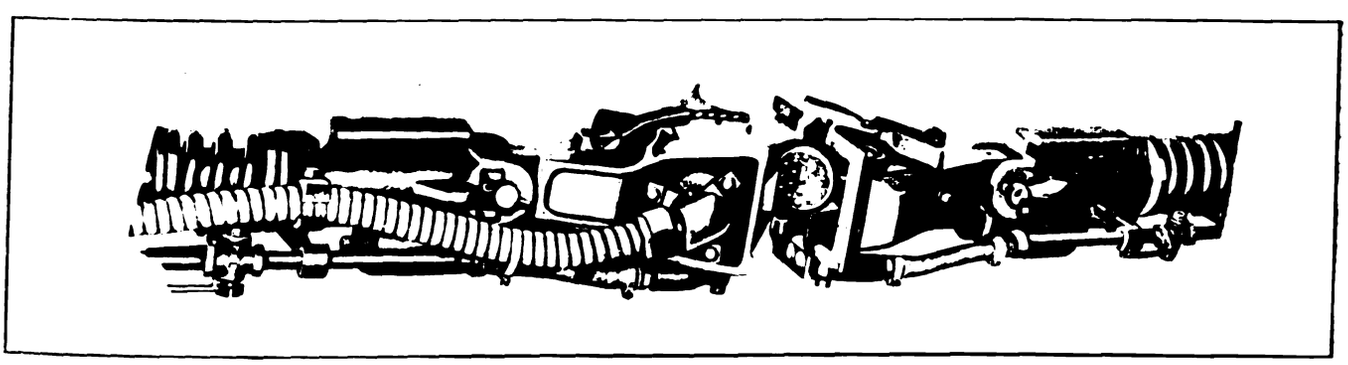
movement. Pay-as-you-pass fare collection is used. Inbound, during the morning rush, the two front doors are used as entrances, accommodating two streams of passengers, the barrier being set so that passengers turn slightly to the right as they enter. When the trailer reaches the unloading zone on the inbound trip the barrier is moved by means of a lever at the conductor's stand, so that passengers from the forward section of the car, who have not yet paid, may deposit their fares and leave by the door at the conductor's right, without interfering with those who had paid previously and who are leaving simultaneously by the rear door. In tests this arrangement showed a saving of approximately one-fourth the time taken with a two-door car of the earlier type. This arrangement of doors is used only for the second car of a train, the leading car being of the Peter Witt type.

In a train developed in Minneapolis by the Twin City Rapid Transit Company, consisting of two permanently coupled cars with front and rear end doors, there is an ingenious division made between the duties of the motorman and the conductors. The front door of the leading car is, of course, controlled by the motorman. Since he is not actively engaged while the train is standing still at a stop, control of the rear door of the front car also has been given to him. With a mirror he can see readily when this door may be closed. The conductor of the leading car, relieved of the control of the door at his own position, controls the front door of the trailing car, at which point there is no trainman. He can see directly from his position when the door should be opened or closed. The rear door of the rear car is directly under the observation and control of the second conductor. The controls are so arranged that changes in the method of operating the doors can be made readily.

A problem that must be faced in the use of trains for urban service is that of determining whether they will be used for the rush hours only, or will be in service all day. From the standpoint of merchandising transportation there can be but one answer. In the rush hours the problem is to carry as many passengers







Top. Left—In This Type of Automatic Car, Air and Electric Coupler the Electric Contact Heads Are Mounted on the Sides.

Right—Spring-Supported Carriers Provide for Breaks in Grade in This Type of Car Coupler.

Below—A Type of Automatic Car, Air and Electric Coupler with Electric Contacts Contained in Head.

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as possible, and this is best done by the use of units as large as can be handled effectively on the streets.

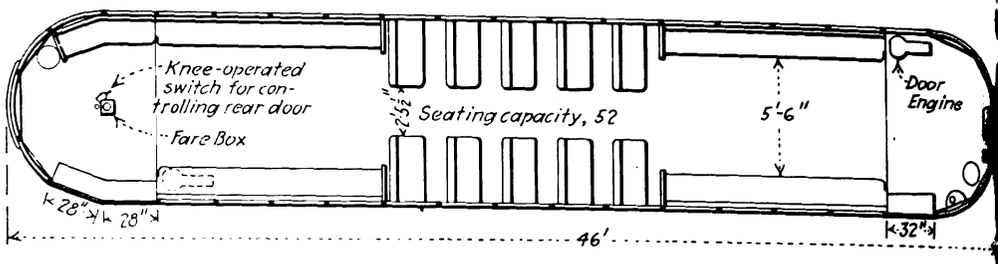
The non-rush problem is entirely different. For the non-necessity rider it is a matter of convenience. When it is known by the patrons that frequent car service is available, more rides will be taken, and the family automobile will be left in the garage to save "gas" and the worries and inconvenience of parking downtown. But in most cities there is not enough of this non-necessity business to justify frequent service with units seating over 100 passengers, and even in the largest cities the number of such lines is very limited. Even a fifty-passenger car is large for most mid-day requirements if "car-in-sight" service is given.

In Cleveland and Detroit trailers are run all day on certain lines. The service given is not, of course, on as short headways as could be provided with single cars. There is a saving in platform labor from the train operation, but for a considerable part of the non-rush periods there are many empty seats that are provided in order to prevent such long headways that riders would be driven away from the lines.

Considerations in Adopting the Most Suitable Form of Train

A limitation to the extension of the use of train operation in city service, particularly for the non-rush periods, is that the streets where congestion is most acute, and which at first sight may appear most suitable for train operation, ordinarily are served by groups of lines which divide and go to various destinations on diverging routes outside the business center. Even where the trunk line is not split in this manner, it may be desirable to give a considerable amount of short-line service, which has a similar effect in limiting the applicability of such large units.

The principal difficulty encountered in attempts to use the one-man car for the mid-day, supplemented with trains for the rush hours, is that the two types are not equally suitable for the heavy requirements. Mixing trains and single units on a route leads usually to overcrowding of the single cars and underloading of the trains, with headways distorted and service poor. It is much better to have the equipment on a route or group of routes uniform, and take care of the variation in load requirements by modifying the spacing between cars.



In the Minneapolis the Conductor of the Forward Car Controls the Front Door

The best answer to the question of flexibility of service may be found in the use of multiple-unit trains. With identical units the non-rush demands can be taken care of without difficulty by use of single cars, and in the rush the trains can be made up on short notice by attaching identical cars to them. With modern types of control and automatic couplers this can be done readily. The latest development in giving flexibility of equipment has been the one-man two-man car arranged with multiple-unit control to allow train operation during the rush hours. As previously pointed out the limitation in this attempt to provide a "universal equipment," that is, one-man two-man cars and three-man trains, is the fact that a car which is suitable for one-man operation is not the most efficient unit for conditions which call for train operation. That is, if not too large for one-man operation, it is too small for train operation.

In some instances arrangements have been tried using four-motor cars for all-day service, supplemented by cars of practically identical type equipped with two motors having like electrical characteristics, and with control. The operation is the same as where all cars are alike, except that care must be taken that the four-motor cars are the ones used for the base service, since the others would not be able to give the speed required, and the motors would be liable to overheat. It is, however, a compromise between trailers and the ordinary multiple-unit operation that merits attention.

Tests have been made on various combinations of motor cars and trail cars for train service, with a view to determining the best arrangement of the electrical equipment. Unquestionably straight trailer operation calls for the least investment, since the power can all be concentrated in two or four motors, with a simple type of platform controller. The electrical connections to the trailers need only supply lights, heaters, and signals, and can be made without difficulty by the automatic couplers now on the market.

The use of multiple-unit trains involves the use of a more complicated control which, although it can be made entirely satisfactory, is somewhat more expensive to install and maintain. The flexibility obtained by this arrangement is, on the contrary, very much greater than where trailers are used.

A type of train intermediate between the trailer and the multiple-unit train has been developed recently by the Pittsburgh Railways Company. A four-motor car of the type standard in that city is coupled with a trailer car equipped with two similar motors. By using an ingenious method of wiring a three-line jumper provides for motor connections between the cars, there being no controller on the second car. The advantages obtained for the train are that the motor capacity is better proportioned for the work than where straight trailers are used, and that the expense of construction and maintenance are considerably lower than with multiple-unit control. The motors on the second car are permanently connected for forward motion, as the four motors on the motor car furnish sufficient power for backing. The second car, although equipped with motors, remains essentially a trailer, and must be handled about the yards and shops as if it had no electrical equipment whatever.

In Milwaukee an arrangement has been tried for using two double-truck cars to form a complete unit for train service. A permanent flexible coupling and vestibule is provided between two cars. Directly under the coupling is placed a swiveling truck, the two inner trucks of the cars being taken off, so that the entire unit is supported on three trucks. The train, of course, can only be operated as a single unit, and thus is suitable for rush service only.

The idea of the articulated unit has been carried still further in the design now being worked out for

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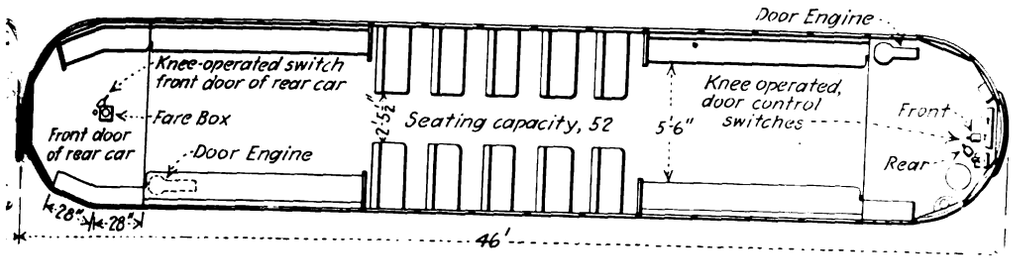


of the Trailer While the Motorman Controls the Rear Door of the Motor Car

use in Detroit, which is shown in an accompanying illustration. There are three separate bodies connected with flexible vestibules. Trucks of ordinary design are placed at the ends and carry the four 60-hp. motors that propel the train. The motors are controlled by a platform type controller, operation being single-ended. The two inner trucks are of special type, and are placed over the swiveling joints between the center section and the two end sections.

Connection between the bodies is made in an ingenious manner by means of a vertical cylinder supported from the truck and rotating with it. The end of the car is also cylindrical, and rotates around the vestibule section.

The two conductors are placed between the sections, collecting fares on the pay-as-you-pass system. In the morning the two end doors of the unit are to be used for loading and the center door for unloading, while the process is reversed in the evening, the entrance being at the center and the exit at the ends.

It is expected that this type of car will have the advantages of lower first cost, less platform labor, maintenance, and power costs than with trains of the ordinary type. It is, however, extremely large for operation on city streets, and has a disadvantage from the schedule standpoint of having 140 seats in a single operating unit. The necessity of taking the entire unit out of service to do repair work on one of the sections is to be met to a certain extent by substituting another section for the one out of order. The weight of the complete unit is estimated at 72,000 lb. The cars now in use in Detroit weigh 37,000 lb. and seat fifty passengers.

In the few instances where trains are in use that are permanently coupled, this of course means that the two cars must be considered at all times as a single unit. This limits their use for practical purposes to the rush hours. Unless the single cars which are in service all day are coupled with second cars to give trains practically uniform with the permanently coupled units, there will be the non-uniformity of equipment mentioned previously that leads to unsatisfactory loading conditions.

The permanently coupled train has the further disadvantage that in case one of the cars is disabled the entire train must be taken out of service and laid up for repairs, while with couplers the disabled car can be removed and another substituted quickly. This means that a greater provision for reserve equipment must be made.

So far as the mechanical arrangements with permanent couplers are concerned, they can be made quite satisfactory. Probably the most recent development in this direction is the unit designed by the Twin City Rapid Transit Company, which is shown in an accompanying illustration. For coupling, a special hollow round bar is used, with a ball-and-socket joint connecting it to each car. The electrical and air connections are carried within this hollow coupling bar. It is stated that tests have shown this rigid type of coupling to be very satisfactory.

Modern Coupler Practice

The selection of coupler equipment is nearly always limited by at least three conditions. First and most vital is the minimum radius of track curvature to be encountered on the system; second is the existence of abrupt changes in track grade; and third is the adaptation of the coupler to existing cars that must be equipped with them.

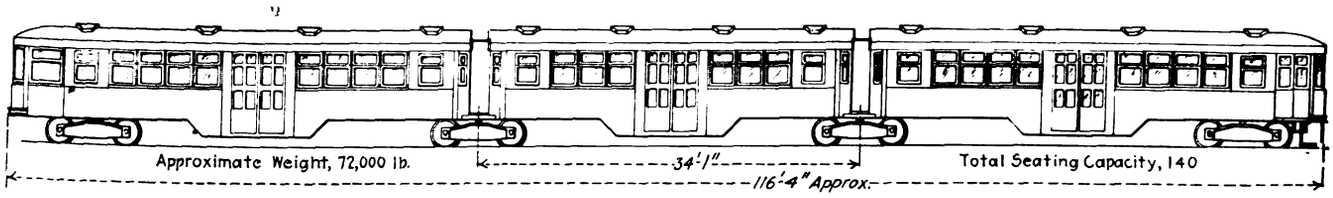
Satisfactory coupler equipment demands a certain space under the end of the car, and the very nature of the device makes it essential that the clearance space be kept free of all obstructions, even though they be such important parts as fenders, car steps, or door operating mechanisms.

In recent years it has been found increasingly desirable to incorporate also such electrical connections as are necessary into the coupler, so that all or a large part of the wiring can be connected automatically when the cars are joined. In trailer service this may consist only of the light and heat wiring, although it is possible also to connect such circuits as door interlocks, buzzer and bell signals through the couplers. The simple action of bringing the cars together makes all the mechanical, air and electric connections automatically. It then is necessary only to throw two air cocks to open up the air brake line.

For multiple-unit control it is possible to carry the leads for the control wiring in the coupler head, so that these circuits are all completed automatically. Until recently the power wiring has been carried in separate jumpers that have to be connected by hand, as the insulation of contacts in a coupler head is quite difficult on account of the limited space available and the exposure to dirt and moisture.

Equipments have been placed in operation in Kansas City and elsewhere in which the necessary power lines are carried through the couplers. These have been in service approximately one year and are reported to have given satisfaction. The type of coupler used is shown in an accompanying illustration.

In connection with one type of coupler the cocks for cutting off the air when the cars are uncoupled are on the same shaft with a drum carrying the electrical connections, so that the act of closing the air cocks automatically disconnects the exposed contacts in the coupler head. In another type of coupler efforts have



The Proposed Detroit Three-Car Articulated Unit Is to Be Handled by Three Men

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been made to provide a shutter that protects the coupler head against the weather when it is exposed at the end of the train.

In conclusion, it may be said that while there is at present a great deal of activity in the direction of developing a universal car applicable to one-man or two-man single-car operation, and to three-man train operation, there is not sufficient evidence as yet to demonstrate that this would be as good for very heavy service requirements as the large capacity cars designed specifically for such train service.

Mechanical and Electrical Equipment Keeps Pace—I

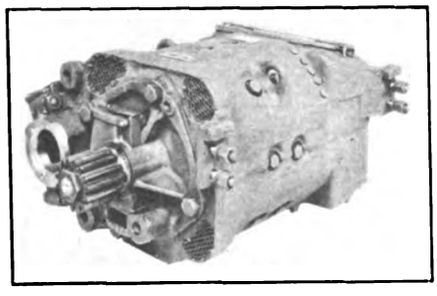
(*Continued from page* 519)

eral decrease in car weights, has produced a rather difficult situation for the truck designer.

The subject of truck springs is almost entirely a problem of the relation between minimum and maximum loads. In the case of street cars the minimum load is the weight of the empty car body together with those truck and equipment parts that are supported by the springs. The maximum load is the sum of this constant or dead load and the variable passenger or live load. The springs must be designed for this maximum load plus a certain reserve for unusual loading conditions or for the effect of road shocks. As the weight of cars has been decreased, the live load has gradually approached the dead load in value, and in many modern cars has become very nearly equal to it.

The importance of low step heights makes it necessary to carry the car body as low as possible on the truck. This requirement has held the clearance between body and truck parts to an average value of about 3½ in. This condition adds again to the difficulty of obtaining easy riding springs without at the same time obtaining either excessive deflections or fiber stresses for comparatively small overloads.

The conditions encountered have led to various arrangements of modern truck springs to provide graduated or compound spring systems which would give easy riding under small passenger loads and at the same time restrict the maximum deflections under extreme loading conditions. The method of providing a light-load helical spring with limiting stops on the spring caps was described under the discussion of the arrangement of springs in trucks.



Modern Full Ventilated Railway Motor, Showing Arrangement of Air Openings in Frame

Another method developed is based on making the elliptic spring the light-load unit and limiting its deflection by interposing a comparatively stiff spring between the bands. In this design a full-elliptic spring is located under the bolster and a volute or flat spiral spring wound in a helix is mounted between the bands of the full-elliptic so that although the latter is made flexible enough to absorb vibrations under light load, the total deflection is limited under heavy loads by the action of the stiff spiral.

In order to obtain spring capacities sufficient to prevent undue deflection under heavy load, and at the same time provide the necessary flexibility to insure easy riding under light load, there has been a tendency to work truck springs under street cars at fiber stresses that are close to the elastic limit of the material. Under such conditions an unusual road shock or extremely heavy passenger load will cause a permanent deformation of the springs. This results in a settling of the body, and it has been necessary in many cases to insert blocks under the center bearings to maintain proper clearances after cars have been in service. As a result of this condition, many cars which were originally designed with desirable step heights are actually operated with bodies blocked up to an excessive height.

The use of higher grade materials for car springs as a solution for some of these problems has been considered. There is a tendency, however, to favor the development of improved spring arrangements which will hold down the stresses imposed on springs of present materials by the further application of graduated spring systems similar to those described.

The balance of this chapter, which describes the developments made in air brake, control and current collecting apparatus, will be published in next week's issue of the JOURNAL.

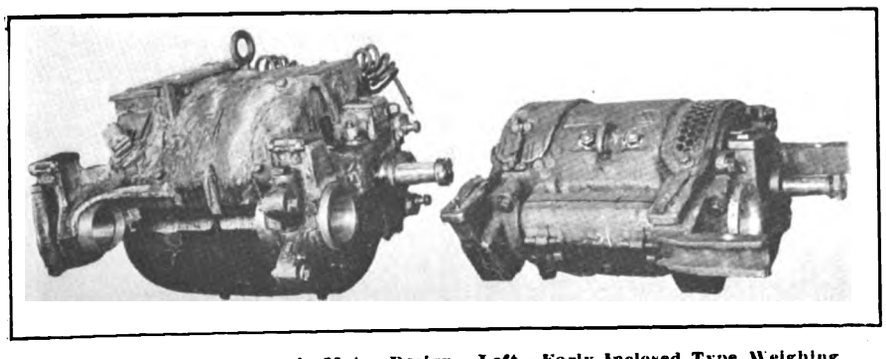


Illustration of Progress in Motor Design. Left—Early Inclosed Type Weighing Approximately 70 Lb. per Horsepower. Right—Modern Ventilated Design Weighing 32 Lb. per Horsepower

American Association News

The Largest Street Railway Exhibit Ever Held

REPORTS from Manager F. C. J. Dell, in charge of exhibits at the Atlantic City convention, indicate that this will be the largest street railway exhibit ever held in this country. Up to Sept. 26, 73,044 sq.-ft. of exhibit space had been rented. This compares with 62,219 sq.ft. at Atlantic City in 1919, 59,528 sq.ft. in Atlantic City in 1920, and 62,095 in Chicago in 1922.

On Sept. 26 of this year the number of exhibitors was 160.

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The News of the Industry

City Is Insistent

Mayor of Davenport Says that Tri-City Railway Must Meet Its Paving Obligations

Mayor Alfred C. Mueller of Davenport has replied by letter to B. J. Denman, president of the Tri-City Railway, who recently notified the Mayor that unless some remedial action was taken service would probably be discontinued. The Mayor has now demanded that the company proceed with the work it contemplated doing and carry it to completion. It will be recalled that the company had stated that unless some plans for relief could be worked out within a reasonably short time (ninety days at the most) there was no alternative save to turn the property over to the creditors to obtain what they could from the salvage of the physical properties.

COMPANY NOTIFIED TO PROCEED

The communication of the company to the Mayor, published in full in the ELECTRIC RAILWAY JOURNAL for Sept. 15, page 419, was read at the committee of the whole meeting of the City Council on Sept. 4 and at the regular meeting of the Council, on Sept. 5, was referred back to the committee of the whole. After receiving the communication and after it had been discussed to some extent, some doubt existed as to the meaning of the sentence "in the meantime it is clear that the company is absolutely unable to proceed with any of the public improvements now contemplated."

At the request of the members of the Council, the Mayor asked for further information and was told that this meant that the Tri-City Railway did not intend to go on with the completion of its part of the extensive paving program planned and contracted for by the city authorities.

At the committee of the whole meeting of the members of the City Council on Sept. 19, the letter from the company was again discussed and at the conclusion of this discussion, a motion was unanimously adopted that the Tri-City Railway be notified to resume forthwith its paving work and carry out the company's part of the paving work which has already been contracted for by the city.

In his letter to the company the Mayor said:

Your attention is called to the fact that in the early part of this calendar year, after the Council had decided upon its paving program, the proper notices required by law, were given to all parties concerned and among others, your company received due notice of the contemplated improvements. Subsequent to that time, matters relating to this paving were frequently discussed by officers of your company and representatives of this city. At no time was a formal protest or objection made on the part of your company and there was no intimation that you would fail to carry out your part of the agreement. The city entered into contracts for the construction of this paving fully believing that your part of the work would be promptly done.

During the negotiations relating to the rerouting plan submitted by your company, the matter of paving was again freely discussed and representatives of your company stated that no matter what the final disposition of the rerouting plan would be, that your company would carry out in full its part of the paving.

A large part of the paving has been completed and yet there are some extremely important paving jobs which are unfinished and which cannot be completed in a satisfactory manner if you persist in your refusal.

The members of the Council therefore feel that the attitude you are now taking is not a consistent one and is entirely out of harmony with the position taken by representatives of your company heretofore. They feel that your company is legally and morally bound to go on with the work and carry it out to completion and I am taking this opportunity to inform you of the action of the Council and to demand that your company forthwith proceed with the work and carry it out to completion.

Philadelphia Voters Approve Fund Transfer

By a vote of practically four to one the citizens of Philadelphia on Sept. 18 expressed their approval of "Step No. 1" of the proposed comprehensive transit plan adopted by the City Council after a series of meetings with the Transit Commission and the Philadelphia Rapid Transit Company. "Step No. 1" provides for a four-track Broad Street subway from Olney Avenue to Spruce Street, the Ridge Avenue loop and subway lines in Chestnut and Walnut Streets to West Philadelphia.

The election showed the voters approved the using of funds voted for in 1916 and 1920 for the new plan instead of for the purposes for which they were originally intended.

The various steps in the transit program in Philadelphia have been outlined previously in the ELECTRIC RAILWAY JOURNAL.

Acquires Property for Power Development

With the acquisition of the Toledo & Western Railroad line and two large utility properties at Adrian, Mich., the Doherty interests will make that road the basis for considerable development in the distribution of power to municipalities and industries along the right-of-way. The Citizens' Light & Power Company and the Lenawee Gas & Electric Company, valued at more than $1,000,000, have been purchased by the Cities' Service Company. The Adrian Street Railway and the Toledo & Western enable the company to tie in these properties with the Toledo Edison Company and other Ohio properties.

Electrification Suggested

Engineers Complete Studies of Albany Zone Changes—Immediate Work Not Planned

Electrification of the Boston & Albany Railroad from Albany, N. Y., to Springfield, Mass., and the electrification of the new Hudson River Connecting Railroad and the freight yards in the Castleton-Ravena-Selkirk area are the next big steps in the transportation development of the district at Albany.

ENGINEERS' REPORTS PRESENTED

Reports and recommendations made by engineers covering the electrification work have been submitted to officers of the New York Central and the Boston & Albany, as a part of the program of improvements to be carried out in the future, but the decision remains to be made by the officers of the company as to when the work will be commenced. Chief Engineer G. W. Kittredge says that he does not believe the work will be authorized this fall, and he has no definite information as to whether it would begin in the spring.

The plan covers 100 miles of electrification on the Boston & Albany and the establishment of a full electrical equipment for the company's freight yard at Selkirk.

Proposed electrification of the Boston & Albany calls for catenary type of construction such as is in use on the Chicago, Milwaukee & St. Paul road's electric division, with a 3,000-volt direct-current load. The Selkirk yards are to be unique in their bulk classification work and it is said that because of this very fact the application of electrical power will be a big economy.

Extension of New York Central electrification from Harmon toward Albany has no direct connection with the proposed electrification of the Boston & Albany, it is said.

CONNECTING RAILROAD IS NEARLY COMPLETED

Work on the Hudson River Connecting Railroad, which began last fall, is a little more than half finished. The contract includes erection of a bridge across the Hudson at Castleton, connection on the east side of the river with the Boston & Albany tracks not far from Niverville, and connections on the west side with the present West Shore line, as well as the establishment of the largest freight yards in the world. The original contract represented an expenditure by the company for this work of approximately $20,000,000.

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Chicago Surface Trackmen Want to Return

Trackmen employed by the Chicago Surface Lines, on a lone strike since Sept. 12, were reported on Sept. 26 to have had their overtures to return rejected by the company. Skilled mechanics—electricians, machinists, sheet metal workers and others—who had voted with the laborers to strike on July 30 agreed to accept Mayor Dever's advice and arbitrate.

The substation electricians have made no demands as yet. They receive $200 a month and chief electricians are paid $210 a month.

The trackmen, however, refused to accept arbitration and quit work. At another meeting held subsequently the laborers by a vote of four to one decided to continue their strike. Officials of the surface lines declared that the strike was not affecting service. One official said that the company had all the men necessary for emergency repairs and could run for six months if necessary without the strikers.

The trackmen number about 1,200. They want an increase of 28 cents over their present minimum of 54 cents an hour.

The union laborers and mechanics voted originally to strike rather than accept the company's wage increase offer of 3 cents an hour.

The company's offer was the same as the wage increase granted the motormen and conductors by the arbitration board which settled the wage dispute between the company and the union carmen.

The laborers and mechanics demand that their wages be increased all the way from 10 to 45 cents an hour.

The present wage rates and the rates demanded by the unions organized among the men employed by the railway company follow:

Union	Present Wage Per Hour	Wage Demanded
Electricians No. 713 (armature winders)	$ .90	$1.00
Electricians No. 9 (linemen)	1.10	1 25
Blacksmiths	.92	1.10
Sheet metal workers	.90	1.00
Machinists	.90	1.00
Patternmakers	.80	1.25
Laborers	.54	.81
Painters	.60	.87
Assistant foremen	.67	.94
Wreck wagon drivers, per day	5.20	6.50

Extension to Cost $4,000,000

An extension of the Dorchester tunnel in Boston and the use of the Shawmut branch of the New York, New Haven & Hartford Railroad to Mattapan station is assured by the action of the Boston City Council in accepting the legislative act of the present year. The work will begin early next year, will take about two years to complete and will cost approximately $4,000,000, and after it has been built it will be leased by the city to the Boston Elevated Railway.

The present tunnel will be extended from Andrew Square, under Boston Street and under land of the Old Colony Railroad, coming to the surface by an incline south of Dorchester Avenue. Then there will be a surface track to Harrison Square, whence the tunnel cars are to run over the electrified Shawmut branch of the New Haven railroad to Mattapan, at the junction of River Street and Blue Hill Avenue.

Mayor Curley would depress the tracks all the way out so that a highway may be constructed above them like Park Avenue in New York.

Brooklyn Officials Not Culpable

No Indictments in Connection with "L" Accident—Tightening of Operating Rules Suggested

In a brief presentment handed up to County Judge Reuben L. Haskell on Sept. 10 the June Grand Jury of Kings County reported that in its investigation of the accident of June 25 on the Fifth Avenue elevated line of the Brooklyn-Manhattan Transit Corporation at Flatbush and Atlantic Avenues, Brooklyn, in which eight persons were killed and about fifty injured, it found no evidence of culpable or criminal neglect and no evidence sufficient to warrant an indictment against any one.

Included in the report were a number of recommendations growing out of the Grand Jury's investigation. The first recommendation was that trackwalkers should be of a more intelligent grade and should be able to speak the English language. The second was that there should be more stringent inspections of all vital parts of rolling stock and structures. The other recommendation dealt with construction features and relations with the Transit Commission. The jury said:

> We respectfully report to the court that we have been unable to discover evidence sufficient to warrant an indictment against any person for culpable, or as is sometimes called, criminal negligence.
>
> Trackwalkers—These men should be of a more intelligent grade, thoroughly able to read, write and speak the English language, and their routes should be shortened to one-half of the present length, so that more frequent inspections of the roadbed can be made.
>
> Inspection—For the safety of the public at large a more stringent inspection of all vital parts of rolling stock and structures should be given in greater detail throughout the entire system. To this end we suggest that the bonus be doubled which is now given to inspectors on the discovery of defects which might cause accidents. This would serve as an incentive to the inspectors to make their inspections more complete.

In regard to repairs to structure and roadbed, the Grand Jury recommended a complete system of indexing short and long ties, inner and outer guard timbers, by means of plates numerically arranged, so as to expedite repairs and renewals on a sectional basis. Regarding all steel running rails, guard rails, frogs, switches, switch stands, fish plates and special steel work, it is recommended by the Grand Jury that a sectional system also be adopted, and that each and every part of the aforementioned steel parts be stamped numerically with steel dies. The report then says:

> By adopting this system the entire road, including all wood and steel work, would be subdivided into sections, from station to station.
>
> We suggest that the installation of inside steel guard rails at switches to the limit of practicability, so as to lighten the thrust imposed on outside guard timbers in case of derailment.
>
> We also suggest that rules be promulgated and rigidly enforced regarding the speed with which trains may approach frogs and switches. We further recommend that steel girders, extending upward at least 3½ ft. above the roadbed, be installed at all curves and at special work where the running rails are interrupted by frogs and switches. At these points experience teaches that derailment most frequently occur. These girders would serve to prevent derailed trains from running off the structure.

In regard to the Transit Commission, the Grand Jury said in its presentment:

> We strongly recommend that all orders of the Transit Commission for repairs and renewals be more promptly complied with than is done under the present system. We understand that this commission is authorized by law to see that its orders are promptly carried out and that such orders are to be regarded as mandatory rather than as mere suggestions.
>
> We likewise recommend that a closer relationship, if possible, should be established between the Transit Commission and the railroads to the end that the safety of the traveling public will be first, last and at all times in the minds of those charged with this duty.

Will Discuss Railway Offer

Negotiations between the city of Ottawa and the Ottawa Electric Railway will be started at once looking toward a settlement of the railway question with respect to extensions and service changes. Mayor Plant said that he would call a meeting of the Board of Control to consider the latest offer advanced by the railway company, as he believed that not a moment should be lost in coming to some agreement.

The company's offer asks for a renewal of the 1893 agreement with the city, but with supplementary amendments. One is for the cancellation of the special rates which provide for the sale of eight tickets for 25 cents good at specified times and seven tickets for 25 cents good at other times.

Permission is also being sought for exemption from taxation except that the usual assessment on real estate be made to apply as long as the renewed agreement exists. The company also asks for the right to operate one-man cars on the lines where traffic is light. The company asks the city to prohibit other passenger carriers, excepting taxis and cabs operating within the city, but offers no objection to interurban business.

The proposal wipes out Sunday fares, leaving the 5-cent rate for adults, 3 cents for children, school children twenty for 50 cents and the 10-cent rate after midnight.

General Manager Burpee stated that the company would be willing under these conditions to maintain the 5-cent fare and complete the Feustel recommendations as to extensions by the end of 1928 when the present automatic renewal of the present franchise expires. It is the suggestion of the company that at the end of this period the rates could be changed if the company could prove before an impartial referee that they are necessary and yet give the city the right to purchase the railway at the end of the five years.

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Five-Cent Fare to Be Tried in Jersey

Public Service Railway, Although Doubtful of Outcome, Withholds Request for 10-Cent Rate to Adopt Suggestion of Public Service Commission—New Fare Effective Oct. 1

A 5-CENT fare is to be charged within city limits by the Public Service Railway of New Jersey for a trial period of four months. In general this rate will apply only within the city limits of the larger communities. Beyond the city limits to the end of the original 8-cent zone another 5 cents will be charged. Beyond that 8 cents will be charged in each zone. Transfers will be issued for 1 cent only on the 8-cent lines. Announcement to this effect was made by the company on Sept. 27. Action by the company to this end was taken on the suggestion of the Board of Public Utility Commissioners. President McCarter says he entertains grave misgivings as to the financial results of the plan, but indicates in his letter of acceptance of the suggestion that he desires to co-operate fully with the board.

Almost co-incident with the resumption of service by the company on Sept. 20 it filed with the board a tariff to become effective on Oct. 11, calling for a 10-cent fare. This request was met by the commission on Sept. 25 by a letter suggesting a trial for four months of the 5-cent fare within the city limits of Newark, Jersey City and other large communities. It is this suggestion which the company has now acted favorably upon as indicated in the following letter from Mr. McCarter:

Public Service Railway has given serious consideration to the recommendation made by the board with reference to fares in its communication of Sept. 25, proposing a 5-cent fare for the congested centers of the larger cities without transfer, and an additional 5-cent fare without transfer to the present 8-cent fare limits of those cities.

While the company entertains grave misgivings as to the financial results of the plan, nevertheless, desiring as it does to co-operate with the board and in the hope that the plan suggested points the way to the ultimate solution of the transportation difficulties confronting the company and traveling public of New Jersey, the company accepts the suggestion of the board in the spirit in which it is offered and will go along with a trial of the rate proposed for period of four months or shorter time as may clearly indicate to the company and the board the results thereof.

In doing this the company will rely upon the active co-operation of the board as offered in its statement in curtailing and limiting wasteful and unnecessary competition and further seeks the co-operation of the board in helping it to obtain relief from municipal paving obligations founded upon archaic conditions inherited from horse car days.

For the rate recommended by the board to be successful, two things must be accomplished. The company must have more revenue arising from the transportation of a very much larger number of passengers which a curtailment of uneconomic and wasteful competition will produce, and its operating expenses must be kept down to the minimum. This latter desideratum can be substantially assisted by relieving it from burdensome paving obligations.

A hearty support of the plan by the public will go a long way to make the trial a success and thus insure the permanency of the rate.

In furtherance of and pending the trial of the rate proposed by the board, the company hereby withdraws the proposed rate filed by it on Sept. 21 with the Board of Utility Commissioners.

The company herewith files the following rate for transportation over the portions of its system enumerated below, effective Oct. 1, 1923, subject only to obtaining a permissive order from the United States District Court.

Fare conditions not specifically hereinbelow referred to to remain for the present as they now are. All reference to municipal boundaries relate to present existing lines and not to any future extensions or modifications thereof.

In its reply to the company the board expresses the hope that the acceptance of the present plan will meet the approval of the public and will, in a measure at least, dispose of the present unsettled conditions in the transportation problems of the state. It says:

The board acquiesces in your proposal to put the rate suggested by the board into effect on Oct. 1, next, as we deem it desirable that the public should have the benefit of the new rate at as early a date as possible.

The board reiterates its declaration, contained in its statement to you of Aug. 8 last, and again in its later proposal which you have just accepted, that, in its judgment, ruinous auto bus competition should be reduced to a minimum and will, as heretofore declared to be its policy, regulate bus competition in accordance with the statute and to the fullest extent consistent with adequate service.

We note your request for the co-operation of the board in obtaining relief from "paving obligations founded upon archaic conditions inherited from horse car days."

The board agrees that these paving obligations are, under present-day conditions, an undue burden unnecessarily passed on to the riding public through the rate of fare charged.

The board has no power under the existing law to relieve the company of these exactions but will recommend legislation for relief therefrom.

The schedule of places where the fare will be 5 cents was affixed to a statement that Mr. McCarter submitted to the commission. The text of the schedule relating to the northern half of the State—the remainder of the document pertaining only to the Camden lines—was as follows:

Details of Plan

A 5-cent fare for a single ride without transfer:

1. Within the limits of the city of Newark (except the existing fare limit to Port Newark Terminal), Harrison, East Newark and on Kearny avenue in the town of Kearny.
2. Within the limits of the other municipalities in Essex county served by the company (except Verona, Caldwell and the Eagle Rock line).

In Hudson County

3. Within the limits of Jersey City and Hoboken.
4. Within the limits of the City of Bayonne.
5. Within the limits of the remaining municipalities in Hudson County not hereinbefore specifically mentoned (North Hudson) served by the company and lying east of the Hackensack River.
6. Within the limits of the town of Kearny between Schuyler Avenue and the Hackensack River and between the Passaic and the Hackensack rivers.

Passaic Lines Affected

7. Within the limits of the city of Paterson, Haledon and Totowa.
8. On the Hawthorne line from the Paterson city line to the Passaic county line.
9. On the Singac line from the Paterson city line to Singac.
10. From the Paterson city line through a portion of the city of Clifton and the city of Passaic to the Passaic river and the Passaic city line at Romaine avenue.
11. On the Paterson line from the southerly Passaic city line to the Essex county line.

Bergen County Line

12. On the Palisade line in the county of Bergen from the Hudson county line to Palisade Junction.
13. Within the limits of the city of Elizabeth.
14. Within the limits of the boroughs of Roselle and Roselle Park.

The proposed increase in fares to 10 cents as contained in the original proposal submitted by the company to the Board of Public Utility Commissioners was intended to provide as follows:

Where 8 cents, or 7½ cents by use of tokens is charged a charge of 10 cents; where 3 cents is now charged a charge of 5 cents; a charge of 5 cents for school tickets; where 1 cent is charged for a transfer, a free transfer.

Reasons given are: The railway company needs additional revenue to provide for the increase wage to its employees; to furnish safe, adequate and proper service; maintain property and equipment, and provide a fair return on the value of its property.

The company further explained in a letter accompanying the tariff:

The changes which have occurred making it necessary to obtain an increased revenue are:

The extra increase of approximately 20 per cent in wages paid its employees, which will amount to $2,500,000 a year.

The necessity of inducing the investment of capital in the business and its continuance therein, in order to keep pace with the requirements of the public.

The present rates of fare charged by the railway are unjust, unreasonable and insufficient to allow the company to conserve its property and to enable it to maintain its financial integrity and furnish adequate and proper service to the public, and the proposed rate herewith filed is a just and reasonable rate and necessary to enable the railway company to furnish safe, adequate and proper service to the public.

It was the filing of this schedule by the company that led to the 5-cent fares suggestion from the commission. In its reply to the company on this matter the commission said:

The board has received from you a notice of intention to increase the street railway fare to 10 cents and has carefully considered your statement and the schedule annexed.

The board appreciates the fact that the conditions under which the company is operating make increased operating costs inevitable.

To deny it the right to obtain sufficient revenue to meet these costs would be a gross injustice.

To raise this revenue the company now proposes to increase its fares to 10 cents.

Whether such an increase would meet the situation at this time, particularly in view of existing auto bus competition, is open to serious question.

This board has in the recent past, and after expensive hearings, although under a lower wage scale, decided against an application for a 10-cent fare.

The board feels that it should not approve such a fare unless it appears upon further hearing that this is necessary to meet existing conditions.

In your recently proposed plan you claimed the elimination of bus competition would result in lower fares. The board agrees that this competition should be restricted to an extent consistent with adequate service and within the scope of its authority will assist in bringing about this result. It will further seek the co-operation of the various municipalities to that end.

In the board's judgment the time has not arrived when the trolley company, long established and used by some 325,000,000 of riders annually, on your system alone, can be dispensed with. Without passing upon the proposed increase in fare to 10 cents, the board desires to suggest a plan which it feels would place the company on a more equal basis in meeting the competition of the buses and at the same time furnish the public transportation at a fair rate.

If the company insists upon a 10-cent fare, the board cannot deny objectors opportunity to be heard.

Expensive rate hearings in the past have cost the State many thousands of dollars and have resulted in protracted litigation.

To avoid further litigation and expense and for the purpose of trial the board suggests that in lieu of the imposition of the 10-cent fare the company establish a

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5-cent flat fare, without transfers, within the limits of the larger municipalities, with an additional 5-cent fare for the longer rides to the end of the existing fare limits, and continue in effect the present 8-cent fare throughout the rest of the State for the time being.

If this is acceptable to the company, the board suggests that the company prepare and submit for approval the details of the foregoing in the form of a rate schedule, which schedule, if approved, shall remain in effect for the trial period of four months.

In order to determine definitely whether such a rate would produce sufficient revenues to meet the requirements of the situation it is suggested that the company during this four months period submit monthly reports to the board showing its operating expenses and receipts.

The foregoing idea is suggested with the hope that it will produce sufficient revenues to enable the company to operate efficiently and not impose an undue burden on the public.

One of the suggestions made during the period of the cessation of service by the railway was that the Legislature be called in special session to consider what could be done in the emergency that the withdrawal of service had created. On Sept. 19 Governor Silzer declined to summon the State Legislature in special session. Without specifically referring to the Public Service agreement to resume operations, the Governor commented upon the sportsmanlike attitude of the riding public in enduring the inconvenience of the tie-up since Aug. 1. He said the citizens will be glad to know the sovereignty of the state over the corporation has been established. Discussion of "plans" may well wait resumption of service, the Governor pointed out, the principle of the legal fight outweighing other considerations.

Pershing Square Subway Plans Temporarily Abandoned in Los Angeles

Pershing Square, Los Angeles, may be abandoned as the site for the proposed underground terminal. This is indicated by the latest developments in connection with the plans for Los Angeles' proposed subway system for handling local as well as interurban car lines in the city. Announcement to this effect was made after conferences held between engineers of the city and representatives of the two traction companies interested in the project.

The latest plans projected by the city are along the lines of a loop system with frequent entrances in a wide district downtown. It was brought out in the conference that the general opinion of all concerned was in favor of the abandonment of plans for a central station and that the loop system should be substituted, as it was considered that Pershing Square, having an area of some six acres, would not be large enough for a central station, because of the city's ultimate development.

It is intimated that if the loop plan is adopted it is possible the city of Los Angeles will finance the subway system.

The city would construct the subway system and lease it to the railways, thus eventually recovering the investment. The city takes the attitude that a terminal station under Pershing Square or elsewhere in the city would be sufficient for the Pacific Electric Interurban Lines at the present time, but would not be large enough in years to come. It is believed that if the city would finance the larger project, such as the loop system, there would be less chance of congestion and faster and more convenient service to the public.

The Long Beach, Pasadena, Hollywood and west beach trains of the Pacific Electric would enter from more or less the same directions those lines now follow on the surface, but as subway or elevated as convenience demanded. The city's engineering forces propose to prepare plans covering the proposed loop system, to be submitted to the railways for their consideration.

Schenectady Men Declare Strike Off

Thirty former employees of the Schenectady Railway have declared themselves to be strikers no longer and are planning to make application to the Schenectady Railway for reinstatement. They are said to have declared that they were denied the right of holding a special meeting to vote on the question of formally declaring off the strike, which was begun on May 16.

A statement signed by twenty other former employees of the company set forth the opinion that the strike should be declared off. On the ground that this group of thirty men represents close to a majority of the old men out of work and still on strike, the thirty men declare they have effectively ended the strike and that contrary action taken by those who disagree with them will be the action only of a minority.

The Public Service Commission of New York State on Sept. 7 directed its counsel to commence an action in the courts against the Schenectady Railway to recover penalties for failure of the company to comply with the requirements of an order adopted by the commission on April 4, 1923. The order required the company, among other things, to secure and place in operation prior to Sept. 1, 1923: Six new interurban cars for use on its interurban lines, twelve double-truck city cars for use on its lines in Schenectady, one double-truck snow plow and one ice-chopping machine.

Under date of Aug. 31 the company reported to the commission its compliance with certain paragraphs of the order, but did not report the purchase of the twelve new city line cars, and the action to be instituted by the commission will be based upon the failure of the company to purchase such additional cars for use within the city.

The order of April 4 was the result of an investigation by the commission as to the service being rendered by the Schenectady Railway and filed complaints to the commission from the Mayor of the city and patrons of the railway lines.

In the report which the company made to the commission on Aug. 31 the company stated that its failure to comply completely with the order of the commission was due to the strike of its employees because of which the company had been compelled to form almost an entirely new organization for the operation of its line. This report further stated: "The present equipment of the company is more than adequate to meet the traffic demands upon it and as demands increase the equipment will be increased to meet such demands. The company will report from month to month its progress in carrying out the provisions of the order of April 4, 1923."

Seattle Municipal Line Seeks Relief from Paving

Agitation is making headway which has for its object a plan to relieve the Seattle Municipal Railway of the burden of paving. The matter is now up to the City Council. The utilities committee of that body has already recommended to the full body that the policy be adopted of charging the cost of paving right-of-way to the general fund. As a first step in this program it has been recommended that immediate relief be extended to the railway from expenditures of $10,000 to cover half a dozen right-of-way jobs and of $5,800 to cover proposed re-decking of a bridge on Boston Street. Members of the committee hold that tacking these costs onto the railway lines is a relic of the days when such charges were regarded as part payment for franchises. George F. Russell, superintendent of public utilities for the city, has cited fourteen cases of similar relief from paving burdens extended to privately-owned railways as indicating the tendency of the times in connection with this matter. The present ordinance relating to the paving streets provides that the maintenance and repair of all street railway rights-of-way shall be borne by the street railway system "unless other provision shall be made therefor by the City Council by ordinance."

Recommends Review of Rochester Appraisal

In its report on the operation of the Rochester, N. Y., street railways, the Municipal Research Bureau on Aug. 22 recommended a judicial review of the appraisal of the lines in the city of the New York State Railways, under the service-at-cost contract under which the system is now operating. The City Council and Mayor are studying this report.

Among the other recommendations made in the bureau's report is the use of one-man cars on the Sodus Bay interurban line and on non-paying city lines. The report declares that "the appraisers returned a valuation at peak prices for a brand-new plant very much above the pre-war scale," and while commending the service-at-cost plan, proposes a court review of the valuation under which the company now receives its revenues.

James F. Hamilton, president of the New York State Railways, defends the present valuation as equitable and is confident that the appraisal fixed at $19,216,000 some time ago would be found to be less than the actual value of the property today.

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Richmond Way Cleared

Prospects for Successful Negotiation of Blanket Franchise Improved by Legal Opinion

The controversy between the city of Richmond and the Virginia Railway & Power Company over the awarding of a new franchise, petition for which has been before the city for several years, bids fair now of finding a solution. The last point of contention between the company and the municipality has just been settled by an opinion by City Attorney James E. Cannon. The opinion is to the effect that the municipality, not the State Corporation Commission, has the right to fix fares on lines running within the city.

The company is operating under franchises granted a multitude of corporations consolidated years ago. These franchises begin to expire in 1925, although one of the major franchises of the lot, that awarded the Richmond Passenger & Power Company in 1889, does not expire until 1930.

For several years the Virginia Railway & Power Company has been seeking a new blanket franchise and has consistently declined to expend large sums of money in rerouting and extending its service into new territories until it was assured the continued privilege of operation.

The decision, or opinion, handed down by the city attorney was requested by the Council committee on streets as one of the final steps before recommending some action on the franchise. The committee refused to make any recommendation until the City Attorney should render an opinion on the powers of the city to fix fares in the city limits, as it has been generally conceded that the Corporation Commission had been delegated this power, along with many others, by the last General Assembly.

The opinion is considered important in Virginia because it has the earmarks of the ruling case. It traces the legal history of traction proceedings in the Commonwealth since the early days. Many conflicting decisions have been made by the Supreme Court on the right to fix fares, and it will be remembered that the city of Norfolk automatically delegated any rate-fixing powers it possessed to the Corporation Commission some time ago and that the case is under advisement at the present time, following award of a 7-cent fare at once to the Norfolk Division of the V. R. & P. This award was made on the grounds that the valuation submitted by both the city of Norfolk and the company was such that a 7-cent fare should be authorized.

Mr. Cannon holds that not only are the present franchises, requiring a 5-cent fare and six tickets for a quarter, binding in every respect, but that the city can enter into another franchise fixing fares within the city limits and that such a contract would be binding and valid until the General Assembly should provide otherwise.

Further, Mr. Cannon is of the opinion that the city has the right to grant a new franchise while the old franchises are still outstanding. He says in part:

> There is no difficulty on this score. The situation can be fully met by requiring the Virginia Railway & Power Company, by written instrument, to agree, in the event it is not the successful bidder, to sell and convey its property rights and franchise to the successful bidder at its fair value as a going concern, the same to be determined by arbitration unless agreed upon by the grantee and the Virginia company, and by requiring in any event that the successful bidder shall surrender all outstanding franchises to the city.

Before the Council now is a complete summary of the proposed extensions which the Virginia Railway & Power Company plans to make under a blanket franchise. Until a franchise is procured, however, which will protect any investments made and strengthen the borrowing capacity of the company, no extensions are to be made.

Electrification a Help in the Cost of Progress

It is a conservative statement to make, said Charles Pierce Burton in *Harper's Magazine* for September, that at least half, possibly three-fourths, of the railroads in the United States should be electrified purely as a matter of economy and, further, that they would be electrified if money for the improvement were obtainable. In his article, entitled "The Cost of Progress," Mr. Burton tells about the romance of the railroad, but shows the practical struggle for the railroads to equip themselves to take care of the growing production. He says that in terms of money, the answer is billions in expenditure. In terms of railroad betterment, he says there must be enlarged terminal facilities, greatly increased yards, longer turnout tracks to accommodate trains of 100 cars instead of fifty, increased motor power not only in New England but all over the United States, and in many cases increased mileage of track. In terms of public policy, he goes on to say there must be a recognition of the rights, the limitations and the economies of railroad operation. He says the facts can be demonstrated that in the case of the railroad and the public utilities in general the decrease in rates to the public was more rapid before the era of government control and regulation than it has been since.

He believes that the average life of the rolling stock of a railroad is not more than twenty years, and this determines the average life of nearly everything depending on that rolling stock. Very little of the depreciation is due to wear and tear but about half of it is due to inadequacy, resulting from the astonishing growth of the nation. Approximately an equal amount is due to obsolescence, new inventions effecting economies of operation having made the old designs obsolete. It is for this reason that he believes so large a percentage of the railroads in the United States should be electrified on the ground of its economy.

Authority Sought to Extend into Los Angeles Harbor

In the matter of the application of the Santa Fé & Los Angeles Harbor Railway for authority to construct its line of railroad over and across the lines of electric railway between El Segundo and Wilmington Harbor, Los Angeles County, a hearing was held before the California State Railroad Commission in Los Angeles recently.

The Santa Fé line has had the authority from the Interstate Commerce Commission for the construction of this proposed 13-mile extension of its line to tidewater for some time, and it is expected that the California State Railroad Commission will give its authority immediately. The proposed line is intended to be devoted exclusively for freight purposes.

Approximately sixty streets are crossed by the proposed line, whereby six overhead grade crossings, for a total estimated cost of $650,000, will be provided. Two of these separated grade crossings are over the electric interurban lines of the Pacific Electric Railway, while four are over important and heavily-traveled highways. The overhead structures are composed of through girder type and concrete piers and abutments.

The prescribed overhead clearance at point of overhead crossing of the electric lines as called for in the plans and approved by the commission is 23 ft. The terminus of the proposed extension upon reaching Los Angeles Harbor will connect with the Los Angeles City municipal belt line, electrically operated, and the city's belt line will arrange to handle all freight destined to or originating from the proposed extended line.

Three Hundred Copies of Bulletin Go to Bankers

The New England Bureau of Public Service Information has issued the report of its second year's work. The report emphasizes the fact that this bureau of information movement is now a nation-wide one and that all public utility companies in the country with vision are contributing to the support of this work. In the opinion of the New England bureau its importance cannot be overestimated in the development of better public relations. In New England alone nearly 300 copies of the bulletin go each week to investment banking houses and are placed in the hands of security salesmen for their educational value.

The director of the New England bureau in the report makes mention of the splendid help and co-operation given the bureau by the national associations—the National Electric Association, the American Gas Association and the American Electric Railway Association—and the executives of the different telephone companies of the Bell Telephone system throughout the country, with whom he has been in frequent communication during the year.

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Large Program of Construction on Electric Lines Announced

General Manager E. W. Oliver of the electric railway lines owned by the Canadian National Railways announced at Toronto on Sept. 25 plans for the construction of certain sections with a view to linking them up with the existing electric lines in the Toronto and Niagara district.

The plans include construction of a portion of the new Toronto and Suburban entrance into Toronto, the tenders for which will be called soon; the completion of this entrance to a terminal to be located on St. Clair Avenue near Prescott Street in the west end of the city by next spring, rehabilitation and electrification of the old Belt Line across the north end of the city to the Don Valley in the east, completion of the construction of the Toronto and Eastern electric line between Bowmanville and Pickering by next spring, electrification of the C.N.R. steam line from King Street to Scarboro Junction by next fall, the erection of stations at Yonke, Bloor and King Streets and the installation of twin passenger elevators at the Bloor Street viaduct in order to permit passangers to descend from the viaduct to the line running from King Street to Scarboro. The location of the connecting link between Scarboro and Pickering is still undecided, but Mr. Oliver expected to make an announcement on this point upon the return of Vice-President S. J. Hungerford of the Canadian National Railways from western Canada shortly.

Mr. Oliver expected an hourly service would be given between Toronto and Bowmanville on the Toronto & Eastern Railway.

Headquarters Moved.—The offices of the Public Trustees of the Boston Elevated Railway have been moved from 108 Massachusetts Avenue to 31 St. James Avenue, Boston, Mass.

Agreement Reached with Shop Employees.—The United Railways, St. Louis, has reached wage agreements with 500 of its 1,000 shop employees, granting them increases of from ¼ cent to 3 cents an hour. Among the men included in the advance are carpenters, painters, blacksmiths, car builders, machinists, metal workers and helpers.

Six-Cent Increase Granted.—A new wage scale, retroactive since Aug. 1, was agreed upon by motormen and conductors at a meeting in Danville, Ill., to consider the contract offered the men by the Danville Street Railway & Light Company. The new scale provides for a 6-cent an hour increase for employees in the service for two years or more.

Favors Abolition of Grade Crossings.—Mayor Curley of Boston has written to Col. Thomas F. Sullivan, chairman of the Transit Commission, urging the abolition of various grade crossings in Dorchester. The Mayor is in favor of depressing the road and building bridges. He believes that this course would be for the best interests of the city.

Additional Service Provided. — Another indication of the rapid growth of Graham, Va., is shown in the necessity for additional street car service. The Princeton Power Company has found it necessary to put the second car in service between Graham and Bluefield during the afternoon hours and all cars are crowded during the evening hours. Business is being built up rapidly on the west end line.

Utility Men to Entertain You.—Listen in on Oct. 4 any time from 7.30 p.m. to 8.55 p.m. to hear the musical program which will be presented by the Kentucky Committee on Public Utility Information over broadcasting station "WHAS." This will be made possible through the courtesy of the Louisville *Courier-Journal-Times*, located at Louisville. If you want to hear "Barney Google" as you never heard it before just listen for the Louisville Railway Inspectors' Quartette. Other talent will be furnished by the Louisville & Interurban Railroad, the Cumberland Telephone & Telegraph Company, the Louisville Gas & Electric Company and the Louisville Home Telephone Company. A brief talk will be given by L. B. Herrington, vice-president of the Kentucky Utilities Company. This committee, it is said, has the distinction of being the first of its kind to broadcast a complete program over radio. Further interest attaches to the program because of the fact that all the participants are employees of public utilities in the state of Kentucky.

Commission Urges Increase of Pay to Tramway Employees.—The Colorado Industrial Commission recommends a wage increase ranging from 4 to 7 cents an hour for the employees of the Denver Tramway in the wood, armature, paint, machine and blacksmith departments. Since the strike of two years ago the company has treated with grievance committees from the men, but in this case it seems that there could be no agreement between the committee and the rest of the men, hence the case went to the industrial commission. The decision of the commission is based upon the wages paid similar workmen by other concerns.

Another Publication Appears.—"Current Topics" is the name of a new magazine which will appear every month by, of and for the employees of the Illinois Power & Light Corporation, the Illinois Traction, Inc., and the North American Light & Power Company. The words "by, of and for" express the purpose of the new employees' magazine. This is to make possible the interchange of views and news between employees and departments of the Illinois Power & Light Corporation and its subsidiary companies. The first issue of "Current Topics" appeared under date of August, 1923. It is a twenty-four-page pamphlet, telling about the company's activities at its various divisions. The editor is E. E. Soules.

Assigns Franchise Rights.—The Public Service Commission, under date of Sept. 7, made an order approving the assignment to George Bullock, as receiver of the Buffalo & Lake Erie Traction Company, of certain franchise rights now held in the city of Dunkirk by the Dunkirk Street Railway. These rights permit the construction and operation of a street surface railroad in the city of Dunkirk. The order also approves the abandonment by the Dunkirk Street Railway of certain portions of the constructed line. Hearings were recently held in Buffalo on the matter and no objections were presented from any source to the above order being made.

Amusement Park Burned. — Sea Breeze Amusement Park, on Irondequoit Bay, 7 miles northwest of Rochester, N. Y., owned by the New York State Railways, was swept by fire recently with the result that a part of the resort was reduced to ashes. The total loss is put at $150,000, of which only a small part will be borne by the railways as the buildings destroyed were owned by private amusement concerns. The fire is believed to have been of incendiary origin. The sheriff's office and the railways are conducting an investigation. Bertram E. Wilson, general passenger agent, said that the resort would be kept open for the rest of the season as the northern half was not injured by the flames.

Wages Increase Three Cents.—The board of arbitration appointed to set wages for employees of the East St. Louis & Suburban Railway handed down a decision on Aug. 6 increasing wages of the employees, including motormen, conductors, shop and shed men, 3 cents an hour. The top rate for city motormen and conductors is set at 54 cents an hour after eighteen months, and the top rate for interurban motormen and conductors is set at 56 cents an hour after eighteen months. The decision was signed by Edward A. Raithel, chairman of the board of arbitration, and C. E. Smith, member representing the companies. The member representing the employees did not sign the award, and up to Aug. 30 had made no report either assenting or dissenting.

Association Benefits by Lost Unclaimed Property.—The Employees' Benefit Association of the Brooklyn-Manhattan Transit Company received this year $2,577, which was turned over to it on July 11 by the cashier of the company, as a contribution from the cash proceeds of the disposal of the unclaimed property assembled during the year by the lost property department. This amount included the net proceeds resulting from the auction of unclaimed articles on July 6 and also the sum of $1,751 in cash which was never claimed by the persons who left it on the company's cars or in the stations. In compliance with the provisions of the general railroad laws of the state of New York, the money realized from the property left in cars and stations is turned over to the Employees' Benefit Association.

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Foreign News

The First Russian Tramway Conference

A tramway conference was called in December, 1922, to investigate the state of Russian city lines to determine general measures for improvement.

At present there are in Russia thirty-six electric tramways. Of this number twenty-seven sent complete reports to the conference. The total number of cars is 4,778; 44 per cent of this number, i.e., 2,096 cars, are reported as totally unusable. In some particular cities the number of unusable cars is as high as 92.5 per cent, in seven cities from 50 to 60 per cent. Part of the stock is now used not for passenger traffic, but for transportation of goods, mostly belonging to the government. During the years of civil war, in certain cities the passenger traffic was considered of secondary importance as compared with the transportation of materials. Therefore, only 32 per cent of the total number of cars was used for passenger traffic. In a number of cities the passenger traffic was stopped for months; in two cities for three years. The cause of interruption, as reported, is the lack of materials, repair parts and in some cases of fuel.

During part of the time between 1918 and 1922 the passenger traffic was free of charge. At present almost everywhere fare is collected quite accurately. Improvement began in 1921 and is gradually increasing.

The cause of lack of materials and of repair parts as reported is not the lack of them in the country, but the lack of money to buy or make them.

Part of the time the tramway enterprises were almost without any income, traffic was declared free of charge and no other sources of income were available. This was ameliorated only after the government accepted the so-called new economic policy, giving permission to collect fares and to organize the operation of tramways on a commercial basis. As drawbacks in this respect are reported:

1. In some cities the tramway is not separated from other enterprises, which means that the income from tramways is included in communal city treasury and is spent for other purposes; the expenses allowed for tramway are in no way proportionate with its income.

2. In other cities, where tramway operation is organized as an independent city enterprise, the communal taxes are too high. For instance, Samara reports the expenses as follows:

Labor and social insurance, 55 per cent of the total expense.
Taxes, 13 per cent.
Electric energy, 25 per cent.
Materials, etc., 7 per cent.

Labor and social insurance is more than 50 per cent of the total expense in all tramway enterprises. The charge for electric energy in many cities is another income of the communal household, and part of the expense for energy must be considered as another item of taxation.

At the end of the conference representatives of industry made their statements. Factories formerly owned by private companies are combined at present into a number of trusts. These trusts have special agreements with the government, according to which they are working as before, but under government control and paying a part of their profits to the government. All representatives stated that their organizations have all necessary equipment required for tramways and will be only too glad to handle their requests. They asked members of the conference not to place their orders in foreign countries, but to support Russian industry. The impression of improvement is made.

Only Two Morocco Cities Have Electric Railways

An official bulletin of the French Protectorate of Morocco publishes the terms of a convention wherein there has been accorded to a group of twenty-three French companies the "privilege of the production, transport and distribution throughout Morocco of electrical energy." This concession, its limitations and its scope being taken into consideration, is bound to have an enormous influence in the development of the Morocco of the near future.

Morocco, scarcely open to the European world ten years ago, has at present only two cities—Casablanca and Rabat—where electric railways have been established. Lines will doubtless be established at Marrakech, Mogodor and other of the coast towns, but this is about all for a long time to come.

Municipality of Dijon Makes Up Deficit

The Compagnie des Tramways Electriques of Dijon, France, made the request of the municipality that a subvention be granted to cover a deficit in receipts from operation. The Municipal Council refused categorically and the company carried the matter before the Prefectoral Council of the Department, or county, and demanded an indemnity of 323,856 francs, a sum corresponding to that which the company took upon itself to expend in supplying the city with a service in excess of that which its franchise called for. Various experts were heard on both sides and finally the city was compelled to pay 56,000 francs to the company as well as the expenses of the suit and the costs of witnesses.

The sum involved is small enough, but the case is supposed to present a new phase of relations between a municipality which grants a franchise and in return demands a certain service on behalf of its population. The company met the demands and on various occasions granted additional services for which it claimed reimbursement of its expenses.

London Railway Electrification

The announcement is made that the directors of the London & North Eastern Railway have decided to electrify the suburban lines of the Great Northern section of their undertaking. The route length is about 38 miles and the principal places reached outside of London are Edgware, High Barnet, Hatfield and Cuffley. Details are being worked out.

Electric Railway to Beach at Ostia

The projected and long-looked-for electric railway which was to take the Romans to their bathing beach of Ostia, Italy, was expected to come into being this summer. It has been looked for every year for the past twenty years, but has not yet become a reality. The line is only 15 km. in length and will cut the journey which is now accomplished by the main line railway in half. It is now proposed to start the line in the near future.

Barcelona's Subway and Labor Troubles

When the Catalan capital of Barcelona first projected its underground railway it was obvious that the work was of a nature which required every possible skill in handling. Actually the underground part of the street railway system of Barcelona is the connecting link which passes below the center of the city, coupling up the surface lines of the outlying portions. In every way this offers a really rapid service from one side of town to the other.

For some months past Barcelona has been in the throes of a labor conflict, which has affected almost every industry and enterprise. Work on the subway was paralyzed for months, but during the past month the company has found a sufficient number of non-syndicated laborers to proceed with a greater activity than ever.

The London Experimental Cars

The six experimental cars for the London tube railways, which were described in a recent issue of the ELECTRIC RAILWAY JOURNAL, having completed their tests on the Great Northern & Piccadilly Railway, have been transferred by road to the Charing Cross & Hampstead Railway, where they will undergo a further trial. It is hoped to open the first part of the extension on the latter railway about the middle of October and for this reason passengers on the Hampstead line are to be given an opportunity to get accustomed to the new rolling stock (200 cars in all) which is on order for this and the City & South London Railway, and which is similar in many respects to the experimental cars. It is found that the three double doors on each side of these cars produce a saving of six seconds at each station stop.

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Financial Notes

Preferred Stock Offered.—A syndicate headed by Greenshields & Company, Toronto, Ont., is offering $550,000 of the 7 per cent cumulative preferred stock of the Jamaica Public Service Company, Ltd. The price is 95 to yield 7⅜ per cent.

Seeks Partial Abandonment.—The Southern New York Power & Railway Corporation has asked the Public Service Commission for approval of abandonment of a portion of its Oneonta system. The company says that this part of the system is no longer necessary for the convenience of the public.

Auction Sales in New York.—At the public auction rooms in New York on Sept. 26 there were sold $1,300 of the Valley Traction Company's first mortgage 5 per cent gold bonds, due 1933; interest April and October 85⅛ per cent. The Valley Traction Company is part of the Valley Railways, Lemoyne, Pa.

Permits Dismantling.—Israel Joseph, who some months ago bought the Chicago, Aurora & De Kalb Electric Railway, Aurora, Ill., can resume work of dismantling the road. Judge Fulton at Geneva recently refused to make permanent the temporary restraining order obtained against Mr. Joseph by the Illinois Commerce Commission. Mr. Joseph paid $90,000 for the property.

Conspectus Figure Corrected.—Albert S. Richey calls the attention of this paper to a slight error in one of the index figures for September, 1923. As contained in The Conspectus of Indexes compiled by him and published in last week's issue of the Electric Railway Journal, and also in the postal card form, the average street railway fare was given as 7.00 cents. This should have been 6.95 cents.

Passes Dividend.—The directors of the United Electric Railways, Providence, R. I., have decided to pass the quarterly dividend of 1 per cent due at this time. The company succeeded to the properties of the old Rhode Island Company. Earnings of the company have been a cause of disappointment since starting the 5-cent fare in January. This fact, together with the unusually heavy operating expenses through the winter and spring, has been responsible, it is said, for the company's decision with respect to the 1 per cent quarterly dividend.

Securities for Reorganized Company Approved.—The application for the approval of the purchase of the former Michigan United Railways by the Michigan Electric Railway has been acted upon favorably by the Michigan Utilities Commission. The commission has also authorized the new company to issue approximately $17,000,000 in new securities under terms of the plan approved a few months ago. The new securities will consist of 98,750 shares on non-par common stock of which 1,250 shares will be sold at not less than $20 a share; $6,300,000 cumulative 5 per cent preferred, class "A"; $400,000 non-cumulative 5 per cent preferred, class "B"; $1,203,800 non-cumulative 5 per cent preferred, class "C," and $6,590,500 first and refunding 5s of which $600,000 are to be presently sold at not less than 85, distribution of balance of securities to be in accordance with plan agreed upon between bondholders' committee some time ago.

Transportation Notes

P.R.T. Starts Roosevelt Boulevard Buses

Bus service was started by the Philadelphia Rapid Transit Company on Roosevelt Boulevard on Sunday, Sept. 23. This is the first attempt by the company at a scheduled bus service on a uniform basis co-ordinated with the city's established transportation system. For the present the open-top type of double-deck bus will be used, pending further study of the semi-inclosed top vehicle. Ten machines are in operation throughout the day, with more running in the rush hours to provide additional service. The vehicles are operated on the basis of a seat for every passenger. The present plans of the company are to establish a bus service to the central business district from the West Philadelphia section so as to relieve the surface and the elevated lines serving a part of that territory. The plans call for bus operation from Sixty-third and Walnut Streets to Broad and Sansom Streets. Thomas E. Mitten, chairman of the board of the company, says that the Roosevelt Boulevard bus service is only the forerunner of an almost city-wide bus service which is to come.

Recommends Zone System.—James Dalrymple, general manager of the municipal railway lines in Glasgow, Scotland, recently visited Superintendent D. W. Henderson of the Seattle Municipal Railway lines and suggested that the Seattle municipal lines start the graduated fare system, governed by zones, similar to the one used in Glasgow. Mr. Dalrymple has been visiting on the coast, but plans as part of his return journey to attend the coming convention in Atlantic City.

Wants Ten-Cent Fare.—The Dover, Somersworth & Rochester Railway, Dover, N. H., has petitioned the Public Service Commission for a 10-cent fare, thus doing away with the permits and tickets. In the month of June the company filed a petition with the Public Service Commission to issue permits for $1 each, which entitled the owner to ride on any fare zone for 5 cents. At that time the company offered strips of tickets, seven in number, for 50 cents, while the cash fare was 10 cents for each fare zone for persons without the permit or tickets. The company's intention now is to withdraw these permits at the end of this month and to operate entirely on a 10-cent fare basis.

Personal Items

Personnel Changes in Macon

L. A. Magraw, formerly general manager and treasurer of the Macon Railway & Light Company, Macon, Georgia, was made vice-president of the company on Sept. 20, retaining his position as general manager but relinquishing that of treasurer to W. E. Hauser. R. Frank Jones was appointed secretary and assistant treasurer and J. Clay Murphy and W. E. Dunwoody were elected to the board of directors of the company.

The changes were made by the board of directors at the regular annual meeting and are in line with the expansion program outlined for the Macon utilities companies during the coming year.

K. R. Lewis, formerly engineer of equipment with the International Railway, Buffalo, N. Y., severed his connection with that company on Sept. 1. Mr. Lewis is now general foreman, electric repair, of the Interborough Rapid Transit Company in New York City.

Fred C. Morton, formerly assistant to the manager of the Savannah Electric & Power Company, is now general superintendent of that company. The Savannah company is under the management of Stone & Webster, Inc., with which organization Mr. Morton has been associated since his graduation from the University of Maine in 1908.

Paul S. Duenweg has been appointed general superintendent of the Houston Electric Company. He has been maintenance of way engineer for this company for the past six years. Prior to that time he was connected with the Galveston Electric Company for several years, and was also on construction work for Stone & Webster, Inc., Boston, Mass., general managers of both companies.

Obituary

A. J. Gadoua, acting superintendent of transportation, Montreal Tramways, died recently at the Notre Dame Hospital in Montreal. He was born at Sherrington, Que., in 1871. Mr. Gadoua entered the company's service in 1891 as a horse car conductor, and after the system was electrified he was appointed inspector. Later he was put in charge of the St. Denis shops. He served in Paris, France, under the late Duncan McDonald, general manager Paris Tramways, and on returning to Montreal in 1907 was appointed claim agent, Montreal Street Railway, later Montreal Tramways Company. In October, 1922, Mr. Gadoua was appointed acting superintendent of transportation on A. Gaboury's retirement. No successor has yet been appointed to the position left vacant by the death of Mr. Gadoua. C. M. Shaw, assistant superintendent of transportation, is looking after the duties of the department.

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Consolidation of Street Railway Journal and Electric Railway Review

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New Jersey Tries a 5-Cent Fare on a New Basis

THE four months trial of the so-called 5-cent fare in New Jersey is an experiment that will be watched with keen interest by the entire electric railway industry. It should be understood, however, that this is by no means a return to the nickel trolley fare which existed before the war. Under the new plan many former single-fare lines become two-fare lines, and the cost of the ride to dwellers in the suburban towns is now 10 cents, or twice the pre-war rate. Then, too, the abolition of the transfer means a 10-cent rate for thousands of trolley patrons. Only local riders in the larger communities will really have a 5-cent fare—but this is about 50 per cent of the total riders.

In the 146 municipalities in which the Public Service Railway operates may be found an infinite variety of traffic conditions. For example, the situation in Newark, a city of half a million people, is very different from that in Bergen County, where the largest town has a population of less than 20,000.

The nature of competition between the trolley company, the railroads and the buses is equally dissimilar in different sections of the state. In fact, the difficulty of establishing a single fare that would suit all the varied requirements of the situation has always been a stumbling block in the determination of a reasonable rate. No doubt alterations in the new arrangement will have to be made here and there to meet local conditions, but there is a good possibility that the fundamental principle of this plan may turn out to be the solution of the trolley problem in New Jersey.

Of course the buses are still there, and the company is still confronted with unfair competition, for the bus and the railway are by no means on an equal basis of taxation and other imposts. The main thing accomplished is that the insatiable clamor for a 5-cent fare is largely met—at least Jersey has what it can call a 5-cent fare. Many of the jitney patrons may therefore come back to the railway. Whether the number of such new railway patrons will be enough to produce an actual improvement in revenue remains to be seen.

The Future of the Rail-Bound Vehicle Is the Future of Transportation

THIS is an age of progress we are living in. The radical changes in car design described in the Annual Convention Number last week indicate that progressive electric railways are alive to that fact, and are acting to improve the facilities at hand to the best of their abilities. There is, however, a broader movement in the transportation field that must be reckoned with—the place which the rail vehicle will have in the transportation plans of the future.

Up to the present time there is no question that for heavy passenger and freight service electric railways and steam railroads can furnish the best service at a cost well below that possible by vehicles moving on the public highway. This has been proved time and time again. Several cities have had the unfortunate experience in the recent past of putting up with bus service exclusively, and all of them have been glad to get back to the old reliable trolley car.

There is, however, a field for the bus, and this field will be found. In its proper place the bus is a valuable auxiliary of the trolley. In some places it can do work the trolley cannot do equally well. Popular prejudice against the railway corporations have also had an effect in furthering the development of the bus, but attention to better public relations is counteracting this tendency.

The lesson derived from the recent experiments with exclusive bus transportation is that, where it is fitted to carry the traffic, the main difficulty is that the operators are also the owners of the vehicles, with no definite responsibility to anyone, and with very loose supervision from the busmen's associations and the public authorities. In consequence the practices indulged in have not been of the best. Courtesy and carefulness, which are demanded of the trainmen, have been sadly lacking.

Unregulated competition has all been on the side of the bus. It has not been subject to the same restrictions that have been imposed on the electric railway, partly because it is a new form of transportation, partly because there is no large fixed investment through which the owners can be reached, but more particularly because there is no competent head to the business, and it is difficult for the public to deal with a large number of individuals of various temperaments and desires and largely irresponsible.

To develop transportation facilities in any community as they should be developed demands that the problem be treated as a whole, and that a broad policy be adopted to fit each unit into its proper place in the scheme. Do this intelligently and community transportation will progress; otherwise it will go backward. The electric railway, having been in the field of urban transportation for many years, has built up the organization and has the background of experience fitting it to carry on the work of transportation for which it is trained and competent. If our urban systems need to be revamped, the present companies are the ones best fitted to do it, and they can utilize the existing investment to best advantage in any scheme whatever that contemplates increased facilities. In any community the rail lines should render at least the bulk of the service, and the buses should be co-ordinated with them in one coherent system. This will provide the cheapest and most satisfactory service.

It must not be forgotten, however, that there are rivals who are always looking for an opportunity to enter the field as competitors. Knowing little about the transportation business, but being able to command

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funds, they appear willing to invest considerable sums in experiments that seem doomed to failure. But in making such experiments the railway itself may be bled by the competition until it, too, is forced to the wall.

Just how the transportation system will ultimately be worked out is a local problem for each community. In the larger cities rapid transit lines will, of course, take the heaviest part of the travel, particularly in the rush hours. This will be supplemented with surface cars and buses furnishing local and crosstown service, feeding the rapid transit lines. In smaller communities the trolleys will be used for mass transportation, the buses serving lines that do not require the most intense service or which have small peak-load demands. But in all save the smallest communities, where the local requirements are at a minimum, the electric car can and will do the work best, provided it is given a fair chance and the management shows a desire to progress and to co-operate with the residents.

Thus it is the duty of the railway man to look to the future, to plan ahead farther than he ever has done before, and to keep the situation well in hand so that he is able and ready to meet the demands of modern travel. In this way he can conserve the investment his company has made and utilize it also for the interests of the public at large.

In fact, it now appears that while there may be some doubt as to the future financial success of the railway by itself, there is no doubt that the future of transportation—railway, bus and whatever other vehicle comes along, in a combined, co-ordinated system—will be one of substantial success.

The Eternal Conflict Between Divisional and Departmental Organization

WHEN an electric railway supplies service to a number of more or less isolated communities, problems of organization arise which do not occur with a more centralized system. On the latter, it is usual, of course, to have all division superintendents and foremen report directly to their respective department chiefs.

Where there are distinct and independent communities to be served, however, it is often desirable to adopt a divisional rather than a departmental system of responsibility and control. The reason for this is that the public relations in the independent community can often be improved if a division manager, with considerable responsibility for the operation of the service in his division, can be substituted for a division superintendent with little or no authority. But with a plan of this kind, to whom should the local maintenance-of-way man and local repair-shop superintendent report?

Practice differs in this matter. Obviously, in questions relating to engineering standards to be used, the head engineering office should control, but on any other subject the division manager might want to have a good deal to say, if not the deciding voice.

There are advantages in both the divisional and departmental plans. It is traditionally hard to have to report to two masters, yet with the divisional plan this is just the position in which the local shop superintendent and way engineer are placed. Reasons of efficiency will tend to urge the departmental arrangement, public relations the divisional plan. A combination of the two, in different proportions to suit each case, is probably the only course which can be recommended.

It Isn't So Much the "Rubber Urge" as the Desire for Continuous Running

THIS is an age of rubber, but it is also an age of continuous motion. Applied to mass transportation, it isn't so much a question of rubber as it is a matter of uninterrupted running that the people want. The most uncomfortable factor in a street car ride is the frequent stopping. Instead of permitting ourselves to feel that the rubber urge cannot be counteracted, perhaps we would do much better to study the local situation with an idea of determining how to secure such traffic regulation as will enable more nearly continuous motion of the street cars.

Application of the principle of express service to street cars has been tried to only a very limited extent, and then usually without correlated traffic regulations. By setting aside certain streets for this type of service, just as we now set aside certain boulevards for through automobile traffic, it would be possible greatly to increase the speed and pleasure of transportation by street car. One of the reasons for the unprecedented development of automobiles has been the education of the public, inspired by automotive manufacturers, to the fact that adequate traffic regulations are as important to the utility of the automobile in cities as the design of the vehicle itself. This is equally true of the street car, but it has not been "sold" to the public. Every attempt to improve street car operation, as for example the skip stop, is met by vigorous protest on the part of local business interests and petty politicians.

When we realized that vehicular congestion was limiting the utility of the automobile we established express streets or through boulevards. The establishment of supplementary through traffic streets in ordinary residence districts has been a more recent development of this idea. All of this is for expediting what to at least a large degree is non-necessity traffic. It serves the privileged minority rather than the masses.

When we approach the problem of providing transportation for the masses who daily ride the street car systems of our larger cities, however, we allow the interests of the corner store merchant, whose business is made better at his location by the presence of the car line, absolutely to prevent any material improvement in the type of service rendered for transporting the workers, upon whose regular movement back and forth each day the very foundation of the entire economic and social structure is built!

In addition we do other peculiar things. We carefully regulate boulevard traffic so that slower moving cars will keep to the right and allow the faster moving stream to proceed through the center of the street. On car lines, however, we allow slow horse-drawn vehicles to keep to the tracks with immunity, which results in slowing up the entire stream of necessity traffic. We also carefuly regulate parking on boulevards or through traffic streets, but we often allow unrestricted and promiscuous parking on car line streets.

In most cities the construction of elevated or subway structures, which in addition to being expensive are either unsightly or uncomfortable, is entirely unwarranted. A service approaching rapid transit in speed and safety may be provided by the establishment of express surface car streets. Here, a maximum of one or at most two stops per mile would be made. The local traffic would be handled by frequent local service on adjacent parallel streets—perhaps using buses instead of cars.

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Mechanical and Electrical Equipment Keeps Pace—II

Brakes Redesigned for Newer Conditions—Component Parts More Rugged and of High-Grade Materials—Tendencies Toward Simplified Multiple-Unit Control—Current Collectors Improved—Motors and Trucks Covered in Last Week's Article

ADVANCES in design of the equipment of the modern car have not been confined to the trucks and motors, which were discussed in the article on this subject in last week's Annual Convention Number of ELECTRIC RAILWAY JOURNAL. Progress has taken place in practically all the details, and parts are being produced that function with greater reliability, while at the same time they are light in weight.

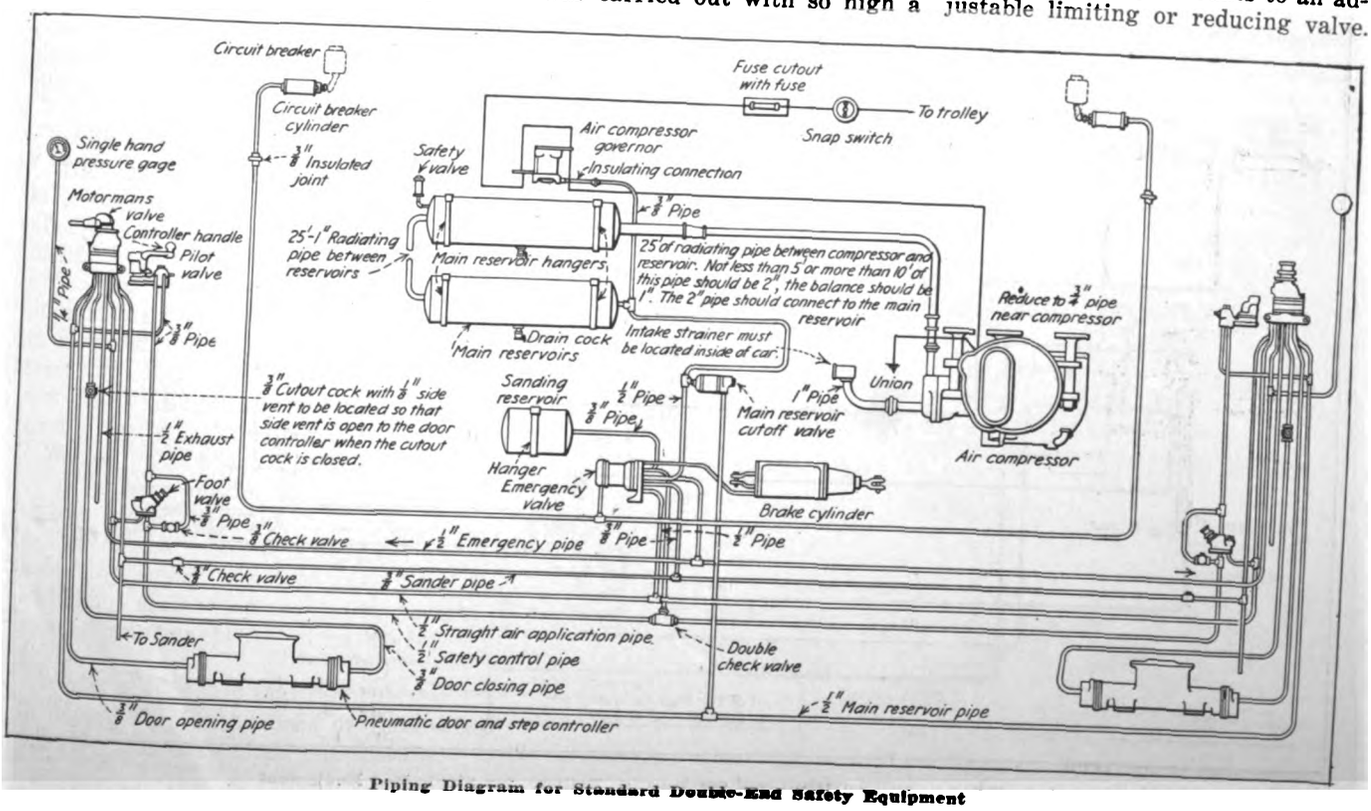
AIR BRAKES REDESIGNED FOR NEWER CONDITIONS

The development of air brakes and the urge for refinement in the performance of the brake itself and its related apparatus is attributable directly to the ever-increasing necessity for maintaining maximum schedule speeds with a limited maximum speed, and also to the continually increasing requirement of obtaining maximum possible safety and smoothness in operation with the greatest possible degree of flexibility in performance. Successful operation of surface cars in modern traffic congestion while maintaining high scheduled speeds has been very largely dependent upon the development of the various parts constituting the air brake equipment so as to provide rapid retardation.

The development of light-weight cars has presented a difficult air-brake design problem which is due to the same conditions as the spring problem previously described. The relatively large ratio between live and dead load has meant a combination of conditions which could not be properly fulfilled without some additional modification in the brake performance. It became increasingly difficult to provide a braking ratio which would operate satisfactorily with an empty car and at the same time give the rate of retardation required properly to control a fully loaded car in congested districts. In the same way, if the brake was designed properly to handle the heavily loaded car, operation of an empty car was carried out with so high a ratio that serious danger existed from skidding on greasy rail.

This condition has led to the development of a variable load brake device, designed to permit the use of a braking effort which will be sufficient for the loaded car and yet to so control the pressure in the brake cylinder that this will be automatically adjusted as the live load on the car decreases. The adjustment effected by this device is accomplished through the movement of the body bolster relative to the truck transom as the load on the car is increased or decreased.

The mechanism consists of a simple rocker arm supported by a bracket from the body bolster so that it can make contact with a fixed point on the truck transom. A vertical movement of the body bolster produces a rotation of the rocker arm about its supporting bearing, and this motion is transmitted through a strut to a valve mechanism which really amounts to an adjustable limiting or reducing valve.



Piping Diagram for Standard Double-End Safety Equipment

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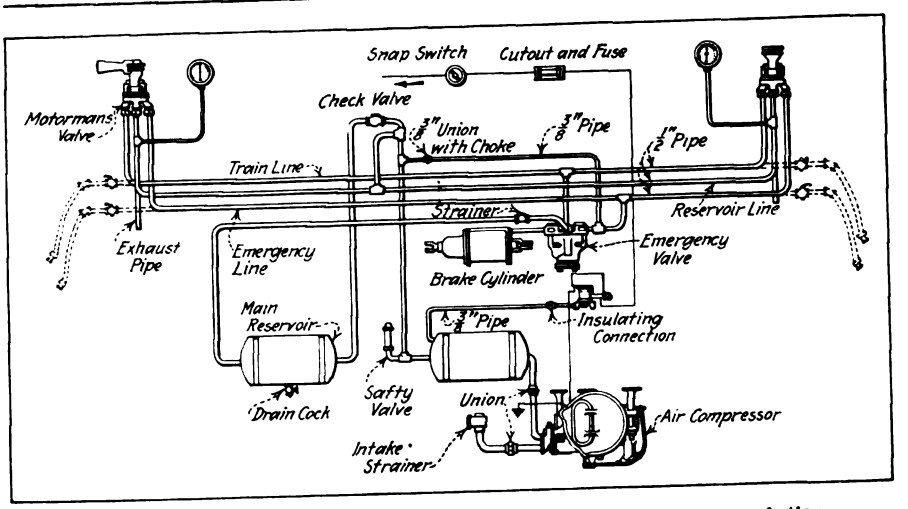
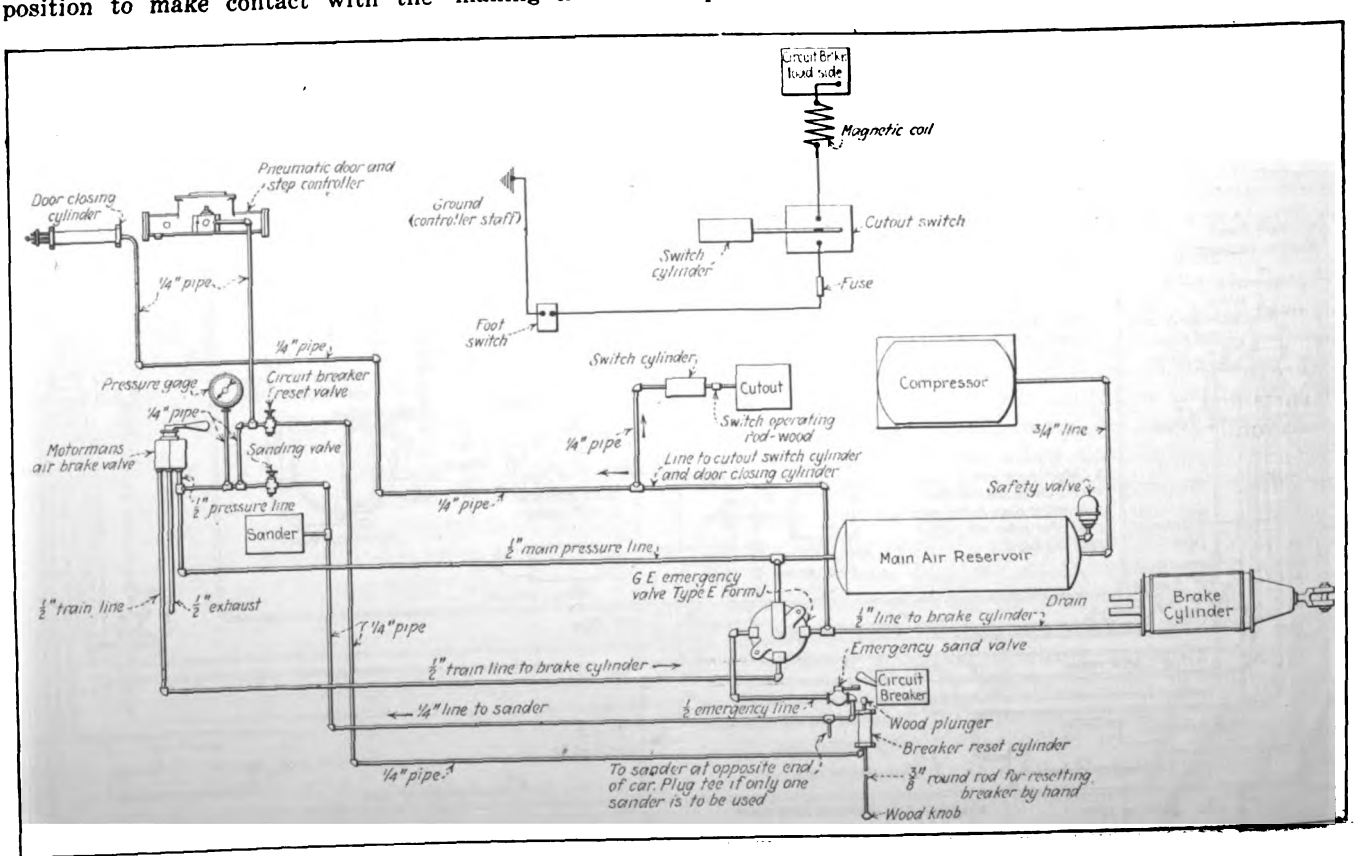


Piping for Straight Air-Brake Equipment with Sensitive Emergency Action

To prevent excessive wear between the bolster rocker arm and its point of contact on the transom, a small air cylinder is inserted in the strut in such a manner that the length of the latter is increased or decreased by the admission or release of air from this cylinder. Through the medium of door contacts and magnet valves, air is allowed to flow to this small cylinder when the doors are open and is released when the doors are closed. Consequently with the doors open the strut is considerably longer than when the doors are closed, and therefore the bolster bell-crank is allowed to remain in position to make contact with the transom member only during the period that the car doors remain open. The movement of the connecting strut caused by such contact is transmitted so as to adjust the setting of the limiting valve to prevent use of more than a predetermined brake cylinder pressure, corresponding to the existing load on the car. Consequently, each time the car is stopped and the doors are opened, the limiting mechanism is reset to take care of any change in the passenger load on the car, and the motorman is automatically prevented from using more than the proper brake cylinder pressure for making the next stop. This device has been applied to cars of the Eastern Massachusetts Street Railway and also in Brooklyn and Boston, and has been reported to accomplish the object sought in such a manner as to allow very much better braking performance than was possible before, under the wide range of car loads encountered.

An additional problem connected with the design of air-brake equipment has been presented by the use of two-car train units on many properties. The advantages of the straight air-brake equipment from the standpoint of simplicity and low cost made this form of equipment very desirable for use on trains of this type, particularly since it also represents the proper equipment for operation of the cars singly. To provide safety in the operation of such trains, some form of emergency mechanism was required in order that a parted train or burst air hose would produce an automatic brake application.

In the earlier equipment designed for this purpose, the emergency valve was arranged so that the emergency line also served as the supply line. Consequently, in order to permit a sufficiently rapid service application of the brakes to be made, it was necessary to increase the size of the by-pass port in the emergency valve to a point where the



Type of Safety Control Developed for Tri-City Railway for Single-End Equipment

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desired sensitiveness in operation of the valve was difficult to obtain. This was particularly true in attempting to obtain emergency application of air from the motorman's brake valve.

This form of apparatus has been improved by taking air for the service application of the brakes from an individual supply line leading from the reservoir, and consequently the speed of brake application can be made as rapid as the size of the supply line and the port in the brake valve will permit.

The by-pass port, which regulates the functioning of the emergency valve for a given pressure reduction in the emergency line, may therefore be made as small as desirable. Hence, positive emergency action on both cars in a two-car train is insured when the motorman's brake valve is moved to an emergency position, or when the emergency pipe pressure is reduced suddenly by any other means, such as the opening of a conductor valve, the bursting of an air hose, or the parting of a train.

Thus, we find air-brake equipment undergoing in various ways development for the purpose of making it more suitable to the particular type of service in which it is to be utilized. One outstanding characteristic of the service requirement of traction brakes is that this service involves very frequent applications of the brakes, and these applications must usually be made as rapidly as possible. The entire design of apparatus and the various pneumatic devices utilized are influenced by this requirement.

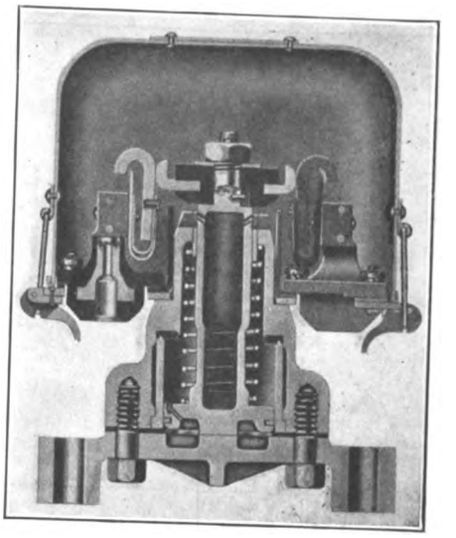
The Air Brake Components

The modern car air compressor is a very efficient and rugged piece of mechanism, and recent developments have consisted more in the nature of refinement in the design of parts and an increasing vigilance in manufacture to insure proper fitting and alignment of parts than in any outstanding change in the function of parts. The primary developments have been in the manner of driving from the motor element to the compressor element and the design of the complete assembly for mounting under low-floor cars. In addition, simplification in suspension arrangements has been accomplished.

It may also be said that refinements in design for the purpose of reducing vibration have made possible the utilization of higher speeds with considerable savings in size and weights.

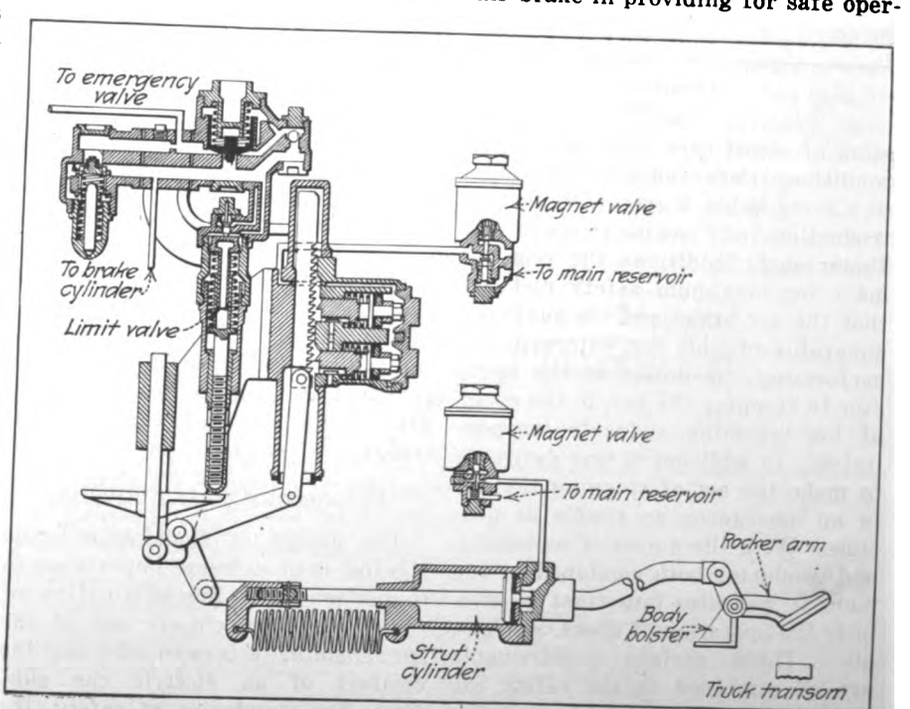
The brake cylinder, which is a comparatively simple piece of mechanism, is nevertheless the very heart of the brake system, and it has always presented the problem of providing proper lubrication and insuring against leakage. Many different types of rings and packing have been designed for the purpose of overcoming the tendency of the oil used for lubrication to leech out the filler in the ordinary type of leather packing. A considerable advance has recently been made in the development of a packing ring made of a composition material which is reported not to deteriorate in oil.

In considering the future development of air-brake equipment, the advantages of the utilization of higher-grade materials and light-weight alloys apply in the same way that has been described for the other parts of the mechanical and electrical equipment on cars. This development, as applied to air-brake parts, is limited by the operating economies which may be expected to justify the increased manufacturing costs entailed. This is particularly true of the compressor equipment. As applied to the fittings and other pneumatic devices incorporated in the air-brake equipment, the limit to reduction in size of parts, particularly the housing castings, is fixed by the necessity for maintaining a sufficiently large body of metal to withstand the strains imposed during assembling, and also to protect the actual operating parts from abuse during both assembly and subsequent maintenance in service. The requirement for what may at first appear to be an excessive amount of metal in some pneumatic device castings is entirely a matter of this mechanical protection to the operating parts, and is entirely distinct from any consideration of the actual air pressure to which the part is subjected. For this reason possible development in the application of pressings or lighter castings of higher-grade materials is largely limited.



A Modern Type of Mechanical Air-Brake Governor

The functions performed by the air brake in providing for safe oper-



This Variable Load Device Adjusts the Braking Effort to the Weight of Passengers

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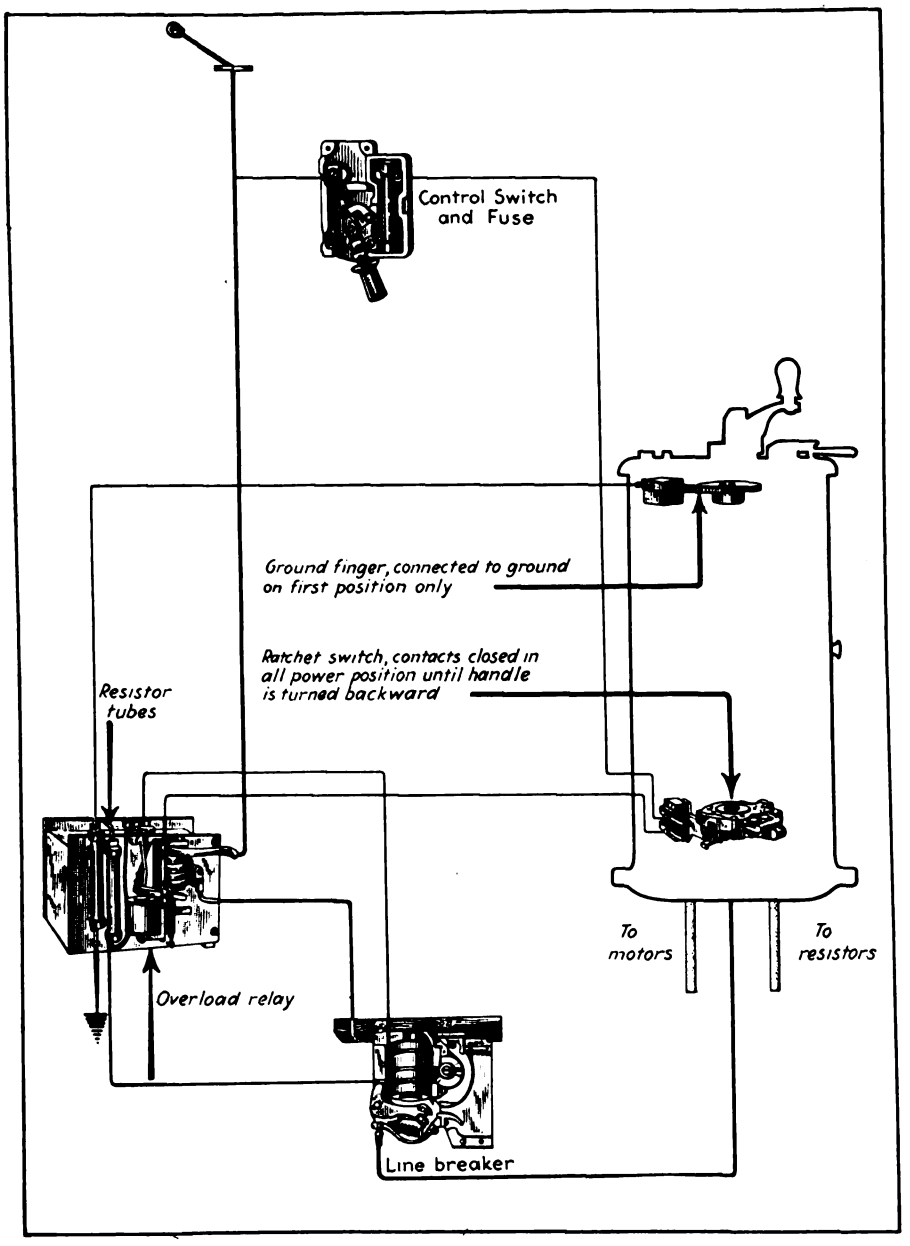

Connections of Drum Controller and Ratchet Switch with Line Breaker Mounted Under Car

ation of street cars under congested conditions were suddenly expanded to a remarkable degree with the introduction of one-man operation. Under such conditions the requirement for maximum safety dictated that the air brake and its auxiliary apparatus provide for automatically performing the duties of the operator in stopping the car, in the event of his becoming suddenly incapacitated. In addition it was desirable to make the act of stopping the car in an emergency as simple as possible. With the duties of motorman and conductor both combined in one man, it was also important to simplify the operation of doors, sanders, etc. These various requirements are all combined in the safety car apparatus, and represent an interesting example of the important part played by the air-brake equipment on the modern car.

An accompanying drawing illustrates the arrangement of the original safety car apparatus. Various other combinations of equipment have been brought out to perform similar functions on a one-man car, and a type developed in Davenport and applied to one-man cars of the Tri-City Railway and others is illustrated.

Foundation Brake Rigging

The design of foundation brake rigging is of extreme importance in connection with the elimination of rough stops, which are one of the fundamental factors in affecting the comfort of an electric car ride. From the standpoint of safety, the design of foundation rigging is of paramount importance. There has been an increasing appreciation on the part of car designers of the importance of devoting proper attention to the layout of brake rigging in order to obtain smooth and equalized application of the shoes to the wheel. This has been partly discussed under the subject of truck design. In the design of the foundation rigging on the body, the increasing tendency to use boxed-over jaws and safety stops to insure obtaining a brake on at least one truck in the event of a pull rod failure is a step in the right direction.

There has also been increasing attention given to the matter of holding down the maximum allowable total leverage ratio, so as to prevent obtaining excessive piston travel as the result of body center bearing wear, play in the axle journals, or any movement of the truck element relative to the body, when the brake is applied. A total ratio not exceeding 12 to 1 is now considered the maximum allowable for good practice, and this ratio should be decreased if there is a possibility of obtaining any appreciable slack in the rigging when the brakes are applied.

The hand-brake equipment on electric cars should be installed so as to be operative at all times. There is a tendency to use various forms of helical quick-take-up castings in connection with the hand-brake rigging for the purpose of taking up slack chains rapidly. It is considered good practice to use either this form of quick-take-up or some type of gearing to insure against serious decrease in the effectiveness of the hand brake, when a chain length greater than 24 in. is required in the leverage layout. Where a quick-take-up casting is used, it has also been found necessary to guard against obtaining excessively short piston travel, as this will result in the brake application being made with the chain on the large part of the take-up cam and a consequent serious loss in the effectiveness of the hand brake. It is also considered good practice, as a safety precaution, in the design of hand-brake rigging to insure a hand-brake application developing forces in all brake levers in the same direction as are developed by the application of the air brake.

There have been considerable advances made recently in the design

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of control equipment. The most outstanding of these developments has been the successful design of multiple-unit control for operation on light-weight city cars, by a general simplification, reduction in size and weight, and improved arrangement to afford readier accessibility of the parts for maintenance. This development has taken place as the result of an increasing use of multiple-car trains in city service, and a desire by some operating companies to provide maximum flexibility in the use of cars by arranging each for independent operation.

For single-car operation there has also been a considerable tendency toward the removal of the customary platform circuit breaker and the installation of some form of line switch under the car. This practice may be attributed to the almost universal elimination of the bulkhead in car body construction, which makes the presence of the common type of platform circuit breaker very undesirable.

The use of field control for motors in city service does not seem to be a favored practice, as its use involves slightly additional complication. For a combination of city and suburban running, however, this type of control is considered of substantial advantage.

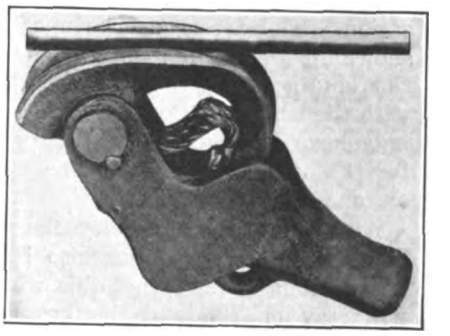
The foot control equipment developed on the Third Avenue Railway in New York to give the car operator simultaneous control of both air-brake valve and car controller by the operation of a foot pedal is an interesting arrangement. This equipment has the advantage of allowing the car operator to have both hands free, but because the acceleration through the controller must be automatic, it has some limitations from the standpoint of flexibility in operation under congested city conditions. The six-motor train control developed in Pittsburgh is also an interesting departure. It was designed in order to carry a portion of the motor equipment necessary to propel a two-car train on the trailer. This construction has the advantage that the extra motor capacity necessary to haul the trailer is dropped when the trailer is disconnected from the train. The scheme was discussed in the Annual Convention Number last week.

The desire to use multiple-unit control equipment on low-floor cars has also led to the development of this type of control in a form suitable to be installed in cabinets within the car body or under longitudinal seat boxes, where it is both protected and easy of access. In this construction, the arc-breaking switches are located under the platform of the car. In the general design of control apparatus there has been a tendency to provide greater arc-breaking capacity due to the fact that the railway power distribution systems have become such large networks with so much power capacity behind them that a failure of the equipment on any individual car causes severe arcing.

Graphite Plug Method of Lubrication for Trolley Wheel Bushings

Current Collecting Equipment

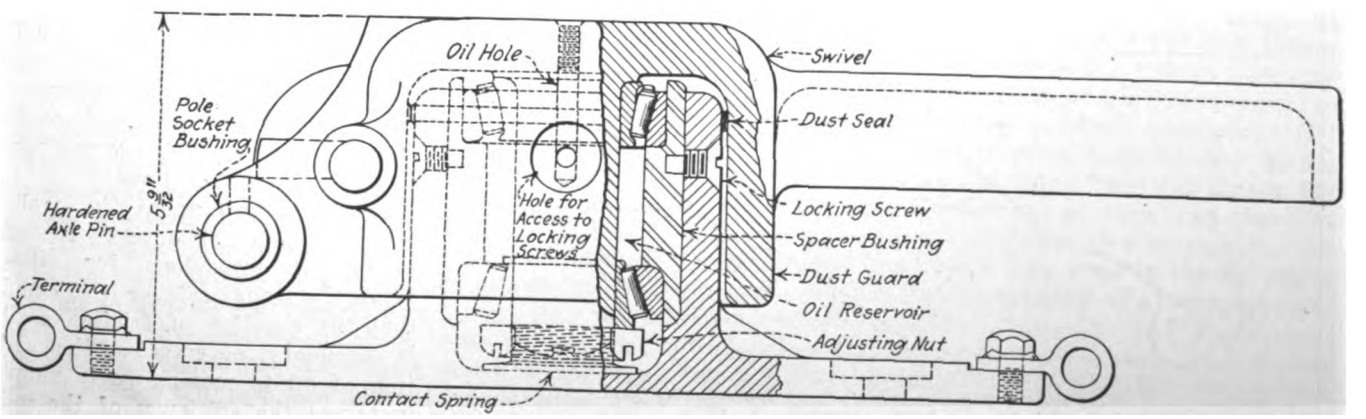
For some time there has been a feeling among railway operators that considerable improvement is possible in the design of the current collectors in common use. An attempt has been made to give the trolley wheel a longer life by increasing its diameter. This, however, has not been entirely successful because the increased weight at the end of the pole causes the wheel to jump farther away from the wire when passing under rigid overhead special work. Three diameters, 6 in., 5 in. and 4 in., seem now to be the most satisfactory sizes.



A Widely Used Type of Trolley Shoe

Damage to both wheel and wire results from excessive vibration with consequent arcing. Vibration, however, is largely a matter of balance and alignment, and improvement has been made in the balance of the wheel by means of greater care in the process of manufacture. A drop-forged copper trolley wheel is claimed in this respect to be superior to the ordinary cast wheel.

One of the outstanding problems in connection with the use of trolley wheels has been the lubrication of the bushing. In many cases the life of the wheel is determined by the life of the bushing. As a remedy for this difficulty, hollow, case-hardened steel, lubricated shafts, using a solidified lubricant, have given satisfaction on some railways. The lubricant inside of the bearing surface is fed to it automatically as required. Another remedy tried is the use of graphite plugs for lubri-



A Method of Application of Taper Roller Bearings to Trolley Base

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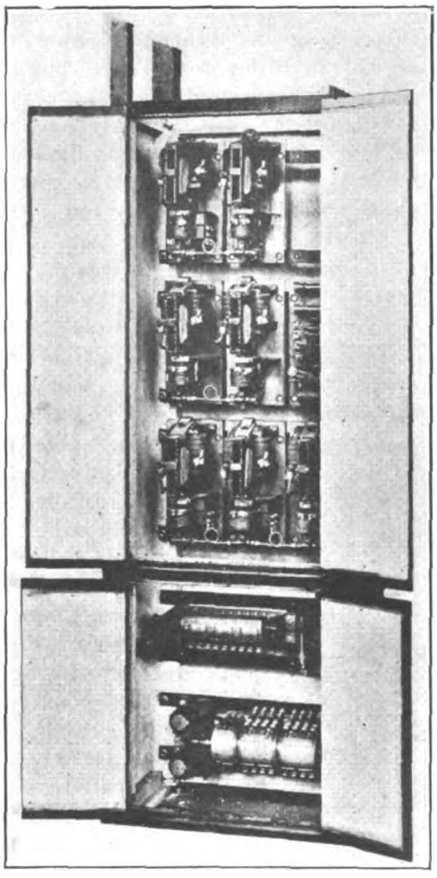
cation. These rest on springs, as shown in an accompanying illustration, and are thereby kept in contact with the bearing. Conical side bearings have been used as substitutes for the ordinary cylindrical bearing on one type of wheel.

A wheel with stationary flanges and a rotating tread has also been tried. It is claimed that this wheel will stay on the wire better than does a solid wheel, and the decreased weight and cost of the moving part are additional advantages. It has not, however, been widely adopted.

Generally speaking, trolley wheel performance becomes increasingly unsatisfactory as the speed increases. The solution of this problem has been approached from two general angles, the first consisting of an attempt to improve the performance of the wheels by the methods already described, and the second, through the development of sliding collectors.

Such devices have as their object the maintenance of a larger area of contact and the elimination of vibration caused by the rotation of the wheel. The designers have had to contend with several requirements, among which the most important are reliable operation through special work, avoidance of excessive wear on trolley wire, and provision for backing. The last of these requirements has probably been the most difficult to meet, although certain types of shoes now on the market are reported to have been improved so as to overcome this difficulty. Some railways maintain that sliding contacts may be used without noticeable wear on the wire. Others consider that an important requirement for the satisfactory operation of sliding contacts is the proper lubrication of the wire. It is important in this connection that the proper kind of lubricant be used and also that it be applied properly. Frequent application of very small quantities of lubricant gives better results than the application of much larger quantities at longer intervals. The requirements for a proper lubricant include adhesiveness and a minimum content of saponifiable material to prevent washing off the wire.



Modern Light-Weight Multiple-Unit Control for Surface Cars Arranged for Installation in a Cabinet in Car Body or on Platform

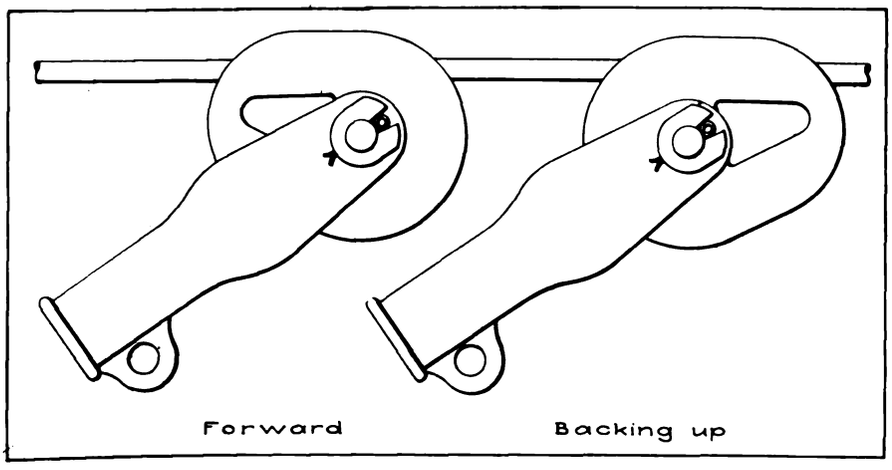
To insure that the trolley wheel will run true and also that there will be proper contact between the wheel and the wire, careful attention has been given to the design of the trolley base. The trolley pole should be free to move instantly in a vertical plane to accommodate changes in the height of wire, and should be equally free to swing in a horizontal plane to follow changes in wire alignment. A tapered roller bearing arrangement, shown in the accompanying illustration, has been designed for the purpose of obtaining better results in this direction.

In the equipment of one-man cars it has been a common practice to make the trolley base light in weight to correspond with the light weight of the other parts of the car. However, on one-man cars the service of the trolley base is even more severe than is ordinarily the case on cars of the larger types. Often the former is lower and therefore requires a longer trolley pole with a consequently greater tension. It is therefore the more general opinion now that the trolley base for both the small one-man cars and the larger cars have practically the same duties to perform and that there is no occasion for consideration of distinctive design.

A problem in trolley construction has been that of controlling the pressure on the wire as the pole changes its angularity for variations in the trolley wire height. Recent improvements in design have taken care of this requirement.

The trolley pole with either a wheel or shoe seems to represent the only practicable arrangement for current collection which will give satisfactory performance on the large majority of city and interurban properties which use overhead systems. This is primarily due to the nature of the existing overhead structure. The successful use of any form of pantograph or bow requires the equivalent of a catenary type overhead construction because of the inertia and rigidity of these forms of current collectors. In addition, the comparative first cost, weight and maintenance expense of the various devices materially favors the existing type of pole for most city and interurban lines.

Recent improvement in trolley catchers and retrievers consists mainly in provisions for oiling. While the trolley catcher is so simple that the question of friction really is secondary, nevertheless the addition of oil to moving parts simply increases the efficiency of the unit and decreases the amount of wear.



A New Type of Sliding Trolley Shoe

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A Review of New York's Transit Situation

Conditions Getting Worse Daily—Yearly Growth Is Almost as Great as Entire Traffic of Buffalo—Mayor's Plan Would Disrupt the Present Rapid Transit Lines —Municipal Operation Means Waste of Money

By LeRoy T. Harkness
Member New York Transit Commission

EVERY day and in every way transit conditions in New York City are getting worse and worse.

Every day, on the average, there are 2,500 more travelers than there were the day before. Last year about 150,000,000 more rides were taken than were taken the year before. This means that an increase as large as the total traveling public of Rochester, Syracuse and Utica combined—156,488,293—is poured into our street railways every year.

These figures are so staggering we cannot fully grasp them. One hundred and fifty million is a big figure, but how big is it? By comparison it shows that the annual increase in New York is about three times the total yearly passengers in Albany (53,562,883), and approaches the total traffic in Buffalo (215,529,528).

The Author Brings Out that in New York City:

7,500,000 people are transported daily!

More than 700,000 ride in one direction in one hour!

Every day 2,500 more rides are taken than were taken the day before; 100,000 more a week; 150,000,000 more a year!

In general, population doubles every thirty-three years; traffic every twelve to fifteen years!

Last year the total traffic was 2,590,313,699!

In 1860 each person traveled forty-three times per year; in 1920 each person traveled 404 times!

In the past fifty years traffic multiplied nearly forty times; facilities increased only about five and three-quarter times!

In two years the ticket sales at Times Square Station increased 9,000,000!

The transit lines could carry 35,000,000 passengers in twenty-four hours—one-third the population of the United States! They actually carry 7,500,000 because most people travel in certain directions morning and evening!

In 1900 the first subway, costing about $50,000,000, was started, and put in partial operation in 1904. Nearly ten years were allowed to elapse before the Dual Subway plan of 1913 was put into effect, costing for construction and equipment about half a billion dollars. That project has been completed except for the Nassau Street line and the Fourteenth Street-Eastern line, both of which have been held up by adverse action of the Board of Estimate and Apportionment.

Again ten years have elapsed before the starting of new subways. We are continually making the same mistake of building a subway and then waiting till it is swamped before starting another. In the past fifty years traffic multiplied nearly forty times; facilities increased only about five and three-quarter times.

Finally, in August the Board of Estimate and Apportionment approved the routes and general plans of the Washington Heights extension in Manhattan and the Crosstown line in Brooklyn. The construction cost of these lines will be in the neighborhood of $60,000,000. This approval puts the Transit Commission in a position to drive forward the building of these lines, but unfortunately nearly five years must elapse before they can be constructed, equipped and put in operation. In May, 1922, the Transit Commission laid out a five-year building program to cost $218,000,000. This is the least that should be done.

The question immediately occurs, Where does all this tremendous traffic come from? Increases in population alone do not account for it. Traffic increases more than twice as fast as the population. It is the increase in population multiplied by the greater use people make of transit facilities.

The figures show this strikingly. The population of New York with number of revenue passengers on its urban transportation lines by twenty-year periods has been as shown in the table below.

It will be seen that in sixty years the traffic has multiplied about forty-five-fold, while the population has multiplied only five-fold. The population has grown from 18 to 39 per cent per decade and the traffic has increased from 49 per cent to 200 per cent, the high percentage following the opening of extensive new lines. In general, the population has been doubling about every thirty-three years and the traffic has been doubling about every twelve or fifteen years.

In 1860, on the average, each person rode forty-three times a year; in 1870 the average number of rides per capita increased to 103, in 1880 to 152, in 1890 to 218, in 1900 to 246, in 1910 to 321 and in 1920 to 404.

There must be considered too not only the increases in population and in the riding habit, but also the added difficulties of carrying people to and from congested districts. For example, the Equitable Building houses 13,000 people. It took a year and a half to build the Equitable Building, but it takes nearly five years to build a subway to carry its people to and from work. The 13,000 people, most of whom keep the same hours, are carried largely at the same time. A car in the subway will accommodate 130 of them and ten cars make up an express train, therefore it requires ten trains to carry the people who work in the Equitable Building. This is the full capacity of a two-track subway for twenty minutes.

Year	Population	Revenue Passengers
1860	1,174,779	50,830,178
1880	1,911,698	290,417,029
1900	3,437,202	846,353,058
1920	5,620,048	2,273,336,533

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Entering into New York City's transit problem is also the number of visitors and commuters that come into the city. It is estimated in a recent report made to the Transit Commission that this amounts to more than 500,000 people a day. Nelson P. Lewis, formerly chief engineer of the Board of Estimate and Apportionment and now associated with the City Plan Survey of New York, estimated that in 1920 in the so-called Metropolitan District there was a population of about 9,000,000. The detailed estimates of prospective increases have not been completed, but Mr. Lewis' preliminary figure for this district for 1960—thirty-seven years hence—is 20,000,000.

The magnitude of this suburban traffic—present and prospective—amply warrants the work already initiated by the Transit Commission looking to the provision of separate adequate facilities for it. Competent advice is to the effect that both the Grand Central and Pennsylvania Terminals will be outgrown within the next seven years.

The Flatbush Avenue Terminal of the Long Island Railroad—the terminal of heaviest traffic of any two-track railroad in the world, is already outgrown. More than 34,000,000 passengers a year go through it.

Figures on Future Traffic

We have considered the past growth. What of the future? In connection with various aspects of its work, the commission has had careful studies made of prospective traffic and has had the benefit of a careful survey made by the New York Telephone Company. These studies indicate a population of about 6,500,000 in 1927 and of more than 7,000,000 in 1932. Judging by the increases of the past the traffic in 1932 unless choked by lack of new facilities will be more than four billion passengers per year.

The traffic is already being choked. The 16,000 taxicabs that are crowding the streets and throttling surface traffic are an indication of the overflow from the transit lines of a considerable part of the public that would rather pay more and avoid the crowding.

Traffic congestion, especially on the rapid transit lines, has long passed the point of acute suffering. There is not only the physical suffering and menace to health, but the indiscriminate crowding of women and young girls on the transit lines in the rush hours is debasing and demoralizing. The whole situation is a disgrace to the city of New York.

At best it will take nearly five years before big trunk line subway systems can be placed in operation. The two lines—the Washington Heights extension and the Crosstown line—that the commission finally secured authorization to go ahead with a few weeks ago are only a beginning. They will only very partially keep up with the increased congestion. It is almost frightening to contemplate what must happen in the next four or five years before any major relief can be given. It is all very well to talk about traffic being reduced because of the choking effect of congestion. People, and more and more people, will try to crowd themselves on the transit lines. At the present time railroad operation in Greater New York is the most intensive operation anywhere in the world. Comparatively little can be done to add to the service that is being given. Tracks in the rush hours are crowded very nearly, if not quite, up to the limit.

These are some of the things that may help, although it must be recognized that anything but major subway construction is merely a palliative:

The engineers of the Transit Commission are already preparing plans for the lengthening of local station platforms both on the Interborough and B.-M. T. Lines. This will substantially increase the local service, and as the congestion gets worse more people may be content to take a little longer time and ride on local trains, thereby relieving the worst crowding, which is on the express trains.

Both subway companies have been ordered to buy more equipment, and large additional orders will probably be placed in the near future. The Interborough company claims that it has been prevented from keeping the present equipment in first rate order and from getting more cars because of the alleged failure of the city authorities to carry out the contract obligation to provide inspection, storage and repair facilities.

Ten years ago the city agreed to build the Nassau Street line, extending from a connection with the Center Street loop at Chambers Street down Nassau and Broad Streets to the Montague Street tunnel. Construction plans, specifications and contracts were prepared by the Transit Commission at large expense for this work, only to have them rejected by the Board of Estimate and Apportionment. The construction of this line would give very material relief to the whole Brooklyn transit operation.

Similarly in 1913 the city agreed to build the Fourteenth Street-Eastern line, extending from Fourteenth Street and Broadway to East New York, and the work on the subway portion was actually started in 1916. When the commission came into office the subway work was largely completed, but it was only after many months that it was able to secure authorization for the contracts for station finish and trackwork. Nor is this all. The subway portion of the line only goes a short distance in Brooklyn and will serve a comparatively limited population. The great service of this line is to reach the population further out toward East New York and the districts beyond East New York served by existing elevated railroads. At the present time these people are being brought by a roundabout way over the Williamsburg Bridge and down through the Center Street loop, where they must change and walk two blocks—most of them on the street surface in all sorts of weather—to reach the Broadway subway. It is without exception the most acute and potentially dangerous situation on any of the transit lines.

The completion of the Fourteenth Street line from East New York will take these people on practically an air route to Fourteenth Street and Broadway, where most of them will be within easy walking distance of where they want to go. The operating contract and the route and general plan which have previously been approved by the present Board of Estimate and Apportionment and the Mayor call for an elevated railroad, practically all of which is over an old right-of-way of the Long Island Railroad on which freight trains are now being operated. The Transit Commission rushed forward plans for this elevated extension in accordance with the provisions of the contract with the operating company, secured bids and submitted them to the Board of Estimate and Apportionment about a year and a half ago. That board rejected the bids on the ground that although the city was bound by a contract to build this elevated line the board now preferred a subway. The operating company, on the other hand, stated that the substitution would mean several years more delay and a continuance of the acute condition at Canal Street and insisted upon a compliance with the terms of its con-

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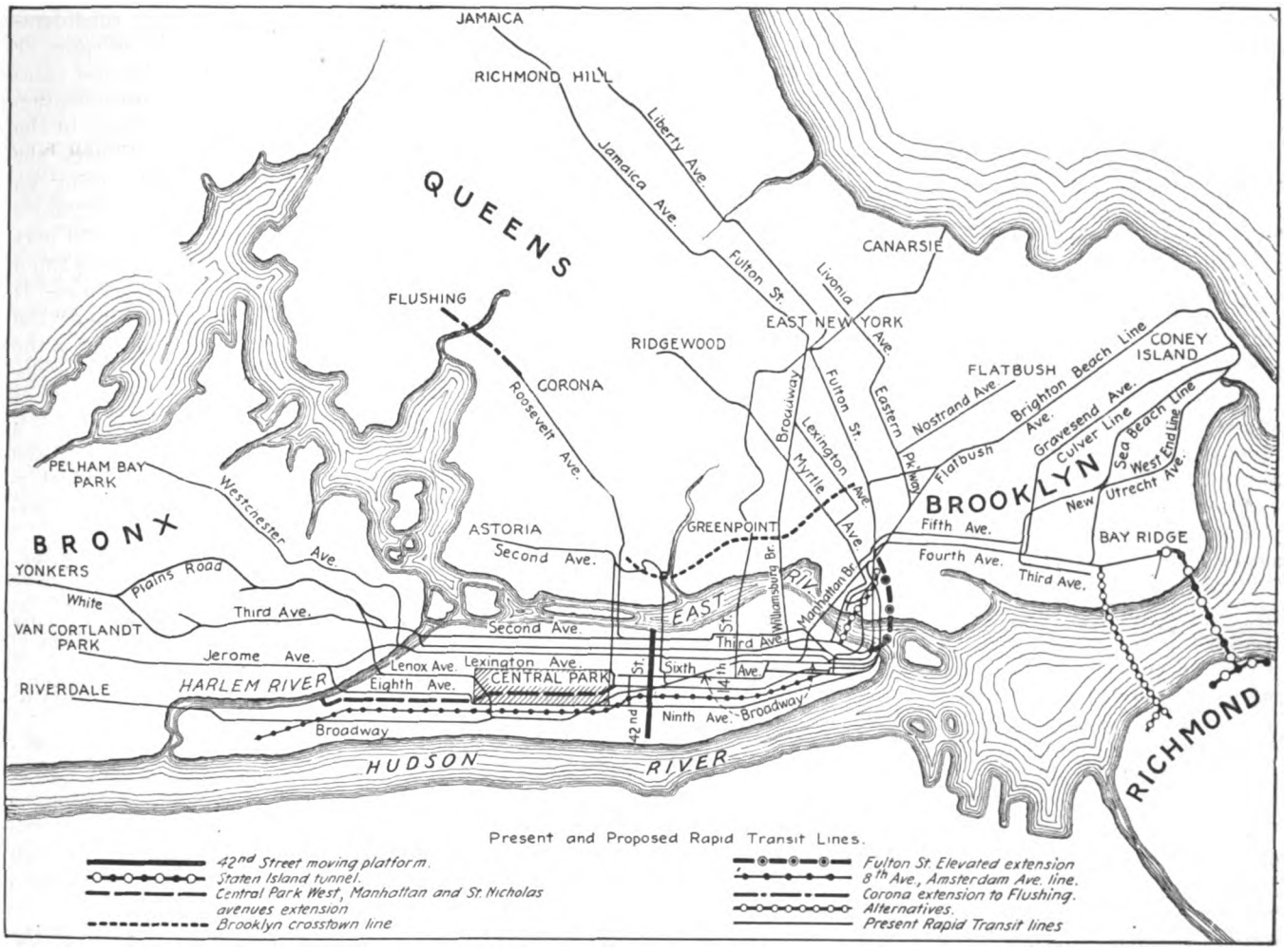
tract. The matter has therefore stayed at a deadlock and the commission has been unable to get this line under way. It could be built in about eighteen months, would relieve the most acute condition in the city and would give the greatest single measure of relief that could be given anywhere within so short a time.

But it would seem that all these things, important as they are, will fall far short of relieving a situation that is bound to grow worse until the new subways come in. There is one method that is drastic, but in my judgment will very likely have to be availed of. That is what is called "staggering the peak," or, in other words, regulating the hours at which people go to and come from business. At the present time the bulk of the traffic is compressed within two hours morning and evening, 700,000 passengers being carried in one direction in one hour. Great relief can be occasioned if by statutory enactment or otherwise it were required that people in certain businesses should start and leave half an hour later or half an hour earlier, as the case might be. This would spread the peak over three hours instead of two, greatly reduce the crowding and at the same time permit carrying a greater traffic. The difficulty is to get the public to do this voluntarily. Such a system was put in operation during the influenza epidemic under plenary Health Department authority. It worked well then. I think we will have to resort to it again.

There are two main things to be done, and fortunately on these the ground work is well advanced. The first is the reorganization, combination and rehabilitation of existing lines, so as to enable them to give the maximum of service. The commission's plan for readjustment of the existing conditions has been made public* so need not be repeated here.

The Interborough company has already been reorganized and saved from a receivership. The old B. R. T. (now the B.-M. T.) after several years in the hands of a receiver has recently been reorganized and put in solvent condition. The plan and scope of these intermediate reorganizations were largely influenced by the Transit Commission working in close co-operation with Judge Julius M. Mayer of the United States Circuit Court of Appeals. Hence, both companies are now so organized that the Transit Commission's plan for the municipal ownership and unification of all the useful properties in the city can be carried out.



Present and Proposed Rapid Transit Lines in New York City

There is one vital point that must be kept in mind in all subway discussions and which is the base of the commission's reorganization plan: The state Constitution limits a city's borrowing power to 10 per cent of its assessed valuations. New York city is always nearly, if not quite, up to that limit. There are certain exceptions to this constitutional provision, notably the one affecting subway bonds. Subway borrowings may be exempted from the debt limit if the bonds are self-sustaining. The first subway built in 1900-1908 is self-sustaining and nearly $50,000,000 expended on it was exempted and used over again. The 1913 transit program, in which the city has invested nearly $250,000,000, is not self-sustaining and the money invested rep-

*See ELECTRIC RAILWAY JOURNAL, Oct. 1, 1921, page 557.

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resents a frozen credit. Over $10,000,000 a year for interest and sinking fund payments are now included on this account in the tax budget. The crux of the commission's plan is to make the transit lines at all times self-sustaining so that nearly $250,000,000 can be released for new subways. This will constitute a revolving fund and will finance more or less automatically all needed future extensions. It will allow what we have long so badly needed—a consistent, continued building policy of putting forty or fifty million dollars' worth of construction under contract every year.

Furthermore, and in passing, one myth ought to be disposed of—that of the 5-cent fare. We have not in reality a 5-cent fare in New York today; it is 6 cents. The abolition of free transfers during the disintegration of the surface lines has added just about 1 cent to the fares paid by the riders on those lines through either an added fare or a 2-cent charge for transfers. On the rapid transit lines the passenger pays 5 cents and the city pays 1 cent out of taxes. The 5-cent fare has not been saved—it has merely been camouflaged. The Transit Commission reorganization plan is the only constructive suggestion yet made for its restoration.

New Subways the Only Solution

With regard to new subways:

The only solution of the problem is the building of new subways on an enormous scale. More than a year ago the Transit Commission outlined a plan that would take five years to carry out at a cost of $218,000,000. Seven lines in all were proposed.

After the Transit Commission had adopted these plans the Mayor of the city made public a so-called subway plan extending over a period of fifteen years. This included a description of various map or paper routes all over the city and called for the reception of the lines built by the city under the 1913 subway program and leased to the Interborough and B.-M. T. companies, the contracts providing that those lines could be taken back at any time after ten years upon the city paying the companies the amounts of their investment plus 15 per cent.

The Mayor's plan called for an expenditure of more than a billion dollars, but without the slightest trace of any plan for financing the cost. Furthermore, the layout of the lines violated fundamental rules of engineering and in the face of the need for utilizing every available agency to meet the enormous increases of traffic the Mayor urged a plan that would split apart and disintegrate the present system.

The Board of Estimate and Apportionment turned down the commission's subway plan without ever officially giving a reason. Thereafter, and for a number of months, the attention of the city board and certainly that of the Mayor was concentrated on attempting to get legislation abolishing the Transit Commission, turning all the powers of the commission, including that of regulating service, rates and capitalization of transit companies, over to a city board and giving the city the power to engage in municipal operation of all transit facilities. As soon as the Legislature adjourned the commission, in a final effort to secure action, slightly modified two of its routes—the Washington Heights extension and the Crosstown line—to agree as nearly as might be with two of the Mayor's routes. After repeated requests the Board of Estimate finally appointed a conference committee, presided over by Dock Commissioner John H. Delaney, who had been Transit Construction Commissioner and thereby had a thorough knowledge of transit matters. The conference finally led to the approval of these two routes and the commission is now in position to drive forward the construction plans, contracts and specifications, and as soon as completed to submit them to the Board of Estimate for the necessary consents and appropriations.

Mayor's Plan Means Disintegration

The Mayor's plan, or, more properly, the theory underlying it, requires more extended consideration. The paper maps or routes included in it are of themselves relatively unimportant except as they are founded upon the principle of disintegration. One route or another, if based on fundamental engineering considerations, should readily be adjusted with another route or routes. The Mayor, however, proposes in the first place to recapture such of the existing lines as are recapturable. By reception is meant the right retained in the 1913 subway contracts for the city to take back the new lines at any time after ten years by paying an amount which at the tenth year equals the company's investment plus 15 per cent and decreases by 1/39 part each year thereafter. But only part of the existing rapid transit system—to say nothing of the surface lines—is subject to this right. The first subway built under the 1900-1902 contracts is not subject to it. Neither is the Manhattan Elevated system nor the company-owned elevated and rapid transit lines in Brooklyn.

This would be the result of the adoption of such a policy and it needs to be carefully considered by the citizens of New York because all signs point to a determined effort on the part of the present city administration to carry it out.

In the first place it would cost something over $180,000,000 in payments to the Interborough and B.-M. T. under the terms of the contracts. This would be an actual cash outlay out of the city treasury and would not add a single seat nor a single strap.

So much for that. Now to consider the disintegrating effect:

In 1913 the city extended the old subway line on the east side of Manhattan south of Forty-second Street north into the Bronx by building the Lexington Avenue extension. Similarly, on the west side it extended the old Broadway line south of Times Square to downtown Manhattan and Brooklyn by building the Seventh Avenue extension. The subway contracts provide for "swapping" one of these new extensions for one of the old lines. That would mean that transfers or connections from one line to the other would be cut off. This would also do away, in large part at least, with the joint service in the Bronx whereby Manhattan Elevated trains operate over the subway extensions.

In Brooklyn a great part of the transit relief under the 1913 program was furnished by linking up new subway lines with existing lines such as the Brighton Beach and Sea Beach lines already owned by the Brooklyn company. The city cannot recapture these old company lines and the reception of the new lines would mean the breaking apart of the present joint operation. Thousands of passengers coming in over the Brighton Beach line would have to transfer at Malbone Street in Flatbush and pay an additional fare to go over the Broadway line. A similar situation would be the case with the Sea Beach service at about Fourth Avenue and Sixty-fifth Street. So also the tremendous traffic coming in over the Broadway Elevated in Brooklyn would be deprived of the present free transfer to the Broadway subway in Manhattan.

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The purpose of this part of the so-called plan is not to give transit relief, because it will not give transit relief. Recaption of the existing lines in and of itself will not add a single new facility, but on the contrary will disintegrate and interrupt the existing avenues of traffic and multiply the number of additional 5-cent fares. The underlying purpose patently is to get possession of a part of the rapid transit system so that it can be municipally operated.

Expressing it briefly, the difference between the Transit Commission's plan and that of the Mayor is:

The commission believes in eliminating existing abuses of private operation, reorganizing, combining and rehabilitating present lines and utilizing every available agency to meet the present traffic congestion and the enormous increases that are indicated for the future. The Mayor's plan is bent upon splitting apart the existing lines and entering upon the field of municipal operation on part of those lines even though that spells disintegration and additional fares.

The commission laid out a conservative plan for the expenditure of $218,000,000 in five years, and provided the way, through its reorganization plan and the exemption from the debt limit of the present investment, for adequately financing this project and all future ones. According to his estimates the Mayor's plan calls for the expenditure of about $900,000,000 for construction over a fifteen-year period. Estimates of the commission's engineers—the men who have actually built the New York subways—show that the bare construction cost would be at least $1,150,000,000. With municipal operation the city would have to spend scores of millions of dollars for equipment for these new lines. No provision has been made in the estimates for this. In addition the Mayor's plan contemplates paying out of the city treasury to the transit companies for recaption an amount in the neighborhood of $180,000,000. If it were possible to carry all this out in toto it would probably entail an expenditure in the neighborhood of a billion and a half dollars. To provide for this absolutely unparalleled expenditure there is no financial plan except as the city administration might expect to fall back upon the ordinary annual accretions to the debt limit. As a matter of fact these are altogether insufficient to meet either the commission's or the Mayor's subway projects, and are practically taken up by the normal increases in city functions such as schools, streets, paving, sewers, and the like.

Recently, the Comptroller officially reported the present debt limit to be about $76,000,000. This, however, did not take into consideration $60,000,000 for the Staten Island tunnel or the cost of various other projects.

Proposed Staten Island Tunnel a Waste of Money

Before leaving subway matters, there is one instance of the city's activities that I cannot forbear referring to. Under a separate act of the Legislature passed in 1921 the Board of Estimate has gone ahead with a project to build a tunnel to Staten Island. This is laid out as a combination freight and passenger tunnel, and in this respect it conflicts both with the plans of the Port Authority and of the Transit Commission. The Board of Estimate and Apportionment is already letting contracts for this work, and the cost is estimated at $60,000,000. It does not fit into the complete scheme outlined by the Port Authority for freight development and as laid out would only connect for freight purposes with the Baltimore & Ohio Railroad. No contracts have been let for this operation and so far as freight is concerned if and when the tunnel is completed the city will practically be at the mercy of the railroad companies in fixing the terms of the lease. So far as transit operation is concerned this tunnel is a complete misfit. To allow for freight operation the grades of a tunnel have to be in the neighborhood of 1 per cent, while for transit operation they may be in the neighborhood of 3 per cent. Stated concretely, this means that the present tunnel has to be so deep at the shore line of Staten Island that access to it can be only through deep elevators, and the railroad only rises to the surface away in the center of the island. Therefore it conflicts with well-considered plans both from the standpoint of freight and transit development.

The Transit Commission's plans for Staten Island contemplate a tunnel that would rise near the shore lines both of Staten Island and Brooklyn and readily connect with existing lines in both boroughs. The city, however, is committed to going ahead and spending $60,000,000 on this project. For this amount of money the Transit Commission could not only provide a proper and adequate rapid transit tunnel to Staten Island but could revamp and rebuild the existing transit lines within that borough so as to give the whole island as good transit service as there is in the city. The spending of $60,000,000 or more on this ill-conceived project represents to my mind the grossest waste of public funds that I have seen in an experience of over twenty years in municipal affairs.

> "ALL the studies made by the commission indicate that in congested districts street cars are more effective in moving large numbers of people than are buses when consideration is given to variations in weather and other conditions. The proper field for buses is to take the place of some of the trolley lines outside the congested areas and generally to serve the outlying districts as feeders for rapid transit and other lines."—*Commissioner Harkness.*

Present Buses Not Municipally Owned

Finally, with regard to surface lines and buses:

It has been popular in certain quarters to refer to the surface systems as antiquated and obsolete. The truth of the matter is that they carry about 40 per cent of the travel of the greater city, 57 per cent in Brooklyn, and large districts, especially in Brooklyn, are absolutely dependent on them.

New York has had for a number of years an exceedingly well-managed bus line operating on a 10-cent fare —that of the Fifth Avenue Coach Company. Several years ago, at the time of the Brooklyn transit strike, one of the city departments arranged as an emergency measure to put a number of buses in Brooklyn along the lines paralyzed by the strike. These were buses operated by individual owners and supervised by a city department. This marks the start of the so-called municipal operation of buses. After transit conditions returned more to normal, injunctions were obtained against the continued operation of these buses, and generally they were withdrawn from Brooklyn. During the early days of the receivership of the New York Railways the receiver discontinued operation on several crosstown lines, and these buses were put in to take their

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places. They bear on their sides the words "Department of Plant and Structures," but in reality are not owned by the city, nor by that department, but are owned by individual operators.

At about the time of starting this bus operation the Board of Estimate and Apportionment passed a blanket resolution authorizing the Commissioner of the Department of Plant and Structures to grant permits to individual owners of buses. The city Charter lays down in detail the procedure that must be followed in granting rights to use city streets, and the public service commission law requires that in addition a certificate of convenience and necessity must be obtained from the Transit Commission. No attempt was made to comply with these statutory requirements, and in the litigation that ensued the Supreme Court of the state of New York repeatedly held this bus operation to be illegal.

> "FURTHERMORE, and in passing, one myth ought to be disposed of—that of the 5-cent fare. We have not in reality a 5-cent fare in New York today; it is 6 cents. The abolition of free transfers during the disintegration of the surface lines has added just about 1 cent to the fares paid by the riders on those lines through either an added fare or a 2-cent charge for transfers. On the rapid transit lines the passenger pays 5 cents and the city pays one cent out of taxes. The 5-cent fare has not been saved—it has merely been camouflaged. The Transit Commission reorganization plan is the only constructive suggestion yet made for its restoration."
>
> —*Commissioner Harkness.*

In the fall of last year the commission conducted an extensive investigation into this bus operation and found it honeycombed with politics and what a local politician once termed "honest graft." For example, permits were quite generally given on the recommendation of district leaders, bus drivers were laid off for not voting, and an old-time partner of the head of Tammany Hall known as "Fish-hooks" McCarthy was given bus permits on the Eighty-sixth Street "cream" line on a telephone request. On one of the lines in the Bronx it was proved beyond question that two local politicians were drawing down two-thirds of the profits on a line operating on a 15-cent fare, for which they had done nothing but obtain the permit. When these situations were called to the attention of the Commissioner of the Department of Plant and Structures, while on the stand before the commission, his answer was that he was not interested "so long as they were Democrats."

Finally a suit for injunction was started by one Schafer as a taxpayer based not on the illegality of the actions of individual bus operators but based upon the broad ground of the illegality of the action of public officials in authorizing and continuing this wildcat system. A decision in Schafer's favor was handed down by Justice Mullan in the Supreme Court last summer and the commission intervened and asked for and obtained a stay while it was investigating the matter. An appeal was taken to the Appellate Division, which affirmed the decision of the court below. Subsequently an application was made by the city authorities for leave to appeal to the Court of Appeals. This leave has recently been denied by that court, and it is this last decision that has brought the bus situation to a focus.

Immediately upon learning of the decision of the Court of Appeals the Mayor called a meeting of the Board of Estimate and Apportionment and resolutions were adopted asking the Governor to call an extraordinary session of the Legislature to authorize the city to spend $25,000,000 for buses and to engage in the business of municipal bus operation.

There has been no need for a special session. The matter of municipal bus operation is a large public question that should thoroughly be thrashed out and decided at a regular session. On the merits it is very simple and easy to hold the matter in abeyance until after the Legislature meets in regular session next January. All that is required is for the Board of Estimate to act in accordance with the provisions of the Charter and grant rights which will expire by their own time limit at the end of, say, six months. On the basis of such action the Transit Commission is prepared promptly to give its certificates of convenience and necessity. The grants by the Board of Estimate may be either to the individual bus operators or to associations of them, and they may contain such terms, conditions or requirements as that board sees fit to impose. One term it must impose under the Charter: That the bus operators shall pay compensation to the city. The Fifth Avenue Coach Company is required under its grants to pay the city 5 per cent of its gross receipts, which amounts to about $250,000 a year. Under the illegal operation that has been carried on the city has not received a cent, and in addition has spent considerable money for salaries of starters, superintendents and the like.

This very significant fact should be kept in mind: The demand for an extraordinary session on the so-called bus emergency is not for the purpose of maintaining the *status quo* or to keep the present small operators going. The demand is for authority to spend $25,000,000 of city money for buses and to engage in municipal bus operation. This does not mean a continuance of the present condition but a substitution for it. The present bus operators are to be put out of business and their places taken by municipal buses and municipal employees.

Bus Costs and Field Analyzed

It has been blithely assumed and promised that the $25,000,000 municipal bus system would pay on a 5-cent fare. So far as I have ever been able to ascertain no real study has been made by the proponents of the plan to find out if this is so. True, the present wild-cat bus operation is on a basis of a 5-cent fare, but in that case nothing is paid to the city and there are no maintenance and depreciation reserves, and the commission's counts indicate a degree of overcrowding and a condition of equipment that would not be tolerated in normal operation. On the contrary, the Fifth Avenue coaches are well run and the whole property is efficiently managed. The plain fact of the matter is that on a basis of efficiency and thorough maintenance and repair the cost of operation takes more than 8 cents out of every 10 cents collected by the Fifth Avenue Coach Company. Investigations conducted by recognized experts employed by the commission of conditions not only in New York but in other cities in this country and abroad indicate that in general 3½ miles is the maximum

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distance that a bus can profitably be operated on a 5-cent fare.

Buses have their part in any modern transportation system and an important part. The trouble with the surface lines in New York in large part is due to their being throttled. To render good service and make money a surface car must move at a fair rate of speed. Broadway, for example, has the lowest mileage per hour of any surface system I know of—less than 5. The remedy for the present ills of surface transportation in New York are those indicated by the Transit Commission some time ago. It proposes to eliminate a considerable part of the present track mileage as being no longer necessary and to straighten and improve the existing routes. This would leave certain streets free for vehicular traffic and give the streets on which trolleys are retained the right of way for railroad purposes. The provision of additional streets wholly for vehicles would fill a great need. On the streets reserved for railroad purposes parking of cars should be prohibited at least during rush hours. By this means and through greater care in letting the cars through on cross streets the schedule speed should very materially be increased. This in turn would draw considerable traffic because if we could go uptown in a surface car at a reasonable rate of speed we would greatly prefer doing that to going down into a subway or climbing up onto an elevated.

All the studies made by the commission indicate that in congested districts street cars are more effective in moving large numbers of people than are buses when consideration is given to variations in weather and other conditions. The proper field for buses is to take the place of some of the trolley lines outside the congested areas and generally to serve the outlying districts as feeders for rapid transit and other lines.

Co-ordinated Train and Motor Bus Service in Boston

Owing to the Short Local Hauls and Congested Streets in Malden, the Boston Elevated Is Proposing to Operate Trolley Car Trains with Distributing Lines of Buses Instead of Individual Trolley Cars—If Successful, the Plan May Be Extended to Other Localities

By Edward Dana
General Manager Boston Elevated Railway

THE story of the motor bus as it is unfolding in the territory of the Boston Elevated Railway may be of interest generally.

On July 1, 1918, when the Commonwealth of Massachusetts assumed the direct operation of this large system, there were no competitive motor buses in the territory. This vehicle, which had insidiously worked its way across the continent from the California coast, leaving in its trail suffering street railway systems, had played no part in the difficulties which led to the public operation of the Boston Elevated.

Under the 1918 act, the Elevated was required to be operated on a service-at-cost basis and fares were increased. On July 10, 1919, a flat 10-cent fare had been reached. This flat fare was accompanied by a substantial decrease in revenue passengers, even though the fare was sufficient to prevent deficits and cover the full cost of service.

Naturally, there has been some discussion and advocacy of competitive buses, but the assessment against the taxpayers of $3,980,151.67 for the first year's deficit under public operation and the fact that this amount had to be repaid before fares could be decreased had a very real effect upon those in authority by whose action motor buses could be permitted.

The consequences of the act were understood by most municipal officers, and it was realized that if competitive motor buses were permitted and the revenue of this great system diminished one of three things must occur under the laws:

First, an increase in fare above 10 cents to offset the loss, or

Second, additional deficits against the taxpayers, or

Third, loss of service in the district affected, in an effort by the state trustees to localize the competition and place no burden upon the system as a whole which might result in a higher fare or a tax assessment.

The result was that cities and towns refused licenses to competitive jitneys with the single exception of the city of Malden. Here the indignation because of the 10-cent fare was apparently greatest and an appreciation of the economic requirements of the act was apparently the lowest.

In the light of what has occurred it almost seems as if Malden was destined to be the scene of the final solution of the problem both in Malden and in other cities outside of Boston served by the Elevated, to the end that it shall be satisfactory to all.

Competitive Buses in Malden

On June 18, 1919, competitive buses were authorized in Malden paralleling one of the main street railway lines. The state board operating the Elevated took no action, chiefly because as a state board, operating according to a specific act, it could not act from the same motives as a private railway. It was necessary to have an actual loss of revenue and a consequent burden to place upon the rest of the system before measures could be taken.

During this period it became a certainty that the 10-cent fare was sufficient to prevent any further deficit on the Elevated system, and it likewise became possible to work out a local fare of 5 cents for those whose rides were so short that they had ceased to ride and thus secure full enjoyment of the facilities of the system. As is now generally known, this has been accomplished,

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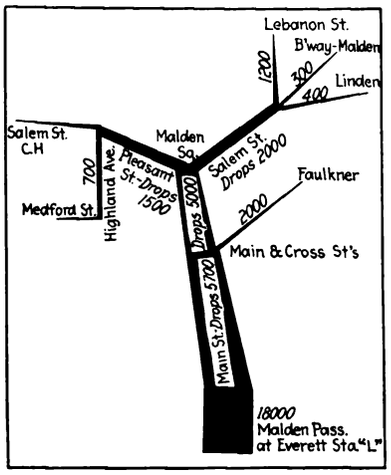
so that now 100,000,000 passengers a year, representing 26 per cent of the total revenue, are carried for a 5-cent fare, and the average fare has been reduced to 8.7 cents.

By the irony of fate, the most ideal location to install this local fare zone scheme existed in Malden. Hence it was tried there without any intention of driving out the jitney, because it was evident that the frequency of the jitney service on a very short haul could not be combated by necessarily less frequent trolley service, whatever the fare.



Traffic Distributes Rapidly in Malden. It Is Logically a Bus Problem

Then followed an attempt covering many months to have the authorities and the car riders understand that there must ultimately be a choice between trolley and motor bus in any situation in which their competitive service resulted in loss of revenue.

After some feeling and a change in the Board of Aldermen by an election in which jitney competition was the chief issue, the approval of a license granted to the private jitney came before the Mayor for approval. The Mayor vetoed the license upon broad grounds, and very shortly thereafter two lines of motor vehicles were in operation by the Boston Elevated Railway as feeders. Apparently the present service has met requirements and has proved satisfactory to the traveling public.

At the present time the question of rebuilding the street in the heart of the city of Malden has brought up the desirability of removing the car tracks from an already overcrowded main business thoroughfare. The local authorities, the executive committee of the Chamber of Commerce and other substantial citizens intent on broad planning for the future have been in conference with the Elevated and appear to favor the plan which is here described.

THE MALDEN PLAN

The chart of the Malden lines shows that they converge through Malden Square and reach the Everett Terminal of the Elevated trains via Main Street.

The traffic flow chart also indicates the volume of traffic concerned. It is interesting to note that a daily load of 18,000 in each direction at the terminal in Everett is reduced at Malden Square to only 6,000. The distribution of these reduced numbers from Malden Square by several trolley lines to comparatively near-by territory is conducive to inefficient operation and lack of flexibility.

It is for this reason that consideration was given to a plan for the operation of trolley car trains from the Everett Terminal of the Elevated to a terminal at Malden Square and the distribution of the traffic at this point by means of several frequent bus lines to the originating and delivery territory of these car riders. The plan at present under consideration is shown in the accompanying diagram.

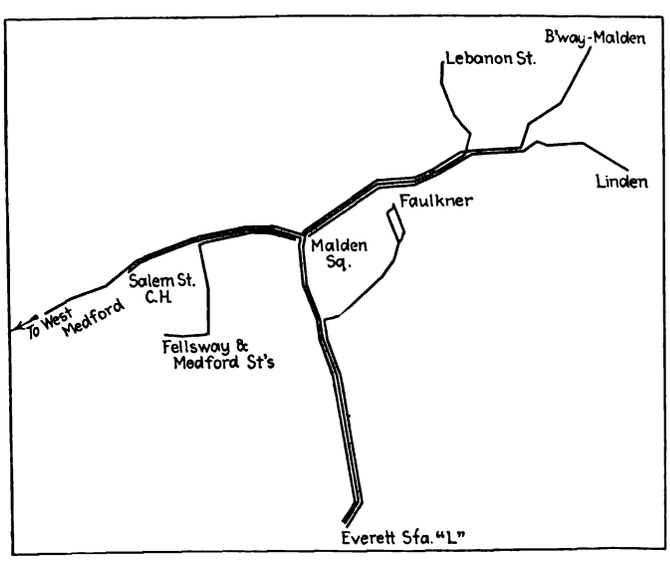
Theoretically, such a plan is fundamentally sound from several points of view. In the first place it permits by trolley trains the best possible service both as regards quantity and regularity where the traffic as indicated in the flow chart is the heaviest.

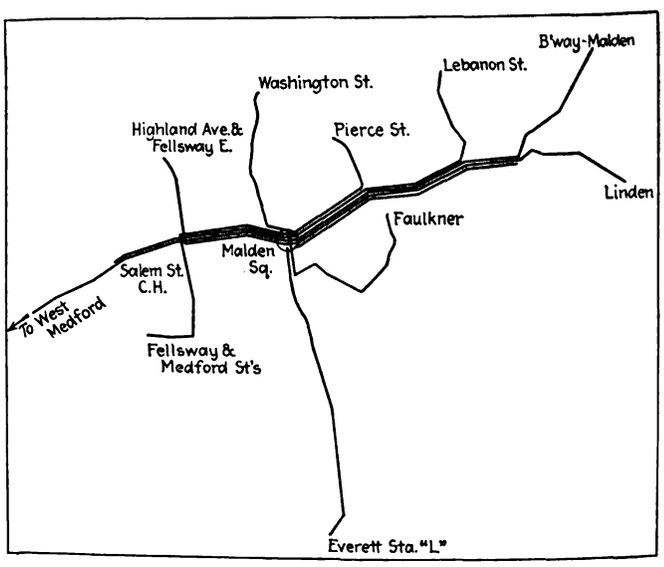
Secondly, it permits a convenient distribution of a relatively light traffic into the originating and delivery district of the rider by short, frequent bus lines.

It would appear, therefore, that at no greater cost to the car rider a much improved transportation service could be rendered and the abandonment of many trolley tracks would solve the street traffic congestion problem in the heart of the city.

The state board operating the Elevated has signified its readiness to proceed with such a plan. Whether it actually becomes an established fact in the near future will depend upon the degree of confidence which is accorded the plan by the community concerned.

Such a plan in successful operation would most certainly mark a step forward in the co-ordination of bus and trolley and be followed by similar arrangements elsewhere.





The Routes at the Left Show Present Car Lines—Those at the Right the Proposed Substitute, i. e., Train Line to Malden Square and Bus Service from that Point

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What the 5-Cent Fare Means in Jersey

More than 150,000,000 Passengers in the Larger Municipalities Get Reduced Rate Under Public Service Railway's New Plan—Success Will Depend Upon Increased Traffic

A NICKEL fare on a new basis is in effect for local rides in the more populous communities of New Jersey, in accord with the schedule of rates put into effect on Oct. 1 by the Public Service Railway. The new fare is the result of a proposal made on Sept. 25 by the Board of Public Utility Commissioners, and accepted on Sept. 27 by the company, as told in ELECTRIC RAILWAY JOURNAL for Sept. 29. In general the plan embraces a 5-cent fare for any continuous ride within the city limits of Newark, Jersey City, Paterson, Elizabeth and Camden, with an additional 5-cent charge to the end of the previous single-fare limits. Beyond these the 8-cent fare continues in effect. No transfers are issued in the 5-cent areas.

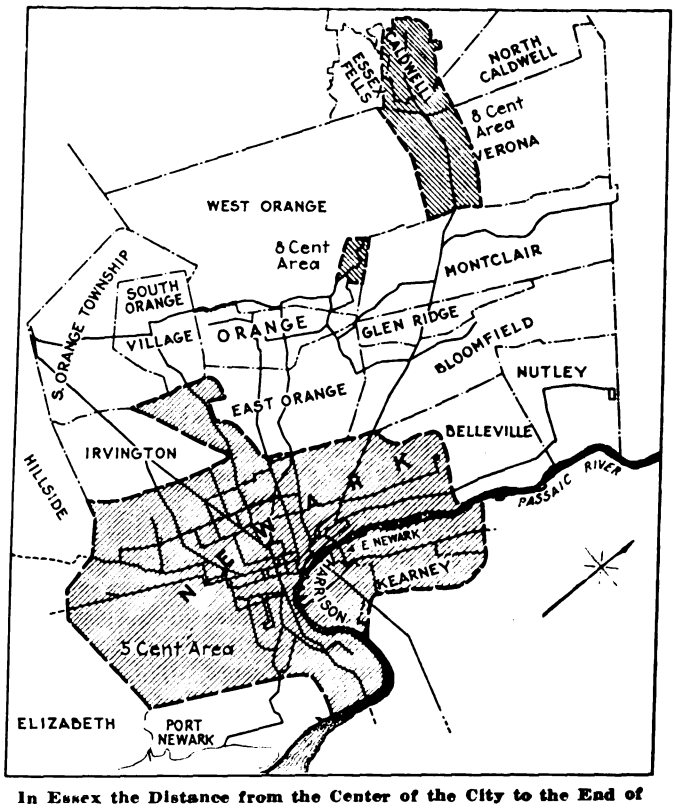
The inauguration of this plan in New Jersey makes the Public Service Railway the largest property, in point of mileage, now operating with a 5-cent base fare. The present arrangement is to be tried for four months unless sooner terminated by joint agreement between the company and the Utility Commission. How successful the scheme will be cannot be foretold with accuracy yet, although it is obvious that there must be a large increase in the number of short-haul passengers if the plan is to produce as much revenue as did the old fare. During the year 1922 the railway carried 325,000,000 passengers, of whom about half traveled in what are now the 5-cent areas. The new fare therefore means a reduced rate for more than 150,000,000 riders. Partly offsetting this decrease in revenue there will be the gain from those who travel to points outside the city boundaries and pay 10 cents instead of 8 cents.

EFFECT ON RAILWAY REVENUE CANNOT BE PREDICTED

Uncertainty concerning the outcome of the experiment is due chiefly to the presence of the hundreds of buses which operate on the same streets as the trolleys. In some cases they are giving a longer haul for 5 cents than the railway is doing under the new rate. But in other cases where the bus fare has always been more than a nickel, the trolley may henceforth have the advantage. There is also some question about the effect of the present routing, because buses in a number of instances make through trips which can be made on the trolley only by transferring.

Traffic conditions vary greatly in different parts of the state, due in part to local geographical features, and in part to the peculiarities of bus competition. The railway system is divided into six operating divisions, and the new plan has had to be adapted to fit the needs of each case. In the Bergen division there are no large towns or cities and no 5-cent areas. Existing rates of fare will continue practically without change.

The most important of the six railway divisions is Essex, which includes the cities of Newark, East Orange and Orange, as well as numerous suburban towns and villages. In a general way the trolley lines radiate from the center of Newark to the surrounding communities, although there are also some crosstown



In Essex the Distance from the Center of the City to the End of the 5-Cent Area Varies from 2 to 4 Miles

lines. The 5-cent area includes nearly the whole of the city of Newark, as shown in the accompanying map, as well as Harrison and part of Kearny. An exception had to be made in favor of these towns because they lie so close to the heart of the city, being separated from it only by the Passaic River, that the mileage of a trolley trip to reach there would be too short for a double fare. Two fares will be charged for the trip to Port Newark as has always been the case.

All other towns in the division lie in a second 5-cent zone, except those at the extreme end of the Bloomfield line. This route is the longest running to the west, and has a third zone, in which the fare is 8 cents, at the end of the two 5-cent zones. The through fare from Newark to Caldwell thus becomes 18 cents instead of 16 cents (or 15 cents in tokens). The short Eagle Rock line will continue to collect an 8-cent fare because of its difficult operating conditions.

On the majority of the bus lines in Essex the fare is 5 cents, and in many cases the fare limits coincide with the new railway zone limit. Trolley and bus will be on a basis of approximate equality so far as length of ride and fare are concerned to Harrison and Kearny. to North Newark, Forest Hill, Roseville, Vailsburg, Hillside and Elizabeth. On the Bloomfield line the 5-cent fare limit for the bus is at Bloomfield Center, more than a mile beyond that of the railway. Similarly the buses run into Irvington for 5 cents, while the

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trolley fare limit is at the Newark city line. But on the other hand, the fact that several north and south car lines run through from city line to city line permits a much longer ride for 5 cents than is possible by bus because the latter lines all terminate in the center of the city.

The distance from Broad and Market Streets to the fare limit varies from about 2 miles on some lines to somewhat more than 3 miles on others. A kink that may cause some trouble is due to the bulge in the city line at South Orange Avenue. The distance a passenger may travel for a single fare on that route is thereby greatly increased over that which he can get on any parallel line.

New Fare Favors the Railway in Hudson County and Medium-Sized Cities

Second in importance is the Hudson division, serving Jersey City, Hoboken, Bayonne and neighboring municipalities. Here Bayonne was made one zone, Jersey City and Hoboken another zone, and the north Hudson towns a third zone. Throughout this division the prevailing trend of traffic is to and from the ferry terminals and the Hudson River tunnel stations. There is no suburban area outside the cities, and the greater part of the trolley patrons are riders within a single 5-cent area, except that many Bayonne people travel into Jersey City.

A curious feature of the situation in this district is that the bus lines in Jersey City have until recently charged a straight 10-cent fare. There has always been, therefore, a differential in favor of the railway, which became even more marked with the reduction of the base rate from 8 cents to 5 cents. This has now been met to some extent by a reduction in the bus rate to six tickets for 50 cents, and it is planned to inaugurate a weekly pass scheme with unlimited riding privileges for 90 cents.

Paterson and Passaic are typical mill towns. Geographically they cover comparatively small areas and they are therefore logical 5-cent communities. The buses did a tremendous business when their fare was 5 cents against 8 cents on the trolley. By the new plan, cars and buses are put on an almost equal footing, and it is to be expected that by the change the railway will profit in number of passengers carried. If this increase is great enough it will offset the smaller return per passenger.

Elizabeth, in the central division, is another typical 5-cent town. Local riding on the railway will probably be stimulated by the reduction in rates. However, on the Union line, an interurban route reaching that city, many people will have to pay higher fares because the old single-fare limit was beyond the city line. In the other towns of the central division the old 8-cent rate remains unchanged.

Situation in Southern Division is Unique

In Camden the layout of the trolley routes is the closest approach of anywhere on the Public Service system to the purely radial plan. Practically every line terminates at the Market Street ferry to Philadelphia. But one or another of the Pennsylvania, Reading and W. J. & S. railroads closely parallels each important railway route. So do the buses. Competition is therefore more intense, in that respect, in the Southern division than in any other.

The standard bus fare in this territory is 7 cents. Under the old conditions, therefore, the buses had the advantage of the trolley by 1 cent. Now the advantage is the other way within the city limits, the differential being 2 cents. But the people of Merchantville, Moorestown, Maple Shade, Haddonfield, Collingswood, Haddon Heights, Gloucester, Woodbury and other suburban towns find the new railway fare higher than the old.

This situation may result in loss of business for the company. Take, for example, the town of Haddonfield. Commuters to Philadelphia used to ride to the ferry for 7½ cents (using tokens). Now they must pay 10, and in addition thereto must pay 4 cents to cross the river. But the new 14-cent rate is higher than the monthly commutation rate on the railroad, which includes the ferry fare, and there are indications that former trolley patrons may desert this means of transportation.

Methods of Fare Collection

A number of changes in the method of fare collection have had to be made in order to meet the demands of the situation presented by the new fare. Such lines as operate wholly within the limits of a 5-cent area operate on a simple pay-as-you-enter basis with a nickel rate instead of the former 8 cents. These cars carry a sign on the front dash reading in red on a white background "Five-Cent Fare."

A large number of routes run from the center of a 5-cent area to points outside the city limits and charge, therefore, a second 5-cent fare to reach the suburbs. On these lines the method of fare collection is pay-as-you-enter in the first zone, with free exit in that area and pay-as-you-leave in the second zone, with free entrance. Thus, local riders in either area may ride for a nickel, whereas through passengers pay 10 cents. In the vestibule window of each car on such routes has been placed a reversible sign reading "Enter at Rear, Pay as You Enter" or "Enter Here, Pay as You Leave." Dash signs indicate the fare.

In Essex, the largest of the railway divisions, one or the other of these two plans covers all important routes except Bloomfield. This is the longest line operating westward from Newark, as previously mentioned, and under the old arrangement it was a two-fare route. The fare limit was the boundary between Montclair and Verona, although a long overlap in the town of Montclair was permitted. Fare collection was by means of a second fare collector, who boarded the car at the overlap limit and collected from each person on the car either a cash fare or an identification check showing the passenger had boarded within the overlap. Under the new arrangement the Bloomfield line will have three fares. Outbound from the Public Service terminal to the Newark city line a 5-cent fare will be charged on the pay-as-you-enter plan. From the Newark city line to the Montclair-Verona line another 5-cent fare will be charged pay-as-you-leave. Passengers who come through from Newark intending to go into the third zone will pay their second fares to the collector who passes through the car as under the old arrangement. The third zone, between Montclair and Caldwell, will be an 8-cent pay-as-you-leave area. Inbound, the process is practically the reverse of this arrangement.

A number of slight changes may have to be made before the new arrangement will work smoothly. But inasmuch as only four days elapsed between the acceptance of the plan and its being put into effect, it was inevitable that this should have been the case.

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Association News & Discussions

Claims, Emergency Stops, Weekly Pass, Bus Competition Interest Mid-West Association

Quarterly Meeting of the New Organization of Electric Railway Men of Six States Has a Large Attendance—Guests Are Entertained by Kansas City Railways

THE interest and enthusiasm displayed by the members in every paper presented at the second quarterly meeting of the Mid-West Electric Railway Association held at Kansas City, Mo., on Thursday, Sept. 20, was evidence that the association has succeeded in its purpose of bringing the officials of the electric railway industry in this territory closer together in an effort to solve one another's problems through an exchange of ideas and suggestions on subjects of importance to each company. More than 100 guests from six Middle-Western states were present.

The first paper at the morning session was presented by F. H. Harrington, general claims agent of the St. Joseph Railway, Light & Power Company, on "What the Operating Department Can Do for the Claim Department." He explained at some length the absolute necessity of harmony and close co-operation between these two departments. In too many instances the motormen and conductors fail to secure witnesses and statements from the parties in an accident when the trainmen feel that the responsibility for the accident rests entirely with the other party.

"The trouble is," said Mr. Harrington, "that the passenger or motorist states he is not hurt and pretends that the accident was a trifling matter, leaving the trainman under the impression that nothing would be done about it, and consequently negligence in securing the names of proper witnesses results.

"Then the passenger or motorist later 'develops' an injury, which was, of course, 'the direct result of the accident,' 'snitch' lawyers come to the rescue of the plaintiff, and in most cases the company must pay. The fact that the plaintiff told the trainman he was not hurt is of little value to the claim department and then, too, there is the absence of witnesses."

Retaining a trainman in the employ of the company merely to serve as a witness in an injury or damage case is not advocated by Mr. Harrington, especially when that trainman's record justifies immediate discharge.

In the discussion of this subject, R. B. Campbell of the Arkansas Valley Interurban, and R. A. Leussler of the Omaha & Council Bluffs Street Railway, stated that it was their policy to confide in the trainman and explain to him just what a certain accident had cost the company, especially if the record and character of the man was such as to justify his retention in the service. Both agreed, however, that this policy was not advisable where the trainman was to be discharged. Mr. Campbell added further that even in minor accidents where perhaps only a fender of a motor car was bent he called in the motorman to talk the matter over, pointing out that a very serious accident and loss of life might have resulted from such an accident. This method has proved highly satisfactory, resulting in a great decrease in accidents during the past year.

The advisability of mailing questionnaires to witnesses in minor accident cases was approved by the members in that it saved the expense of employing several additional investigators and at the same time reduced the statements of these witnesses to their own handwriting.

E. R. Fitch, district engineer of the Westinghouse Traction Brake Company, St. Louis, presented an interesting paper at the morning session on "Emergency Stops in Street Railway Operation." An abstract of this paper appears on another page.

The afternoon session was opened with a paper on "The Weekly Pass," presented by A. E. Reynolds, vice-president and general manager of the Springfield Traction Company, Springfield, Mo. This subject was of special interest to all members in that the weekly pass has been little tried in the Mid-West Association's territory.

Mr. Reynolds explained that the constant decrease in the Springfield company's receipts during the years 1921 and 1922 demanded some immediate action to increase revenues or it might have become necessary to suspend service entirely. Consequently it was decided to try the weekly pass in an effort to stimulate riding, and upon recommendations of a competent engineer this plan was placed in effect on April 1 of this year.

"I am not recommending the inauguration of the weekly pass as a panacea for your ills on other properties," said Mr. Reynolds, "but with us it has been a life saver. During the few months that the pass has been in use it has demonstrated that there is no loss whatever in transient travel, as the number of 7-cent cash fare riders has increased as many as 10,000 per month over the period when the pass was not in use. There is also a reduction of about 25 per cent in the use of transfers.

"It is a noticeable feature of our operation that since the adoption of the pass the earnings of the bus lines have materially increased. This can, no doubt, be explained by the fact that the pass is good on either street car or buses, whereas it was formerly necessary to pay 2 cents for a transfer from bus to street car. The pass holder uses the cars and buses on an average for about twenty-five rides per week.

"Summing up the whole situation, we are firmly of the opinion, after five months' use of the pass, that it is very satisfactory from all points of view and is one of the best advertising mediums the company could possibly adopt in an effort to obtain the good will of the public."

Mr. Reynolds pointed out that since April 1 the sale of tokens has been reduced about $4,425 per month, while the weekly passes sold in their place represent about $5,500 per month. He also added that unless given plenty of proper publicity for several weeks before its inauguration, the weekly pass would not be successful. In Springfield Mr. Reynolds published a full page advertisement in the daily papers every day for a month prior to the time the pass was put into effect, and a quarter of a page daily for about a month thereafter. At the present time only signs on the cars are used to advertise this feature. Mr. Reynolds gave out the operating statistics given in the table below to show the changes before and after the weekly pass was put on.

The last paper of the afternoon session was presented by William R.

	1923	1922	1921
Gross earnings—first three months	$85,750	$87,266	$88,945
Gross earnings—five months since weekly pass was put on	$151,822	$146,915	$150,281
Car mileage—first eight months	842,344	839,894	.....
Total passengers for five months since weekly pass was put on	2,651,049	2,349,142	.....
Average fare per passenger, cents	5.7	6.2	.....

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Taylor, vice-president and general manager of the Kansas City, Kaw Valley & Western Railway, on "Motor Bus Competition and Legislation."

"During the last ten years the commercial possibilities of the motor vehicle have been gradually promoted," said Mr. Taylor. "The hauling of freight came first. It grew from the privately-owned truck to the transfer company in the city, which gradually enlarged its field, until, stimulated by the demands made in the war period, extremely long trips were undertaken. These war demands were carefully fostered and enlarged by the brightest minds in the automobile game. Long trips, however, have proved to be a failure, and motor freight trucking does not pay for a distance of more than 25 miles."

Passenger buses have been successful on the east and west coasts, perhaps better in California, where climatic conditions are ideal. There the chief business is to entertain the crowd of tourists. These tourists are not regular riders and they are always leaving to make room for others.

Hauling of freight and passengers by motor-operated vehicles on hard-surfaced highways has indications of becoming a real public service business. For that reason it must be properly regulated, since it is now in the scheme of things to regulate all public utilities. Regulation is demanded by the farmers, the electric and steam railroads and every thinking taxpayer except the motor salesman. This feeling in favor of regulation is due to the direct effect on hard-surfaced roads and to unfair and unregulated competition. The cost of operating motor buses and the profits to the man in the business are very indefinite. This is due to the newness and to the type of men who have engaged in it so far. Most of them have kept no accurate records. So far as known no bus line paralleling an interurban has made money. It seems that for a bus carrying around twenty passengers it costs between 25 cents and 30 cents per mile to operate.

"Each railroad operator will have to study his own case carefully and, if he so desires, use the motor buses as a feeder, or in self-defense," said Mr. Taylor.

An informal dinner in the Elizabethan Room at the Baltimore Hotel, with talks by Colonel E. M. Stayton, R. W. Williams, and Robert P. Woods, closed the business session.

Colonel Stayton, city member of the Board of Control, Kansas City Railways, spoke briefly on the present pleasant relationship between the Kansas City Railways, the city and the public. Never before has there been a better understanding between the street railway and the public than exists at this time in Kansas City. This happy condition was brought about because the receivers placed all their cards on the table face up, asked the support of the public in building up the property, promised the best kind of service, and then actually delivered the goods.

"The rapid strides made by the receivers in obtaining the good will of the public and the resulting growth in receipts has been truly remarkable," said Colonel Stayton.

"Co-operation Between the Manufacturers and Operators" was the subject of a short talk by R. W. Williams, district manager of the Westinghouse Traction Brake Company.

"With the 5-cent fare in universal use and receipts rapidly falling off, something had to be done to help the operators reduce expenses," said Mr. Williams. "The safety car was brought out to meet this need and it has accomplished its purpose admirably. Indeed, the economies effected by the use of the one-man car operation have resulted in the expansion of this form of transportation until today we have in Kansas City one-man two-man cars equipped with multiple-unit control and complete safety car apparatus, operated in two-car trains."

Mr. Williams added that the problems of the operators were also the problems of the manufacturers and urged close co-operation between these "departments" of the electric railway industry to bring about the best results.

The meeting closed with an interesting talk by Robert P. Woods, vice-president and general manager of the Kansas City, Clay County & St. Joseph Railway, on "Sightseeing in Europe." Mr. Woods recently returned from a three months tour of France, Holland, Belgium, England, Scotland and Ireland. In addition to his pleasing description of conditions in Europe at this time, Mr. Woods provided a stereopticon exhibition of more than 100 scenes visited during his travels.

A number of supply men from this territory attended the meeting and, as Mr. Fennell, president of the association, stated, these "commercial ambassadors" played an important part in making the convention a success.

The place and date for holding the next quarterly meeting will be decided by the executive committee within the near future.

Emergency Stops in Street Railway Operation*

By E. R. Fitch
District Engineer Westinghouse Traction Brake Company

THE shortest possible stop that can be effected with a moving car irrespective of possible equipment damage is the first requirement of an emergency application of the brakes, within the limitations, however, that the greatest possible equipment damage should be materially less than the average collision cost. One of the most important considerations in obtaining a clear understanding of emergency stopping is wheel sliding. When the wheels of a moving car stop turning during a brake application, the length of a stop is materially increased by the sliding. So the shortest stop that can be made occurs when the brakeshoe friction is just at the point of stopping the wheel rotation. If, however, the brake force is too high the shoe friction is greater than the rail adhesion and rotation is stopped even though the car is still moving. Because the sliding friction between the wheel and rail is less than that due to rolling, the stopping distance is increased by the use of too high a brake force. Therefore the fundamental limitation in securing high rates of retardation is the coefficient of friction between the wheel and the rail.

This factor varies widely for different rail conditions so it is necessary that the prevailing conditions govern the brake design. Another important fact to be considered in securing high rates of emergency retardation is that the ratio of the brakeshoe friction to the shoe pressure is not constant. This coefficient varies with the load on the shoe, the actual area of contact between the shoe and wheel, the length of time the brakes have been held applied, and has an astonishingly wide range at different car speeds.

The majority of cars in service are equipped with pneumatic brakes which include three interdependent factors, all of which are necessary to brake application; the pneumatic devices for the control of the air, the brake rigging to transmit the cylinder pressure to the brakeshoe head and the shoes themselves to develop the friction necessary to produce retardation.

For convenience in general comparisons, the nominal brakeshoe force is often expressed as percentage of the car weight, which is then termed the braking ratio of that particular car. If the nominal force developed at the brakeshoes were equal to the car weight, then the brake ratio would be 100 per cent, and if this total shoe pressure were developed with 50 lb. per square inch in the brake cylinder the statement might be extended to include 100 per cent brake ratio on 50 lb. per square inch cylinder pressure. This ratio is practically a standard for the majority of city and interurban cars for a full service brake application. An emergency application of the brakes produces a higher brake ratio.

Modern car equipment supplements the air brake with three safety combinations, that is, the hand brake, reversing the motors, and "bucking" or generating of the motors. Due to the limited space available the air and hand brakes are interdependent, and in a sense so are the reversing and bucking possibilities, though it is impossible to conceive of a collision and resultant

*Abstract of a paper presented at meeting of the Mid-West Electric Railway Association held in Kansas City, Mo., Sept. 20, 1923.

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damage that did not stop the car but rendered all four of these systems inoperative. Hand brakes are hardly to be considered a factor in emergency stopping, for they actually require several seconds for a serviceable application, and time is the all-important factor until the brakes are set. Reversing the motors with power on the car quickly applies a retarding effect which, however, is not comparable with the air brake emergency retardation in amount and is a uselessly severe strain on the motor and control equipment. Similarly, bucking the motors even though the circuit breaker is out or the trolley off produces a quick retardation but retains the same disadvantages as does reversing. Retardation can be accomplished in this manner on any car equipped with direct-current series motors with the series parallel type of control, or where any two of the car motors can be connected in parallel.

The relative effectiveness of these four methods of retardation would be in the following sequence: Emergency application of the air brake, reversing the motors, bucking the motors and hand brake, though the relative average resulting damage to equipment would undoubtedly be hand brake, emergency application of the air brake, reversing and bucking. Under no consideration should any two of these methods be used together. This restriction is unusually important and is unfortunately often disregarded through ignorance or lack of proper instructions.

The reason for this fixed restriction is found in the fact that the emergency application of the brakes is designed to produce a retarding effect just short of wheel sliding, and any additional drag on rotation is sure to lock the wheels. The average retardation for the rest of the stop would be about one-third as effective as if the wheels were turning, and even the use of sand under these conditions will not help the situation materially, for the resulting increase in the rail friction is not sufficient to counteract the increased drag on wheel rotation.

It is obvious that the entire question of emergency stopping depends upon the adhesion of the wheel to the rail, and under adverse rail conditions the coefficient of adhesion attains but a fraction of its normal or dry rail value. This factor varies from about one-tenth for the poor rail condition to about thirty-five-one-hundredths for the good rail with all the intermediate values at times. The statement is often made by our steam road confrères that "a wet rail is not necessarily a bad rail but is often times the reverse." In traction service, unless the cars are operated on private right-of-way with the rail heads at a nominal elevation above the ground surface, a wet rail is invariably bad. Enough mud, slime, and slush is deposited on the rail by traffic or splashing to keep it constantly lubricated with a slippery sediment, and a rain that cleans a surface elevated slightly over the ground is equally as bad on flush surface rails as a fine greasy mist. For street railway operation the brakes are designed to develop their maximum rate of retardation on dry clean rail, and are made extremely flexible or sensitive to control for the adverse track conditions.

There is no doubt that slippery rails preclude the use of the emergency application except on straight air-brake cars where a quick application does duty for emergency, for this brake is capable of an immediate release. Equipment with an emergency valve or triple valve, however, cannot be immediately released, and with these the use of emergency position of the brake valve should not be encouraged when operating on bad rail. There is altogether too much tendency in the operating department to feel that everything possible was done to prevent a collision if an emergency application was made, even though wheel sliding took effect immediately.

A thorough explanation of the proper use of sand should be given new men. Before sliding occurs sand increases the coefficient of adhesion about five-one-hundredths, but after wheel sliding has started the coefficient of kinetic friction between the wheel and rail amounts to about one-third that of adhesion and the slight increase resulting from the application of sand produces little effect on the length of stop but does increase the tendency toward flat wheels.

The problem of securing satisfactory emergency stops when operating on heavy grades introduces another factor into an already complicated situation. To have full control of a car on a down grade it is necessary to develop an average retarding force equivalent to the grade force of acceleration. For convenience this retarding force might be expressed as a required brake cylinder pressure to overcome the grade effect, and the difference between this pressure and the total actually obtainable on the car would be available for making a stop. If a 30,000-lb. double-truck car braked at 100 per cent on 50 lb. per square inch pressure with a passenger load of thirty-three people, or about 5,000 lb., started down a 5 per cent grade at 15 m.p.h., then a brake cylinder pressure of 18 lb. per square inch would be necessary to just control the car and the remaining pressure would be available for stopping. On a level this car would make an emergency stop in about 28 ft., whereas on the 5 per cent grade the stop would be accomplished in about 37 ft. The stop distance, therefore, due to the grade alone, has been increased 9 ft. or, for these conditions only, about 30 per cent.

Grade requirements for brake design in traction service include special provision for decreasing the length of stops by using higher brake ratio and also throw an added burden on the car operator. The only satisfactory answer to the question of emergency stopping on severe grades is that of added caution, lower speeds, and road tests of equipment.

Delegates Consider Safety Measures

Electric Railway Section of National Safety Council, at Largest Meeting Ever Held, Discusses the Best Methods of Preventing Accidents

GREATER co-operation between the American Electric Railway Association and the Electric Railway section of the National Safety Council on the preparation of bulletins and other phases of safety work affecting the welfare of the electric traction systems of the country was urged by J. H. Truett of the safety committee of the United Railways & Electric Company of Baltimore, chairman of the electric railway section of the National Safety Council, at the opening session of the section in the Hotel Statler in Buffalo on the morning of Oct. 2.

The meeting was the largest and most interesting ever held by this section. About seventy-five representatives of electric railway lines throughout the country were present. The room given over to this section by the National Safety Council was too small to accommodate all who wished to hear the addresses and participate in the discussions which followed, so that larger quarters were prepared for the second session of the conference held on Thursday.

Chairman Truett opened the meeting of the section with a brief address in which he told of the increased support being given by electric railway systems to the problems of public safety, and he urged even greater support in the future. M. W. Bridges, secretary of the section and safety engineer of the Metropolitan West Side Elevated Railway of Chicago, presented a brief report of his activities during the year and pleaded with members to submit more safety suggestions to the council.

According to Mr. Bridges, the membership of the section had increased during the past year from 110 to 126. In February the executive committee created a committee on public education with Victor Noonan of the Cleveland Railway as chairman to assist in educating the traveling public through the use of newspaper advertising, car cards on dashboards, posters, etc., in accident prevention among railroad patrons. The membership committee was authorized to approach the 283 members of the American Electric Railway Association, which were not members of the council, with the view of securing their membership.

The membership committee reported that through an active campaign the membership had been increased.

The bulletin committee asked for suggestions for bulletins and said that the safety educational methods incor-

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porated in bulletins issued by the committee have done much to reduce accidents. The only complaint found by members was that there have not been enough bulletins. At this point in the discussion members urged greater co-operation between the bulletin committee and the advertising section of the American Electric Railway Association regarding the size of bulletins. Standardized sized bulletins were urged and members were asked to submit to the committee the sizes of the bulletins they use so that the committee can present facts on plans for standardized bulletins at the next meeting.

It developed during the discussion that one company is required to pay the company which has the exclusive advertising contract in its cars $3,600 a year to put bulletins on safety inside its cars. It was suggested that swinging signs from the roof of the car be used, as this does not infringe upon the rights of the advertising companies.

George B. Anderson, manager of service of the Los Angeles Railway, Los Angeles, Cal., was unable to attend the conference and his paper, "The Award System as a Means of Preventing Accidents," was read by John C. Collins, supervisor of safety for the Los Angeles Railway. This paper is published in abstract in this issue.

G. T. Hellmuth, claims attorney for the Chicago, North Shore & Milwaukee Railway, opened the discussion by saying that the Los Angeles plan promotes safety and courtesy, and he urged that the subject be continued another year so that additional suggestions could be secured from other railways.

H. M. Keyser, secretary and claims attorney of the Washington Railway & Electric Company, Washington, D. C., gave a few figures applying to the Washington company since the inauguration of a safety campaign. Accidents arising from collisions of cars have been reduced 66.7 per cent, Mr. Keyser explained; no-report cases were cut 47.8 per cent; serious injury cases, 42 per cent; not serious injury cases, 24.6 per cent, and deaths arising from accidents were reduced 43.7 per cent.

R. R. Hadsell of the New York State Railways, Rochester Lines, was appointed chairman of a special committee to continue the investigation of the award system as a means of preventing accidents. The committee was authorized by Chairman Truett to gather data from railways throughout the country using the merit system and compile it for distribution among members of the electric railway section of the council. Mr. Hadsell was authorized to appoint his own committee to assist him in the undertaking.

Chairman Truett appointed this nominating committee to report at the Thursday morning meeting: A. W. Koehler of Rochester, D. D. Haskins of Chattanooga and D. E. Parsons, general manager East St. Louis & Suburban Railway, East St. Louis, Ill.

An account of the Wednesday and Thursday sessions will appear in a later issue.

The Award System as a Means of Preventing Accidents*

The Merit and Demerit System Was First Ridiculed but Is Now Recognized as Desirable and Has Reduced Damage Claims—Company Morale Improved, and Pride in a Clear Record Is Clearly Evidenced

By George Baker Anderson
Manager of Transportation Los Angeles Railway

An inspection of the methods generally employed among street railway operators up to a comparatively recent period indicates the lack of an adequate system of checking and recording the services of trainmen worthy of commendation, and those calling for disciplinary action. There are today in the United States many thousands of trainmen who have persistently violated certain necessary rules and have been suspended from service for from one to ten days in their records—but in their records only—such suspensions not resulting in the loss of a moment's time or a dollar in their pay envelopes. As the result of such so-called discipline, the individual involved was warranted in feeling a certain sense of security, regardless of the storm signals raised. Under the merit system as applied in Los Angeles, all this has been changed.

The plan, at first opposed, even ridiculed by some of the 2,500 men in the platform service, now apparently meets with the approval of practically all, the exceptions being some extra men not yet under the system and a few indifferent ones.

No man is entitled to participate in the bonus of $60 per year until he has been in the service six months. The amount of the bonus paid depends entirely upon the trainman's record under the merit system. During this probationary period, no man receives credits or demerits. On the day following the expiration of the probationary period the name of the trainman is entered upon the "efficiency record" card with a standing of 100 per cent. The bonus year begins Dec. 1 and ends Nov. 30. The bonus is paid by special check at a general assembly of the men on Dec. 15, a date decided upon because of the holiday needs of the men. To be entitled to the bonus or any portion thereof, a trainman's name must be on the payroll the last day of the bonus year, Nov. 30. On that date all records are cancelled, and every man starts the new bonus year, beginning Dec. 1, with a rating of 100 per cent.

Safety and Courtesy Emphasized in Merit System

Demerits are assessed for infractions of certain important operating rules.† The rules pertaining to safety and courtesy come first. Violations of these rules bring the heaviest penalties, and careful observance of them brings substantial reward.

The operating heads of the Los Angeles Railway believe that under normal conditions a trainman who is courteous and considerate in his dealings with passengers is attentive to considerations of safety also. The transportation department has set forth very plainly that valid excuses may be offered for almost any failure except insolence or discourtesy, and most collisions between cars. Running ahead of time also is dealt with severely, as it is regarded as one of the most unnecessary and demoralizing practices and as exhibiting an inclination toward careless operation. A comparison of notes for three years or more indicates that the man who persistently runs ahead of time is a man who is inclined to take chances. His desire to "beat it" leads him into dangerous situations. All other forms of dangerous operation likewise are penalized.

For some offenses like the vicious practice of running ahead of time, demerits are cumulative. Cumulative demerits sometimes result in automatic dismissal, a man's connection with the company terminating when his rating on the merit card falls as low as 75 per cent.

The bulletin announcing the establishment of the merit and bonus system was issued on April 9, 1920. It read as follows:

To foster efficiency, the existing method of discipline for trainmen will be discontinued and a Merit System, or plan of "Discipline by Record," instituted, effective April 10, 1920. Every trainman will start with a clear record.

Credits will be given for meritorious service, such as alertness in preventing accidents, the exercise of good judgment in emergencies, making accurate reports and other acts worthy of special commendation. Demerits will be given when discipline is necessary. Each five credits will count 1 per cent on record and each five demerits will count 1 per cent off record. Demerits will be charged only when, after investigation, a trainman is found to be at fault.

Ratings will be made upon reports from division superintendents, supervisors, patrons and other sources. A rating of 100 per cent will represent the maximum of capacity, efficiency, service and conduct. A rating of 75 per cent will represent the minimum of capacity reasonably allowable. A rating below 75 per cent should represent a standard of service, capacity and conduct below any reasonable requirement and will be sufficient cause for dismissal from the service.

If upon investigation extenuating circumstances are found to exist and reinstatement is approved, the trainman so reinstated may resume his duties with a standing to be determined by the head of the department.

An accumulation of markings above 100 per cent will be sufficient cause for special consideration of trainmen.

The rating will be entered upon individ-

*Abstract of paper presented at annual meeting of National Safety Council, Buffalo, N. Y., Oct. 1-5, 1923.

†A list of the ratings for merits and demerits for the Los Angeles Railway Corporation was published on page 721 of the issue of this paper for April 28, 1923. With the exception of a few slight changes in ratings this list still applies. Other particulars of the merit system will be found on page 131 of the issue for July 22, 1922. —Eds.

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TRAINMAN'S EFFICIENCY RECORD CAP NO. 3947

NAME Comstock, R. P. (5-16-19) DIVISION NO. 6

DATE	DISCIPLINED FOR	BY	Credits	Demerits	Per Ct.	Bonus
	Fiscal Year 12-1-22 to 12-1-23.					
Dec. 17	8 Reported accident and secured witnesses 12-12-22	Acc.17423	15		103	
Dec. 28	2 12-20-22	" 17894		20	99	
Dec. 31	Courtesy only	R.B.H.	10		101	5.00
Jan. 2	38 Ran over stop sign 12-28-22	A.K.P.		10	99	
Jan. 8	8 Reported accident and secured witnesses 12-29-22	Acc.18125	15		102	
Jan. 9	8 Reported accident and secured witnesses 12-30-22	Acc.18192	15		105	
Jan. 11	38 Missout 12-13:1-3:1-4.	Supt.		10	103	
Jan. 27	12 1-18-23	Super.		10	101	
Jan. 28	12 1-24-23	"		10	99	
Jan. 31	No clear record for courtesy or safety					4.75
Feb. 16	Put at foot of extra list for three days because of missout					
Feb. 18	12 2-14-23	Super.		10	97	
Feb. 28	Courtesy only	R.B.H.	10		99	4.75
Mar. 9	Put at foot of extra list for three days because of missout					
Mar. 29	2 3-22-23	J.C.C.		20	95	
Mar. 31	Courtesy only	R.B.H.	10		97	4.25
Apr. 5	38 Missout 3-28-23	Supt.		10	95	
Apr. 23	Put at foot of extra list for three days because of missout					
Apr. 30	Courtesy only	R.B.H.	10		97	3.25
May 7	38 Missout 4-24-23	Supt.		10	95	
May 14	12 5-11-23	Super.		15	92	
May 17	12 5-14-23	"		20	88	
May 20	11 & 31 5-16-23	"		25	83	
May 23	12 5-18-23	"		25	78	
May 24	11 5-20-23	"		20	74	
May 24	Automatically dismissed because of low record.					
May 25	Reinstated with an efficiency rating of 100	R.R.S.			100	
May 31	8 Reported accident and secured witnesses 5-25-23	J.C.C.	15		103	
May 31	Courtesy only	R.B.H.	10		105	5.00
June 30	Courtesy and safety	R.B.H.	20		1[illegible]	5.00
July 16	8 Courtesy when patrons 7-12-23	R 123	15		112	
July 31	Courtesy and safety	R.B.H.	20		116	5.00
Aug. 31	Courtesy and safety	R.B.H.	20		120	5.00

#27933

TRAINMAN'S EFFICIENCY RECORD CAP NO. 3865

NAME Ramsey, S. C. (2-23-18) DIVISION NO. 6

DATE	DISCIPLINED FOR	BY	Credits	Demerits	Per Ct.	Bonus
	Fiscal Year 12-1-22 to 12-1-23.					
Dec. 15	8 Efficiency in operating car 12-6-22	Super.	15		103	
Dec. 31	Courtesy and safety	R.B.H.	20		107	5.00
Jan. 6	8 Excellent instruction of student 1-2-23	Instr.Dept.	15		110	
Jan. 31	Courtesy and safety	R.B.H.	20		114	5.00
Feb. 10	8 First to report blockade 2-6-23	Super.	10		116	
Feb. 27	8 Assisted crippled man off car 2-21-23	F-22	15		119	
Feb. 28	Courtesy and safety	R.B.H.	20		123	5.00
Mar. 12	8 Quick stop, preventing accident 3-9-23	S-45	25		128	
Mar. 31	Courtesy and safety	R.B.H.	20		132	5.00
Apr. 30	Courtesy and safety	R.B.H.	20		136	5.00
May 6	8 Assisted after accident 5-1-23	J.C.C.	10		138	
May 31	Courtesy and safety	R.B.H.	20		142	5.00
June 13	8 Valuable information 6-10-23	J.C.C.	15		145	
June 30	Courtesy and safety	R.B.H.	20		149	5.00
July 31	Courtesy and safety	R.B.H.	20		153	5.00
Aug. 17	8 Worked extra trip to assist supervisor 8-13-23	Super.	10		155	
Aug. 31	Courtesy and safety	R.B.H.	20		159	5.00

Efficiency Cards—Above, That of a Motorman Who Discharged Himself but Built Up His Record Again. Below, a Good, Clean Record

ual cards and each record may be examined at any time by the man affected.

As an incentive to trainmen to maintain the highest possible efficiency, the company has set aside a fund based upon an award of $60 per year, or $5 per month, covering the period from April 10, 1920, to Nov. 30, 1920, inclusive, for each man in the service coming under the operation of this rule, which will be paid on Dec. 15, 1920, to each man in the service on Nov. 30, 1920, who has a clear record and has been continuously in the service of the company for the entire period; and the proper proportion of this amount to those who have a clear record and have been in the service of this company for more than six months and under eight months; or the proportion of such sum as has been earned.

All records will be balanced monthly and the percentage of efficiency determined thereby. This efficiency rating for each month will determine the proportion of the maximum amount to be credited to each trainman for that month.

Such portion of the total amount set aside for distribution as may not be absorbed through the operation of the foregoing plan, by reason of the failure of any trainmen to attain ratings entitling them to the extra money, will be applied to a fund for the relief of all employees.

A deduction of 25 cents is made for each 1 per cent below the 100 per cent standard for any month. (Example: A rating of 95 per cent leaves but $3.75 due the trainman for that month.)

Anything affecting the pocketbook of the average wage earner is of immediate interest, but as has been shown, the amount of cash a trainman receives at Christmas time is not the greatest spur in all cases. There have been many cases in which men have gone to great lengths to disprove charges on which demerits were based, although the rating of these men was so high that there was no probability of their failing to receive the full bonus for the year. Keeping their records clear of demerits was with them a matter of personal pride. In many other cases trainmen have exerted strenuous efforts to eliminate or counterbalance demerits, but not until the percentage of efficiency fell below 100 per cent and meant actual monetary loss to them.

R. R. Smith, assistant superintendent of operation, who is in charge of the administration of the Los Angeles Railway's merit system, states that a comparison between the handling of discipline under this plan and the haphazard methods which prevailed before its adoption proves conclusively that the merit system is the logical way to administer discipline. But as we profit by experience, he finds it necessary from time to time to make certain changes.

Administration of Method Important

The close relationship between the morale of the men and the administration of discipline by record makes the methods of such administration of paramount importance, and we find that several factors should be given consideration in changes to be made for the coming fiscal year. In the first place, in order to maintain the morale of the men, reports on which demerits are assessed must be of such a nature as to allow no doubt as to their reliability. Most of the recommendations on which demerits are based come from secret service operatives and supervisors (or inspectors). More attention is to be paid to details in making such reports, and with few exceptions the conditions under which our men are operating are such as to make it necessary at times for a man to use judgment in enforcing a rule. The supervisor or operative who recommends demerits merely because he notes the violation of a rule, without making allowance for obvious extenuating circumstances, is doing much toward breaking down the morale of the men.

The ideal plan, toward which we are working, is to place the records in charge of one competent person who can devote all his time to the administration of the system, follow up recommendations for discipline as they are received, increase penalties in cases where men are shown to be repeaters, and fix a definite length of time for demerits to stand, after which, if it be proved by the record that the man has profited by the assessment of such demerits and has not repeated the offense, the demerits will be automatically canceled.

If there has been one mistake a little more surely demonstrated than the others during the first three years of the operation of this system it is that of having been too generous in the award of credits. It has been found in some instances that men with high efficiency ratings, but with some demerits, are disposed to treat demerits slightingly after attaining what appears to be a position of security, so far as the bonus is concerned. Such men are disposed to make no appeal on account of demerits assessed until after their efficiency rating has dropped below 100 per cent, when they immediately appeal, in some instances even admitting that they do so because their rating has dropped to the point where it prevents them from earning the full bonus. These short-sighted men, of course, lack the proper spirit of service, but they are not numerous.

Generally speaking, during the past three and a half years the number of accidents and the volume of claims and damages on the books of the Los Angeles Railway have shown us material increase year by year, although during that period the population of the city has increased approximately 50 per cent, the number of cars in service has increased 26 per cent, the daily mileage

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has increased about 10 per cent, the number of passengers carried upon the street cars has increased more than 40 per cent. Just how much of the credit for this rather remarkable showing should be awarded to the merit system is hard to determine, but that the plan has operated effectively to reduce accidents of all classes is admitted by all observers, including those authorities who at the beginning were the most skeptical.

The degree of success to be attained through the application of the idea is influenced largely by the character and personality, particularly the temperament, of the individual intrusted with the responsibility therefor. It is highly essential that such authority be a man of firmness, poise and self-control, possessed of capacity for judging men, and actuated by a spirit of justice.

Accompanying this paper there is submitted a specimen efficiency card showing the history of the service of a motorman which resulted in his automatic dismissal from the service, reinstatement after this severe discipline, and immediate improvement in personal service, also a specimen efficiency card showing a motorman's record built up by the merit system.

Safety Principles as Applied to the Individual Utility*

By D. E. Parsons
General Manager East St. Louis & Suburban Railway, East St. Louis, Ill.

OUR safety department is an integral part of our organization. It is headed by a man of ability with the title of safety engineer. Our safety committees are composed as follows: Central committee, consisting of the general manager, general superintendent, and a reasonable number of department heads. This central committee meets regularly once a month and acts upon all suggestions that are offered by the sub-committees. The sub-committees are as follows: Mechanical committee, power committee, gas committee, electrical committee, maintenance of way committee and transportation committee. The personnel of these committees is about forty members. The sub-committees are selected by workmen in the different departments. The committees not only accept and pass on suggestions for the benefit of safety of their fellow workmen, but also make suggestions which are beneficial to our customers—the traveling public. This committee work is interesting and is eagerly sought after by our employees.

We are very favorable to the illuminated bulletin boards placed in conspicuous places. These bulletin boards carry bulletins of the National Safety Council and others of interesting world events.

Our safety engineer, in addition to attending meetings of all committees, makes a monthly inspection of every nook and corner of the property for accident and fire hazards, and makes, in addition to the committee reports, his own report of his inspection. Before we made our systematic inspections our annual fire insurance was $953,000 with an annual premium of $4,923, or a basic rate of 51.7 cents per $100. Today the total amount of our insurance carried is $1,862,000 and the annual premium is $5,493, with a basic rate of 29.5 cents per $100. This showing has been accomplished by careful inspection and good housekeeping, and no expenditure of new money was approved that would not pay for itself in premiums in two years.

In all of our safety and fire prevention work, as well as our compaigns on unusually clean cars and courteous employees, we did not forget to inform our traveling public in well-worded advertisements what we were accomplishing for their benefit. Our advertising is not spasmodic but is continual in all cars and in all newspapers in all the cities in which we operate.

With our continual safety program we endeavor to interpose occasionally some special stunt which adds to the interest of our work. For instance, in 1921, we painted one of our regular city cars several coats of white enamel with bulletins on the sides and ends of the car. The following were some of the slogans used: "Do your duty, obey the laws and ask others to do likewise." "Reckless drivers make your city unsafe for safe drivers."

Recently we installed on two interurban cars Klaxon, air-operated horns. Such a horn warns the driver of the noisiest Ford or truck of the approach of the car and meets the approval of all the communities in which we operate. We believe that this Klaxon air-operated horn is much more satisfactory than the standard air whistle on the average interurban car.

We have decided to change the wording of the picture on our 300-ft. highway crossing signs every two years so as to make them so attractive that they will not be overlooked by any automobile driver.

We have been able partially to convince the Illinois Commerce Commission that about 50 per cent of our crossings are extra-hazardous instead of about 10 per cent and the commission has ordered "stop" signs installed. According to Illinois law automobile drivers must stop before a crossing where these signs are placed.

At the suggestion of our local automobile clubs we recently adopted a special lens on interurban headlights that somewhat obviates the glare and, at the same time, gives the same illumination as the original clear glass lens. This has met the approval of the automobile drivers.

We recently adopted a rule on our interurban lines where hard roads cross the right-of-way that motormen must approach and pass over such crossings at such speed that collisions would be improbable. This is in addition to our regular rule that motormen must sound whistle or ring bell vigorously on approaching such road crossings. We believe that this rule has materially reduced highway crossing accidents.

There has been a continual decrease in the number of accidents to employees from year to year, in spite of an increase in the number of employees. There has also been a decrease in the expense for injuries and damages. On the East St. Louis Railway, 2.29 per cent of the gross passenger revenue is our record for the year 1922; for the East St. Louis & Suburban Railway suburban and interurban lines it is 4.85 per cent. Automobile collisions with interurban cars in 1921 were 171; in 1922, 149. On the East St. Louis Railway, which is strictly a city line, in 1921, the automobile collisions were 218 and in 1922, 270. A careful analysis of the automobile and car collision records shows there has been a decrease each year in the number of collisions where our cars were moving at the time of the collision, but there has been an increase in the number of collisions where automobiles collided with our cars that were standing still.

The trouble with the average manager of a public utility who is not thoroughly in accord with spending even 1 per cent of his gross income for safety work is that he allows the operating department to start a safety program and if it does not show a decrease in money expended for injuries and damages the first or second year he becomes skeptical and is not in thorough accord with the movement. It will take more than two years on most properties that have not had thoroughly organized safety work to make a very material saving in dollars and cents. The management of nearly every public utility property has a hobby of some kind which is pleasing to its patrons or customers, and I do not know of any hobby that an up-to-date manager could adopt with less expense for the benefit of the public than well organized safety. It has proved that it is conducive to good business.

*Abstract of paper presented at annual convention of National Safety Council, Buffalo, N. Y., Oct. 4, 1923.

Manufacturers Will Show How They Are Co-operating

ALL exhibitors at the Atlantic City convention next week have been invited to make a little exhibit in their booths showing in what manner they have been co-operating with the electric railways in informing the public, and particularly their employees, on the true situation with the railways. This is in conjunction with the work of the committee on co-operation of manufacturers, headed by E. F. Wickwire, secretary Ohio Brass Company. On Wednesday, a committee, comprising F. R. Coates, L. S. Storrs, H. B. Flowers, D. W. Pontius, James P. Barnes and C. D. Emmons, will inspect these exhibits and present a certificate of appreciation to those companies which have joined in the work.

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Maintenance of Equipment

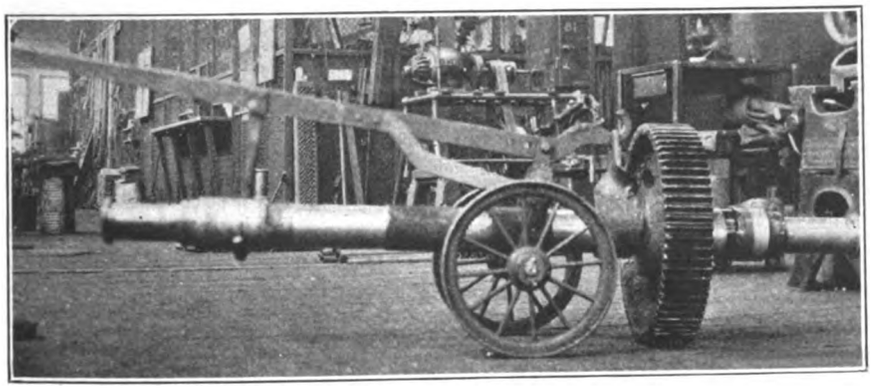
Carriage Makes Axle Handling a One-Man Job

THE machining of axles in the West shops of the Chicago Surface Lines is done in lathes at a considerable distance from the presses where wheels are mounted. The handling and transporting of axles are done in a very convenient manner by a two-wheeled carriage shown in the accompanying illustration. This carriage was made in the company's shop and consists of two cast-steel wheels 18 in. in diameter with 2-in. tread and a cross-connection raised 9 in. above the center of the wheels. This cross-connection is made of 1¾-in. x 1¾-in. iron and has the axles for the wheels fastened at either side.

The carriage can be run over the axle as it lies on the floor with the gear mounted in position. With the carriage over the axle the light end is lifted into a hook support and then by raising the handle another hook at the front end of the carriage can be easily placed next to the gear. Then by lowering the handle of the carriage, the entire axle and gear are lifted free of the floor and can be transported easily.

The handle of the carriage is 6 ft. from the fulcrum to the end, and the extension toward the front of the carriage is 8 in. long. A cross handle 2 ft. long is fastened to the end for convenience in pulling and pushing the carriage. The long handle is made of 2-in. x ⅝-in. iron. The hook for the light end of the axle is 1 in. in diameter, and four holes are provided for adjustment to accommodate different lengths of axles. The hook for the front end of the carriage is made of ⅝-in. x 5-in. plates.

In order to provide a permanent construction and relieve the strain on the handle, two side braces made of ½-in. x 1¾-in. iron are used. These are fastened to the handle and run to the cross-member between the two wheels.



Moving an Axle and Gear to a Lathe for Turning

Use of Steel Castings Reduces Breakage

By O. A. Norene

Assistant Master Mechanic Omaha & Council Bluffs Street Railway

THE life of gears and pinions depends to a great extent on the gear cases being kept in good condition. We have experienced a lot of trouble from broken gear case supports, both on the malleable and wrought iron types. For the last two years we have replaced these with cast steel, from which we have had a very small proportion of breakage. A large part of all our gray iron castings are being replaced by steel castings.

All the various truck and body bolster center bearings are being replaced by one standard cast steel bearing, whereby only one type is now carried in stock in place of six or eight. Nearly all of our malleable iron fender intermediates have been replaced with cast steel, thus greatly reducing the breakage. When they are returned to the shop for repairs they are mostly bent out of shape, but very seldom are broken.

Old Mower Rebuilt for Railway Use

ONE of the cheapest weed cutting machines ever devised was recently built by the Gary & Southern Traction Company, Crown Point, Ind. An old mower was bought from a neighboring farmer for the sum of $4. Worn and broken parts were repaired at the carhouse by acetylene welding, and the device was then mounted on a pair of hand-car wheels. The pole of the mower is attached to the rear of one of the railway's cars. The operator of the machine sits in the seat just where the farmer did when the mower was pulled by horses. Good speed of operation is possible, a 10-mile stretch of track having been completely cut recently in eighteen hours.

An Ordinary Mower Mounted on Flanged Wheels and Pulled by a Railway Car

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New Equipment Available

Slanting Bed Switch

THE new Wharton slanting bed switch is a somewhat radical departure from designs of tongue switches now on the market. Two principal features distinguish it: first, a tongue of "I" beam section, gradually increasing in depth from the point to the heel with a corresponding downward slope of the bed on which the tongue rests; second, a novel method to take up wear of the circular heel.

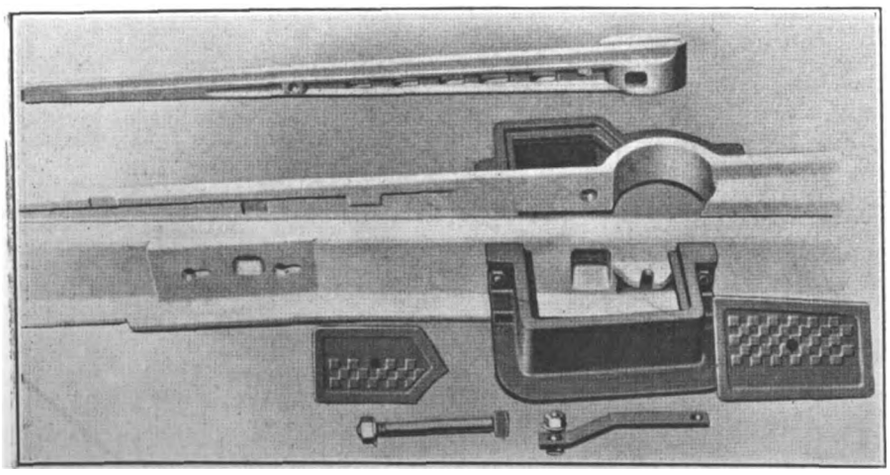
The tongue is made the usual depth at the point, and slopes to a much greater depth at the heel, instead of being of a uniformly shallow depth throughout. The "I" beam section gives it much greater strength, stability and resistance against tilting, or distortion under traffic.

The bottom of the tongue presents an uninterrupted surface in one plane having a continuous bearing on the machine ground bed for its entire length from the point to the extreme heel. There are no depressions or projections of any kind. The increasing thickness gives sufficient depth through the body of the tongue for springs or other actuating devices, without the necessity of a downwardly projecting lug.

Many tongue pivot tightening devices consist of blocks, bearing only on a small part of the lower portion of the circumference of the pivot, and in taking up wear, will not restore contact around the cylindrical bearing surfaces. The heel tightening device of this switch is based on the principle of a split collar. Part of the wall of the socket into which the heel fits, and which is an integral part of the switch casting, is made flexible by a longitudinal slot at its junction with the bottom of the bearing. By means of a large size bolt the wall is drawn in until it hugs the tongue heel. Thus the wear is taken up through contraction of the radial dimension of the socket. The nut of the bolt is located in one of the drain boxes, readily accessible.

A "hold-down" at the center of the pivot, accessible from the other drain box, prevents dirt from working underneath and raising the tongue, although with the sloping bed there is a natural tendency to keep the tongue down and the joint on the tread surface tight.

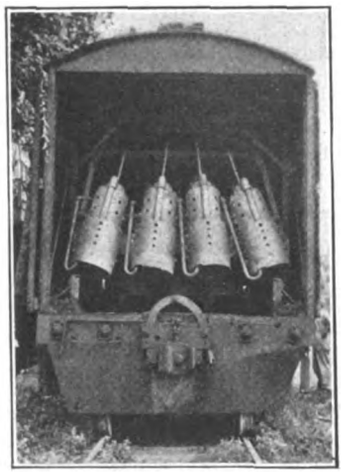
The downward slope of the bed gives a natural drainage toward the drain boxes, located on both sides of the heel, preventing water from settling at the point of the tongue, except on extremely steep up-grades. This also eliminates splashing on mechanically operated switches. The longitudinal openings through the wall at the heel give opportunity for drainage and for dirt to escape into the boxes, which can easily be cleaned out.

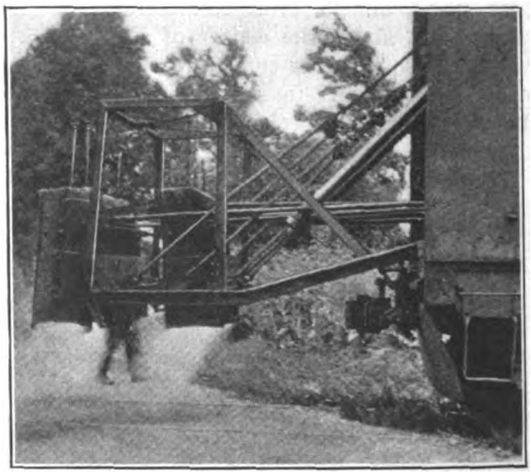


This New Switch Has a Specially Shaped Tongue and a Novel Way to Take Up Wear on the Heel

Weed Burner Has Successful Trial

EXPERIMENTS which were recently made on the property of the Aurora, Plainfield & Joliet Railway with the Lamb weed burner were entirely successful. At a cost of $15 per mile the burner produced as good results, according to the company, as had previously been obtained with a chemical exterminator at a cost of $54 to $65 per mile.





Rear End of Car with Weed Burner Housed. At Right, the Carriage Is Extended and the Seven Burners Are in Operation

The present device is an outgrowth of attempts by the inventor to perfect a burner which would exterminate the weeds without danger of setting fire to vegetation near the tracks. As will be seen from the accompanying photograph, it consists of seven blow torches of large size mounted in a carriage which is projected from the rear end of the box car. Gasoline is used as fuel, and each torch measures 17 in. in diameter by 42 in. long. Played on the roadbed from a height of approximately 3 ft. 6 in., the intense heat at the track level is sufficient not only to exterminate the growth above the ground, but will also dry out and kill the growth to a depth of 2 in. below the surface. Traveling at the rate of approximately 6 m.p.h. and covering a roadbed width of approximately 10 ft., the burner con-

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sumes 48 gal. of gasoline per hour, or in the neighborhood of 8 gal. per mile of track. Needle-valves adjust the heat to the growth of weeds.

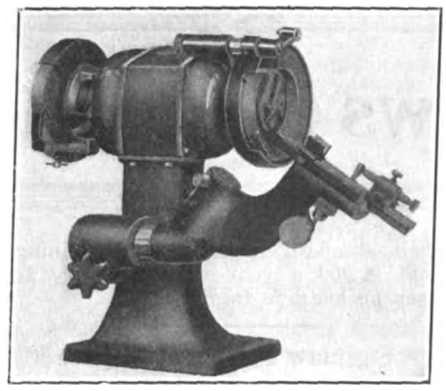
During the first day of the experiment on the Aurora, Plainfield & Joliet Railway a heavy growth of weeds which had previously been cut with a scythe and was very dry was ignited by the burner and a small conflagration was started. However, on the second day of the trial, following a heavy rain during the night, no difficulty was encountered. As is the case with the chemical extermination the results of the process were not apparent until after three of four days, at which time the growth which had been subjected to the burner had dried up and charred, giving the roadbed a very clean appearance. The Lamb weed burner is available either on a rental or an outright purchase basis.

Bench-Type Drill Grinder

SEVERAL improvements have been incorporated in a new bench-type twist drill grinder recently placed on the market by the Gallmeyer & Livingston Company, Grand Rapids, Mich. A self-contained ½-hp. motor drives the grinder, consequently it may be placed in any convenient location in the tool room or on a bench.

The drill holder is so designed that either straight shank or taper shank drills of standard type can be ground. Drills with enlarged shanks or drills mounted in quick change sockets can also be ground without changes or extra adjustments. A swinging arm with diamond mounted therein is provided. This gives a convenient means of adjustment in the process of truing the wheels. For double-holder machines a truing device is furnished for both wheels, and a diamond is part of the standard equipment.

A safety stop is provided for the truing device in the form of a track on a movable section of the wheel hood. As the diamond is advanced into the grinding wheel in the process of truing it, this movable section of the wheel hood with its track is advanced an equal amount. It thus always remains a fixed distance from the face of the grinding wheel. A circular stop on the front of the drill holder abuts against the track and rocks thereon in the process of swiveling the holder. This is so adjusted as to bring the lip rest into close proximity to the wheel. At the



Twist Drill Grinder for Bench Mounting

same time it is impossible to get the front of the holder or the lip rest into the front of the grinding wheel where it could be ground off.

On wet grinding machines the end of the drill being ground is flooded by a stream of water 1½ in. wide and about ¼ in. deep, which drops directly on the point of the drill. The water is carried to the special flat nozzle through a ¾-in. hose. Hoods, water pan and guard are provided so as to prevent the water dripping to the floor.

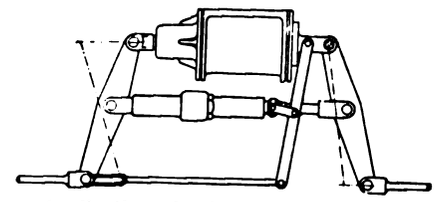
New Type of Slack Adjuster

A TYPE of slack adjuster for electric cars, which has been applied to several hundred on the Paris Metropolitan subway, is now being marketed in the United States under the direction of G. S. Albanese of Paris, who is now in New York.

This slack adjuster takes up the slack in infinitesimal steps as the brakeshoes and the wheels wear down. The principle of this adjuster is based on the action of two nuts on a single high pitched screw. One nut operates, while the other is an auxiliary. These nuts are provided with conical friction surfaces facing in one direction engaging conical seats. The seat corresponding to the operating nut is in the main body to which the operating effort is applied. The auxiliary nut seats in a separate sleeve which is movable in a longitudinal direction relative to the main body and is held normally by a spring in a definite position relative to this main body. This auxiliary sleeve is provided with stops which engage with a point which is fixed relatively to the truck. The screw rod is connected to the lever operating the brake as shown in the accompanying illustrations.

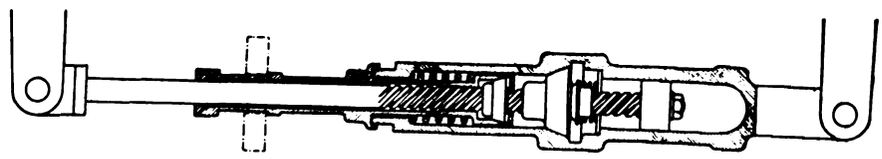
When effort is applied to the main body, the force is carried through the main operating nut, through the screw to the brake operating lever. The auxiliary sleeve moves together with the main body until it is limited by the stop. The movement of this sleeve corresponds to the normal clearance between the brakeshoe and the wheel. If there is any wear, it is evident that the main body will travel still further, and consequently will move relative to the auxiliary sleeve. When this happens, the auxiliary nut will follow the screw, until it strikes the back plate of the auxiliary sleeve, when it travels down the screw as long as the relative movement continues.

When the brake is released again, the main body as well as the sleeve moves back until the sleeve is prevented from moving any further by the stop, which thus limits the return of the brakeshoe to the normal clearance. The main body then continues its movement under the action of the spring until the normal position between the auxiliary sleeve and the main body is regained. During this movement, the main nut is released from its seat and is pushed by a back plate in the main body down the screw just as far as the auxiliary nut has been pushed down when the brake was applied.



Application of Adjuster to One Type of Brake Rigging

This completes the cycle and the wear is automatically taken up, whatever this wear may be. With this type of adjuster, the smallest fraction of wear will be taken care of automatically instead of step by step, as is the case with the usual ratchet arrangements. The entire mechanism is inclosed in a watertight housing, so as to protect it against the elements. Some installations have the chamber filled with a thick grease.



Two Nuts on a High-Pitched Screw Actuate This Slack Adjuster

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The News of the Industry

Strike Averted

Increase of 3½ Cents an Hour Awarded to Men on British Columbia Electric Railway

Vancouver, British Columbia, lived for two days, Sept. 24 and 25, under the expectation of having to walk to work on Sept. 26. A board of conciliation, under the industrial disputes act of Canada, had been in session for several weeks, hearing both sides of the case in the controversy between the British Columbia Electric Railway and its men and on Sept. 24, before the board had made any report, the officials of the union announced that the men would go on strike two days later.

The reason given is contained in an ultimatum sent to George Kidd, president of the railway, as follows:

As our representative, R. P. Pettipiece, has withdrawn from the conciliation board dealing with wages and working conditions of the street railway employees because he cannot agree with the other members of the board, we, the members of the joint advisory board of Division 101 Vancouver, 131 New Westminster and 109 Victoria, have no alternative but to carry out the instructions received from the members, and we hereby give notice that a strike will be called of all members of the three divisions to take effect on the morning of Wednesday, Sept. 26, at 5 a.m.

This letter was signed by seven members of the advisory board.

The industrial disputes act of Canada makes a strike on a public utility against the law if the men who are concerned go out before a conciliation board makes its report, and strikers are liable to fines up to $50 each for each day on strike. It is not known that these fines ever were imposed. The union went on strike in a similar way before a board could report in July, 1918.

On Tuesday, Sept. 25, the Mayor of Vancouver took steps to prevent a strike and after prolonged sessions, it was announced in the afternoon that a basis had been arrived at which was satisfactory to all three members of the board and which would be satisfactory to the men. The strike was thereupon called off.

The settlement, as later released by the Department of Labor, Ottawa, gave the motormen and conductors an increase of 3½ cents an hour from 58½ cents to 62 cents. All employees were reduced 10 per cent a year ago and now all others not mentioned above will receive an increase of 2 cents. Motormen and conductors will also receive 20 cents an hour additional when a run is not completed within ten hours of the commencement of the first shift.

The company contended that by the cost of living figures it was entitled to a decrease as wages were already the highest in Canada, although the cost of living was lowest. The men held out for increased pay so as to raise their standard of living, maintaining that $1,900 a year was necessary to keep an average family of five.

Saginaw Promised Service in November

Partial resumption of electric railway service will take place the early part of November, Charles S. Kressler, general manager of the Saginaw Transit Company, recently announced. Auxiliary bus service will start the same time and will gradually be augmented until the complete system is in operation. Track, roadway and overhead construction repairs are now being made and all of the rolling stock is being renewed and will be put in service, Mr. Kressler says, just as soon as it is 100 per cent ready.

Mr. Kressler is getting his organization together as rapidly as possible and has announced the appointment of George E. Cushman as transportation superintendent and Edwin Krueger as track and roadway engineer.

Orders have been placed by the company for bus equipment. The cost of this equipment is $122,000, which is $20,000 more than the company had contemplated expending for buses.

Because of the general breakdown of the jitney company that has provided transportation for Saginaw during the last two years Mr. Kressler will start the operation of street cars just as soon as one complete route is ready. The main route will be opened first for service and others, he says, will follow just as rapidly as conditions will permit. In two years the track, overhead and roadbed have deteriorated. Aside from the special work no new tracks will be laid now because it is impossible to obtain steel deliveries, Mr. Kressler says. However, orders have been placed for March 1 delivery.

Wage Arbitration Opened. — The hearing of the arbitration proceedings on the wage and working agreement of the Middlesex & Boston Street Railway employees has been opened. Charles H. Donahue, a Boston attorney, is acting as chairman and neutral arbiter, with President Pitt F. Drew representing the company and Attorney James H. Vahey representing the employees. According to Mr. Vahey, the men are seeking a wage of 66⅔ cents, a differential wage on the one-man cars; 20 cents an hour extra for snow work instead of 10 cents an hour; the inclusion of all employees under the time and a half rate for overtime; an eight-hour day for all employees. At the present time the average pay is 51 cents an hour for a nine-hour day.

New $100,000,000 Line

Engineer Turner Suggests to New York Commission Construction of Rapid Transit Line to Queens

The New York Transit Commission is considering the project of the construction of a new type of rapid transit line to be built through the center of a 500-ft. parkway, 10 miles long, in the undeveloped section of Queens lying between Flushing and Jamaica. The proposed route is from the west side of Manhattan eastward to the Nassau County border.

The commission a few days ago received an extensive report upon the subject by Daniel L. Turner, its consulting engineer, and has asked Mr. Turner to make additional studies looking to the further development of the idea.

In his report to the commission, Mr. Turner points out that there is no good reason why, in the sections of the city where land is relatively cheap, a rapid transit line may not be made the nucleus of a wonderful parkway line. His plan, as outlined, provides for the 500-ft. parkway strip approximately in the center of which would be the rapid transit line, running either in open cut or at grade, or, where the configuration of the territory demanded it, for short distances as an elevated railroad structure. Allowing about 50 ft. width for the railroad structure, approximately 175 ft. would remain for park treatment on either side, with a 50-ft. allowance for roadway and sidewalks on each side. Taxable values would increase by millions through the construction of such a line.

The route which Mr. Turner proposes is 17 miles in length, of which 4.37 miles would be subway, 1.1 miles under the East River would be in tunnel, 1.65 miles would be elevated railroad and 9.88 miles would be parkway line. The park area would be approximately 450 acres.

The construction cost of this line, Mr. Turner points out, would be $49,200,000. Adding to this the necessary interest, superintendence and administration costs and the equipment cost, the total cost is reached of $99,000,000. To build it as a subway now would cost $120,000,000, and later, in developed territory, much more. The line is proposed to begin as a two-track structure at the Nassau County boundary and extend as such about 7 miles to Seminole Avenue. From this point it will be a four-track line into Greenpoint, where the route intersects the proposed Brooklyn Crosstown line route at Greenpoint and Manhattan Avenues. The line will then pass in two

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single-tube tunnels under the East River, but on the Manhattan end, Mr. Turner points out, the line should be three-tracked. Eventually the line could be increased with additional tracks and spurs in Manhattan, additional tubes under the river and an extension of the four-track portion from Seminole Avenue out to the city line, as traffic develops.

Declaring that 27 square miles, approximately 25 per cent of the entire area of the Borough of Queens, is not accessible by any kind of rapid transit facilities, Mr. Turner states that this inaccessible area is largely the region lying north of Richmond Hill and Jamaica and to the south of Elmhurst, Corona, Flushing and Bayside. Most of this territory has no service at all, except that which is provided by the distant elevated lines to the north and south and the lines of the Long Island Railroad.

Queens, however, contains 36 per cent of the land area of the city, but has, with its 8 per cent of the population, only 8 per cent of the total rapid transit mileage of the city. Mr. Turner states that it is obvious that in its next rapid transit building program the city should provide additional rapid transit facilities for Queens Borough.

It is through the center of the open area that he has indicated that such a line should be built, the commission's consulting engineer states, and not into and through a section or sections already heavily built up. For the reason just mentioned he rejects the proposal to construct a line from Jamaica to Manhattan, and asserts that rapid transit lines should be built into undeveloped areas to relieve congestion. Additional lines into congested areas only augments congestion.

Dallas-Denton Electrification Delayed

The hearing has been concluded which was held to consider the motion to dissolve the temporary injunction granted several months ago by Judge Louis Wilson restraining the Texas Interurban Company from proceeding with construction. This company was organized by the Strickland-Hobson interests in Dallas to electrify the line of the Missouri - Kansas - Texas Railway from Dallas to Denton. The order of the court prevented the company from laying a double track on Fairmount Street, in accordance with provisions of the franchise granted by the city of Dallas. Judge Wilson announced that he would not render an opinion in the case for several days. Injunction was sought by the property owners along Fairmount Street, who alleged that the laying of a double-track interurban along this street would greatly damage their property and cause heavy reduction in property values.

Court action has been delaying the electrification of the Katy line from Dallas to Denton, for which plans and estimates have been prepared by engineers for the line, headed by E. C. Brown, chief engineer. It was originally planned to have the electrified line in operation by Sept. 1, but, due to court interference, it is not known now when the project will be completed, or if it will be undertaken at all at this time.

The electrification of the Katy to Denton was to be done by the Strickland-Hobson interests in fulfillment of their promise to the city of Dallas, at the time the franchise was granted in 1914, that two electric interurban lines, each at least 30 miles long, would be built out of Dallas within a specified time. Due to conditions resulting from the World War, extension of time was granted by the city of Dallas. The Dallas-Terrell line was built in fulfillment of the promise for one of the lines and the electrification of the Katy from Dallas to Denton was proposed in fulfillment of the promise for the second line. The electrification project, which it was estimated would cost in excess of $1,250,000, was approved by the city, and the company was preparing to begin construction when court action halted such preparations. Nothing further has been done, and officials of the company say they will await settlement of suit against them before anything further is done.

Sad Leave-Taking in Terre Haute

Employees of the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., recently showed their appreciation for the services of E. M. Walker, general manager, who has left the company to accept the position of president of the Schenectady Railway. At a large gathering a farewell party was staged, at which Mr. Walker was presented with a handsome leather-bound set of the works of Robert Louis Stevenson, and also with a beautiful large silver loving cup. His helpmate, Mrs. Walker, was not forgotten. She was presented with an ivory set of the new Chinese game, "Mah Jongg."

The celebration was a surprise to Mr. Walker, who was not aware that the employees had been making preparations for the big farewell. In his six years' association with the men at Terre Haute they have learned to like him very much and to appreciate his kindnesses to them.

John T. Beasley, president of the United States Trust Company, presented the gifts to Mr. and Mrs. Walker. He said that, despite the short time that Mr. Walker had been in Terre Haute, he had established himself as one of the substantial men of the city; that he had faced a task when he went to Terre Haute that would have discouraged most men.

Mr. Walker, in expressing his appreciation, said the realization that his work was appreciated was one of the things that stirred a man to do all he could.

In referring to Mr. Walker's leaving the company an editorial in the Terre Haute *Tribune* paid a real tribute to his activity as a traction manager. In part that paper said:

> Mr. Walker's methods did not concern the politician. He rather dealt with the makers of new and better cars, and instead of looking for propaganda, he occupied himself with building up an organization among his men and employees generally, the one aim of which was perfect street car service. A spirit of courtesy has marked every branch of the corporation, to such an extent that it has been a matter of comment by visitors to the city, and the company cheerfully has participated in legitimate helpful civic and commercial matters, enhancing the happy relations between the public and the corporation.

Charleston Survey Completed—Increased Fare Recommended

The Beeler organization has completed the survey of the electric railway situation in Charleston, S. C. The report has been in preparation since early in May, when the Beeler organization, at the request of the Charleston Consolidated Railway & Lighting Company, undertook to make a traffic survey of the situation and offer recommendations which it believed would help toward bringing the company back on a good financial basis.

One of the first recommendations, as suggested by the experts, calls for an adjustment in fares, which it considers necessary in solving the problem in that city. It points out that the average rate of fare of eighty-one railways for the first four months of 1923 was 7.13 cents, and the average rate of fare charged in the city of Charleston was 6.02 cents.

In addition to the fare increase recommended, the organization further suggested a modification in the routing of lines, with a few excepted. It recommended the abandonment of certain small portions of the railway system which do not contribute a sufficient amount of revenue to justify their operation. It recommends, further, the complete relief to the company from the cost of paving between the tracks, except where such paving is damaged by the railway in its operations. Faster schedules are recommended on all lines, that the patrons may be given prompt and efficient service. It suggests that, if necessary, relief be granted in the matter of taxation, as has been done in some cities. It brought out the fact that while the number of passengers in 1922 was about the same as the number carried in 1912, the taxes of 1922 had more than quintupled during the last ten years.

Other minor recommendations were made, looking toward the solution of the traffic problem. The report states that substantial savings would be effected in operating costs by the adoption of these changes. It is indicated further that it would be impossible to put the operation of the railway upon a sound financial basis until such time as a substantial increase in the traffic carried could be experienced. It was the hopeful opinion of the engineers who made the report that Charleston was to experience, in its industrial and business conditions, a great improvement, which would be helped along by the changes in car routing and service recommendations.

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Active Safety Measure Campaign Under Way in Los Angeles

The July traffic injury record of Los Angeles was broken when reports showed 634 persons were injured, seventeen being killed, as compared with 466 injured in July, 1922. Since Jan. 1, 1923, 310 persons have been killed in traffic in Los Angeles.

The press in Los Angeles during the month of July undertook a campaign of attempting to arouse the people to the need of more safety measures to eliminate dangerous grade crossings and the adoption of improved traffic laws and rules to lessen the loss of human life.

None of the laws in the State is broad enough to enable the Railroad Commission to order a separation of grade of highway and railway lines with respect to fixing the portion of cost to be borne by each concerned. Neither can this adjustment be legally arranged by handling such work under improvement acts and assessing the adjoining property. It rests with state, county and municipality officials to get together with the taxpayers and railroads and work out the desired plan to eliminate these hazards.

D. W. Pontius, vice-president and general manager of the Pacific Electric Railway, said that his company was doing everything possible to prevent accidents at grade crossings; that it had installed along the lines, at 304 crossings, automatic wigwags, and that the company would soon commence the installation of sixty more. The company was arranging to install additional standard crossing signs at 1,000 crossings not so frequently used. He said that he was willing to join in conference and co-operate with the commission, city authorities and the Automobile Club of Southern California in order to prevent accidents between trains and automobiles. His company had agreed to pay its share for the separation of grade crossings along the Los Angeles River, for which the city of Los Angeles voted bonds to the extent of $2,000,000 at the last June election and as soon as he was authorized to do so construction of a tunnel and terminal under Pershing Square would be started at a cost of $4,200,000, and if denied use of Pershing Square, the terminal would be placed on Hill Street between Fourth and Fifth Streets, as originally planned. The building of this tunnel will eliminate twenty-one grade crossings for interurban trains.

Judgments Enacted Affect Oklahoma Utilities

The people of the state of Oklahoma have recently enacted judgments binding upon the public utilities in that state. The opinion states that in all hearings before the corporation commission to fix, raise or lower the rates charged by any public utility, of which the Corporation Commission has jurisdiction, the state shall be considered a party to said action adverse to that of the particular public utility in question and it shall be the duty of the Corporation Commission before it enters an order to fix, raise or lower the rates of this public utility, to enter a judgment finding and fixing the value of the property of the utility.

On the matter of the utility submitting a report on the value of its property, the opinion states that the report when filed shall be considered by the commission as a confession of judgment and upon receipt of the statement the commission shall enter a judgment in an action in which the state shall be the complaining party and the public utility in question shall be the defendant or respondent finding the value of said property as stated in the said confession.

If the Corporation Commission desires to dispute the value of the property the commission shall set the matter for hearing and notice of this hearing shall be given to the public utility. The right to modify the judgment of the Corporation Commission has also been provided in Sec. 4 of the judgment, which states that the Corporation Commission shall have full authority at any time upon due notice to said public utility to modify the judgment provided for in the preceding section, and may modify the same upon application of the public utility after due notice of hearing.

The opinion defined a public utility.

Niles and Company in Controversy

A temporary injunction has been granted restraining the city of Niles from further tearing up the tracks of the Pennsylvania-Ohio Power & Light Company. Court action was started by the railway following the cutting of the track leading to Girard and Youngstown. The tearing up of the tracks came as the result of a bitter fight between Niles and the West End Traction Company, a subsidiary of the Pennsylvania-Ohio Power & Light Company, over the question of repaving Robbins Avenue. The company claims that it is financially unable to pay for this improvement and further that it is attempting to negotiate a new franchise calling for a higher rate of fare that would put the West End company in a position to meet the paving bill. In commenting on the situation President MacCalla of the Pennsylvania-Ohio stressed the fact that he had no desire to abandon railway service through Niles and replace with bus service because he said that buses could not handle volume traffic.

Statistics of the Industry

Census Bureau Gives Out Figures on Passengers Carried in 1922 in Connection with Atlantic City Convention

Although there were approximately 12,000,000 automobiles in the United States last year, the electric railways of the country carried more passengers in 1922 than ever before in the history of the United States Census Bureau. The total number was 15,317,687,212.

This fact was announced on Oct. 6 by the secretary of the American Electric Railway Association, on authority of the Census Bureau, which has just completed a survey of the electric railway operations for 1922. These figures have been released in advance by the Census Bureau for use in connection with the association's convention. They should be considered as preliminary only and are subject to possible correction by the Census Bureau.

The largest number of passengers carried previous to 1922 in any census year was 14,506,914,573, carried in 1917. Thus, 1922 shows an increase of about 6 per cent. The report for 1922 also showed that electric railways operating buses carried about 15,000,000 passengers.

Passengers carried by states in 1922, with the 1917 figures, are as follows:

TABLE SHOWING TOTAL PASSENGERS CARRIED ON ELECTRIC RAILWAYS, BY STATES

	1922	1917		1922	1917
Alabama	80,583,684	84,962,155	Missouri	692,747,054	660,703,957
Arizona	5,776,976	7,893,924			
Arkansas	34,131,000	30,525,360	Nebraska	97,566,736	95,782,721
			Nevada	487,200	890,471
California	935,446,247	638,632,142	New Hampshire	22,270,122	26,341,020
Colorado	100,764,698	102,882,744	New Jersey	484,084,796	555,286,203
Connecticut	209,129,169	249,452,728	New Mexico	1,494,480	1,594,543
			New York	3,311,252,940	2,951,805,264
Delaware	25,889,902	32,648,315	North Carolina	34,206,694	32,140,967
Dist. of Columbia	197,406,744	165,445,889	North Dakota	3,616,069	3,063,647
Florida	49,220,967	38,625,356	Ohio	967,969,914	1,034,245,928
			Oklahoma	42,322,202	35,820,508
Georgia	130,718,221	114,021,766	Oregon	97,246,645	91,926,694
Idaho	3,497,888	3,560,462	Pennsylvania	1,662,796,825	1,520,378,517
Illinois	1,753,500,547	1,665,552,944	Rhode Island	144,960,937	128,220,984
Indiana	262,320,348	231,290,386			
Iowa	110,406,523	119,348,038	South Carolina	22,338,616	28,408,318
			South Dakota	2,273,666	2,105,626
Kansas	43,575,343	46,212,673			
Kentucky	147,490,154	141,218,932	Tennessee	130,767,681	122,655,470
			Texas	229,165,045	184,912,268
Louisiana	164,593,374	134,017,669			
			Utah	39,303,737	47,671,180
Maine	55,575,075	61,789,846			
Maryland	350,024,448	315,969,539	Vermont	7,372,195	9,268,385
Massachusetts	1,058,708,495	1,219,706,121	Virginia	139,049,282	135,411,909
Michigan	576,823,922	593,096,656			
Minnesota	352,464,915	316,904,581	Washington	173,728,486	186,361,737
Mississippi	9,441,459	12,215,749	West Virginia	95,989,610	80,920,697
Montana	17,522,464	25,948,387	Wisconsin	238,963,176	217,599,493
			Wyoming	690,541	1,475,704

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Subway Plan Revised

Change in Subway Scheme in Los Angeles Presented to Council by Board of Engineers

Los Angeles engineers have submitted to the City Council alternate plans which provide for the construction of a vast underground railway system with central stations extending from the present Hill Street Terminal of the Pacific Electric lines along three blocks between Fifth and Eighth Streets on Olive Street. This report of the city engineer and the chief engineer of the Board of Public Utilities sweeps aside the many proposed subway system plans that have previously been submitted.

The report further recommends that the proposal previously made for a central terminal under Pershing Square be abandoned, but that the Pacific Electric be permitted to construct under a section of the square in such manner that the present appearance of the park will not be disturbed.

The City Council is urged to appropriate funds for an immediate complete survey for working out detailed plans for the proposed subway system, which is to meet demands imposed by unprecedented growth of the city of Los Angeles and southern California towns. It is outlined that the great need for the subway is evidenced in reports showing that the Pacific Electric Lines are now handling 196,000 passengers daily and the Los Angeles Railway Lines 210,000 daily along routes of a suggested subway system.

The former proposed plans for a Pershing Square terminal are declared completely inadequate; that the capacity of such a system would not be sufficient even by the time this project would be completed.

It is cited that the advantages of this proposed plan is with a view of more than doubling the downtown station capacity, in addition to assuring the preservation of Pershing Square Park, as well as establishing a grade for the immediate construction of the Hollywood tunnel. As preliminary steps, the report states that the Pacific Electric must acquire a new right of way through the Hollywood district, and the City Council must take measures to cause the city charter to be amended to permit construction of subways in any streets or alleys at any levels consistent with efficient operation.

The report also included a city-wide subway system plan which would enable the Pacific Electric lines to route a large part of its interurban traffic from the center of the city along underground channels. The plans outlined that four main projects be built soon.

In view of the fact that a short stay of time is necessary to work out the detailed plans of the Olive Street subway stations, the city is urged to obtain from the State Railroad Commission a stay of its order requiring the Pacific Electric to construct its subway from First and Glendale Boulevard into the present Hill Street terminal at grade, the extension not to exceed ninety days.

The report further contains recommendations that the vast subway system care as far as possible for local traffic.

Wants Privilege Accorded Seattle Municipal Railway

The Seattle & Rainier Valley Railway has served notice on the city utilities committee of the City Council that it will request the city of Seattle to abolish the gross income tax levied against the company under its franchise and also the requirement that the line carry policemen and firemen without charge.

John C. Higgins, counsel for the company, appeared before the committee to oppose a Council bill requiring the company to pave its right-of-way in Rainier Avenue between Graham and Morgan Streets, saying the company had laid planking several years ago, which is still in good condition, and that the Council in 1917 had relieved the company temporarily of the paving obligation, except in certain blocks.

The company's counsel explained that free transfers were now being given on the line and that it was accepting school tokens the same as the municipal railway. In consideration for these concessions, he said, the Rainier Valley line should be treated on a parity with the Municipal Railway as to paving. Mr. Higgins stated that the free transfers and school token privileges are costing the company 39 per cent of its net revenue and that the company is not earning a profit.

Co-operation Sought for Houston-Seabrook Interurban

All contracts involving the city of Houston, the Houston Electric Company and the Galveston-Houston Interurban Company relating to the construction and operation of an interurban electric line from Houston to Seabrook, a resort on the shore of Trinity Bay, have been executed, according to a statement made public by the trustees of this undertaking. The trustees appeal to the citizens of Houston to cooperate to the end that construction may begin soon after Oct. 1, 1923, as provided in the articles of agreement by which the undertaking was launched.

The purpose is to incorporate the Seaboard Electric Railway to construct and operate an electric interurban railway from Houston via Harrisburg, Pasadena, San Jacinto Battle Park, Morgan's Point, along the Houston Ship Channel, and thence along the bay shore to Seabrook. The company will have an authorized capital of $2,000,000, consisting of 10,000 shares of 7 per cent cumulative non-voting preferred stock of the par value of $100 a share and 10,000 shares of common stock of the par value of $100 per share. Of this company it is provided that John H. Kirby, W. C. Munn, John S. Bonner, J. M. West, J. S. Rice, I. A. Cottingham, and Jacob F. Wolters will be among the initial directors.

Railway Ethics Compulsory in Cape Breton

A twentieth century version of the beatitudes was recently given out by the Cape Breton Electric Company, Sydney, N. S., and distributed in circular form to the passengers of the line. The company seeks to relieve congestion in railway traffic and the circular, as a way of doing this, is attracting much attention. The circular reads as follows:

He who spreads himself out across the aisle shall be humbled and he who strives to make room for his fellow men shall be exalted.

Blessed is he who giveth up his seat to a lady, but scorned shall be he who hideth himself behind his paper.

He who standeth upon the platform and emitteth poison gas from a noxious weed is an abomination unto his fellow passengers.

The wrath of many who wait shall descend upon the head of him who hath not his fare ready.

A wise one is he who goeth forward in the car, for he shall be rewarded with a seat.

Blessed are those who have their transfer unfolded, for by such is the service improved.

Abandons Pleasure Park Plan

The Philadelphia Rapid Transit Company has abandoned its plan for an amusement park at Sixty-third and Market Streets, Philadelphia. The property has been ordered sold by the owners, the Willow Grove Amusement Park Company. After much opposition to the plan voiced by residents along the way, legal action was taken, with the result that Judge Johnson handed down a permanent injunction against the railway forbidding it to establish a pleasure resort on the ground that it would constitute a nuisance to residents of the community. It was decided not to appeal.

A Story with a Moral

Honest business men can become blackguards and crooks in the eyes of the public if they enter the public utility field. Just what the attitude of people in general is toward utilities and their operators is aptly expressed by W. M. Maupin in a recent editorial in the Gering (Neb.) *Mid-West*. "The Story of Three Men in a Fix" related the experiences of Plodder, Figgers and Smithers, who, with extraordinary perseverance, became the most respected and beloved business men in Billville and after amassing a fortune settled down to a life of ease and comfort. They were too ambitious for that kind of a life, though, and set to work to perform their greatest achievement—to give the residents light, power and a transportation system. They organized the Billville Electric Railway, Light & Power Company and in a few years made Billville a real city, the epitome of industry. But how they stood in the community now was a very different story. As individuals they were respected and admired, but as public utility operators they were condemned and despised. The moral of this, in the opinion of the writer, is "Don't it just beat hell?"

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Official Improving.—The condition of George L. Maltby, general manager of the Jamestown Street Railway, Jamestown, N. Y., who has been dangerously ill, continues to improve steadily and his friends look for a speedy recovery.

Compromise Agreement Reached.—A wage compromise between the Board of Works and the platform employees of the San Francisco Municipal Railway provides for an increase of 40 cents a day. The new scale is retroactive to Sept. 16. The men had asked for $1 a day increase, and under the new arrangement will be paid $5.40 for an eight-hour day.

Asks $576,706 for Bridge Operation.—Commissioner Whalen of the Department of Plant and Structures, New York, N. Y., in a supplementary budget has asked for $576,706 for operating the Williamsburg bridge trolley system. Of this amount $320,870 is for personal service and $203,931 to operate trackless trolleys, of which $113,108 is for personal service.

Nutshell Economics to Appear.—In the weekly "Service Talks" of the Philadelphia Rapid Transit Company a series of discussions has been started under the heading "Nutshell Economics." The first appeared in the Sept. 12 issue of the pamphlet and was called The New Era in Labor. The article tried to show the difference in attitude between capital and labor today and fifty years ago.

New Slogan in St. John.—The New Brunswick Power Company, operating the street railway in St. John, N. B., has turned attention to the education of public sentiment. The company has started an advertising drive, with the slogan of "Assured Service." A recent bulletin says: "We appreciate your patronage. Let us make it reciprocal. We are always at your service. Thank You. We are on the job twenty-four hours a day."

Mr. Chapin Entertains Railway Men.—Each year for a number of years past Edward H. Chapin of Rochester, vice-president of the National Car Wheel Company, has given a summer outing and dinner at his beautiful summer home at Geneseo, in honor of the officers and department heads of the New York State Railways, Rochester Lines. This year the event took place on Sept. 27. After gathering at Conesus Lake there was a dinner at East Avon. About a hundred guests were present.

Men on Strike.—Trolley service has been at a standstill in Mahonoy City since Oct. 2, when motormen and conductors employed by the Schuykill Railway went on strike because the company refused to accede to their demands for an increase in wages amounting to 10 cents per hour. The company had asked the men to accept a decrease of 5 cents per hour, and later came back with a counter proposition to "split the difference" and agreed to add 7½ cents to the minimum rate per hour, which is 50 cents.

Foreign News

Le Havre Replaces Cog Railway with Moving Stairway

Throughout Europe, as in many places in the United States, there have been established funiculaires, or cog, railways, climbing from some low level to a neighboring height. A new suburban development at Le Havre, on the Norman coast of France, has gone one better and suppressed the very thought of the funiculaire by a project for the installation of a magnified moving stairway of 300 steps. There will be two sets, one going up, the other going down, the motive power being electricity. The steps, or *paliers*, will each be wide enough to take a baby buggy or a bicycle. There is nothing especially new in the idea, but there is in its application, and the Compagnie de Tramway Funiculaire at Saint Adresse saw here at Graville the opportunity of giving a similar service at a less cost of operation and a no greater cost of installation. Nothing is said of upkeep in the sense of repairs or replacements. It would seem, however, that this is a factor which should be given due consideration. Operating and upkeep figures after a term of years as compared with those of the neighboring funiculaire will make interesting reading.

The proposition came from an Alsatian engineer.

Genoa, Italy, to Have Underground

A new company has been formed at Genoa, the Societa Metropolitana di Genova, for the construction and exploitation of an electric underground railway running from Sampierdarena on one side of the city to Quarto on the other side. The line is to be so built that it may be extended as occasion may require, at ground level.

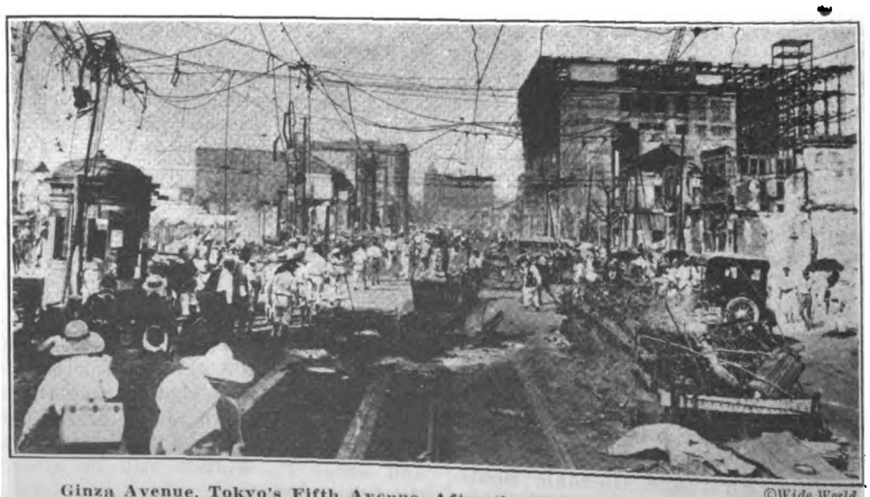
The company is capitalized at 5,000,000 lire, all paid up and in the hands of the promoters. The charter provides for an increase of the initial capital to 80,000,000 lire. The promoters of the enterprise are the Marquis Stefano Cattaneo Adorno di Luigi and the engineer, Emilio Rava. Aside from these, who are Italians, the rest of the principal stockholders are Spanish.

The "engineer-president" of the company is Senor Roberto Farjon y Farjon. His staff of associates are all Spanish.

The *Critica*, the organ of the railway and transport interests, announces that this group of Spanish capitalists forms a part of the consortium which is carrying out the subway projects of Madrid and Barcelona, and that its participation in this Genoa project marks its first venture into foreign fields.

Dr. Charles A. Beard Will Aid in Reconstructing Tokyo

Dr. Charles A. Beard, economist and authority on municipal government, has left for Japan to aid in the rebuilding of the ruined cities. Dr. Beard goes as a representative of the Bureau of Municipal Research. Dr. Beard was invited by Viscount Shimpei Goto, Minister of Home Affairs, to help in the reconstruction of the devastated territory. The bureau will meet all the expenses of his mission. Dr. Beard, speaking on questions of transportation, said that three subway companies had been organized in Tokyo before the earthquake, but that he did not know what effect the disaster would have on subway construction. He said the plan would be to enlarge the city of Tokyo to seven times its present area, so as to include all the outlying districts. He said that a conference had been held with the New York City Planning Committee of the Russell Sage Foundation to discuss reconstruction plans. It was his belief that there would be some difficulty in reconciling the views of the Japanese conservative element and the younger progressives in planning reconstruction.



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Ginza Avenue, Tokyo's Fifth Avenue, After the Fire and Flames Had Subsided

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Financial and Corporate

"Stew in Their Own Juice"

Court So Declares of Some St. Louis Bondholders and Moves to Lift Receivership

Lifting of the receivership and a forced reorganization of the United Railways, St. Louis, as an immediate prospect are indicated through a decision handed down by Federal Judge Faris on Sept. 29. On that date the court denied the receiver's application for extensions of three underlying bond issues totaling $4,100,000 and two bond issues of the St. Louis & Suburban Railway, a constituent company, totaling $6,500,000.

Default in the payments due on Oct. 1 on these bond issues automatically brings about a default in the $30,000,000 issue of United Railways general 4s, which otherwise would not mature until 1934. Attorneys of the Suburban group of bondholders announced that they would institute foreclosure proceedings before Oct. 6.

Confusion exists among the various groups of security holders. Following Judge Faris' decision, there were conferences late Saturday and over Sunday, and efforts were made to get in touch with the bond and stock holders. The Suburban group has announced that it had offers from outside interests to segregate and take over the lines covered by the mortgages on that property. Others contend the Federal court and the Missouri Public Service Commission will never consent to disintegration of the system.

In handing down his decision Judge Faris said:

> The questions involved are whether the receivership, which has been here for four and a half years, should not be terminated and whether the Suburban bondholders should be forced—to use the vernacular—"to stew in their own juice," taking 4 per cent while others more favored are able to get extension after extension from month to month and year to year, at 8 per cent or better.
>
> It is inequitable, it is unjust, it is unthinkable. This case has been here long enough, and the facts, as they present themselves to the court, induce me to reach the conclusion that I ought not to order these extensions. Concerning the issuance of additional receiver's certificates—there are enough receiver's certificates at issue now. The foreclosure and the reorganization would rid the company of much underbrush and the new company will be able to begin life under much more favorable skies.

The underlying bond issues for which three-year extensions were sought were Lindell Railway, Cass Avenue & Fair Grounds, Compton Heights, Union Depot & Merchants Terminal, and the Suburban. The Suburban lines were the last to enter the United Railways system. Prior to 1906 they were operated separately from the United Railways. One of the Suburban bond issues of $2,000,000 matured April 1, last, and the six months grace period expired on Oct. 1. On the same date the two other issues totaling $4,500,000 matured. The Suburban lines are the present Hodiamont, Sarah Street, Union, Manchester, Meramec and Kirkwood-Ferguson. The Hodiamont is an east and west line through the heart of the city and much of the distance is through its own private right-of-way.

Attorneys for the Suburban group, who alone opposed the bond extensions, declared they did not want segregation, but did want foreclosure and a reorganization. They indicated, however, that segregation might become necessary. Attorneys Jeffries and Early stated that their foreclosure petition would be filed not later than Oct. 6.

The Suburban interests contended that when the receiver recently invited financial interests to underwrite the various bonds and the proposed extensions he received proposals for underwriting the underlying bond issues, but none to underwrite the Suburban issues. It was to this matter that Judge Faris referred when he said the Suburban group were left to "stew in their own juice." Attorney Jeffries would not hazard a guess as to how much time will be required to bring about a reorganization. After foreclosure it will be a matter for the security holders to pass on, subject to approval by the court and the Public Service Commission.

City's Stand Alters Case

Receiver Wells declines to discuss the decision by Judge Faris. In the opinion of others, however, a reorganization would have taken place months ago had it not been for the fight the politicians made upon the valuation. When the Missouri Public Service Commission decided the property was worth $52,000,000 the city appealed, and then the company also appealed. It might have been possible to reorganize the property on the $52,000,000 valuation, but in view of the city's fight the case now is on its way to the United States Supreme Court. The underlying and junior bonds total $50,690,000, and in addition there are receiver's certificates outstanding of a total of $4,200,000. The satisfaction of these claims in full would leave nothing for the stockholders. The preferred stock totals $16,383,000, and the common stock $24,913,000. A majority of the common stock is held by the North American Company and is carried on the books of that company at $1. The North American Company, however, is the owner of substantially all of two of the underlying issues—$1,474,000 Lindell Railway first 4½s and $1,640,000 Gass Avenue and Fair Grounds Railway first 4½s—and has expressed its readiness to extend beyond Oct. 1 their present maturity dates.

Just two days before the decision by Judge Faris, the Missouri Public Service Commission announced that a conference of all interested parties would be called with a view of hastening a reorganization of United Railways. In the light of subsequent events it is not known whether the commission will insist upon a conference. In the meantime the commission had approved the receiver's request that the underlying bonds be extended, and that $4,200,000 of receiver's certificates be issued. A formal statement was issued as follows:

> The commission feels that a reorganization of this property should be effected as soon as possible. The expenses necessarily incident to the receivership are very great and inevitably impose a constantly increasing burden to the system, disadvantageous both to the property and to the public. The commission has no power directly to bring about a reorganization, but it desires to do all it can to effect that result. A conference of all the interested parties will therefore be called for an early date looking toward a hastening of reorganization.
>
> The question of reorganization was discussed before the commission on Friday in connection with the receiver's application for permission to extend the maturity date of the bonds. Morton Jourdan, representing the North American Company, said the company had submitted a reorganization plan some time ago, but nothing came of it. Receiver Wells said he had tried to work out a reorganization plan, but had not met with success.
>
> It was evident at the hearing that the security holders of the St. Louis & Suburban Company would like to see that property, which includes the Hodiamont line, separated from the main system and left to work out its own salvation. It was likewise clear that the receiver and the North American Company will oppose any plan of reorganization which provides for separating the various street railway lines which now form the system.

The protest filed by the attorneys representing bondholders of the Suburban Company against the extension of the maturity of the $4,100,000 bonds was not mentioned in the statement by the Public Service Commission. One of the points advanced by the Suburban bondholders was that an extension of the underlying bonds would tend to delay the reorganization. They also claimed that the fact that the United Railways is not satisfied with the valuation of the property as fixed by the commission is no justification for the continuance of the receivership.

The commission also said:

> It is necessary, therefore, for this commission to act at once upon the application. The receiver and other parties have represented to the commission, that if this plan [for bond extensions and receiver's certificates] be not allowed to be carried out, dismemberment of the present railways system in St. Louis probably will result. The City Counselor of St. Louis has joined with the receiver in urging upon the commission the approval of the application. The holders of practically all of the securities have urged upon the commission the desirability of this course. There has also been filed with the commission the recommendation of Judge Henry Lamm, special master under appointment from the Federal court, recommending the authorization prayed for by the receiver.
>
> The commission has decided to grant the application in view of the various representations made to it by the interested parties, including the city of St. Louis, and in view of the emergency requiring immediate action. Accordingly an order has been issued approving the application.

All of which was nullified by the decision of Judge Faris.

$155,491,555 of Issues Approved in Ohio

Security issues totaling $155,491,555 were authorized by the Ohio State Public Utilities Commission during the year ended July 1, 1923, for the purpose of continuing, extending and improving public utility services for the people of this State. That is one of the high

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lights in the report of the commission's work, just issued.

Of the capital security issues authorized by the commission, $96,286,334 represented bonds and notes, while the amount of stock totaled $59,205,220. The commission in its report also points out that during the year its bureau of rates and service had before it 1,206 informal complaints, of which 1,138 were adjusted to the satisfaction of both parties. In fifty-five proceedings filed by shippers of freight for overcharges, the commission ordered refunds amounting to $55,438.56.

During the year 243 formal orders were issued by the commission and forty-nine supplemental or modifications of previous orders were promulgated.

Among the numerous matters acted upon by the commission in the year were 112 applications to approve new capital expenditures, fifty-six applications for property transfers, involving a money value of $51,546,929, thirteen applications to abandon public utility services, sixteen appeals from rates fixed by ordinance in municipalities, forty-three complaints against utility services being rendered, and hundreds of other matters involving such things as safety gates at railroad crossings, rules and regulations for overhead and wire crossings, extensions of passenger train service, orders regarding coal car supply, and thousands of other details referring to filing of schedules and investigations, etc.

Reorganization Requirements of B.-M.T. Met.

With the sale of approximately $4,500,000 in shares of stock of the Brooklyn-Manhattan Transit Corporation to private buyers, the $26,000,000 required under the reorganization plan has been paid into the new company.

In the official statement issued by Gerhard M. Dahl, chairman of the executive committee of the corporation, he said:

> Brooklyn Rapid Transit Company Underwriting Syndicate will be terminated successfully Oct. 5. Eighty-two per cent of the stockholders paid their assessment and received therefor the new securities provided for by the plan. The balance has been placed privately and the syndicate subscribers relieved of their liability.

The syndicate, headed by the Chase Securities Company, was opened on March 15 and underwrote the $26,000,000 to be paid in by the stockholders under the reorganization plan. The payments were made by the stockholders in three installments. The time expired several weeks ago in which the holders of the stock of the Brooklyn Rapid Transit Company were authorized to purchase the shares of the Brooklyn-Manhattan Transit Corporation.

The $26,000,000, which has been paid into the company through the assessments as the result of the reorganization plan, is to be used in providing cash requirements, and $5,000,000 in capital requirements, a part of which has already been appropriated for the purchase of new equipment.

Denver Fare Case Closed in U. S. Court

In the United States District Court of Colorado A. L. Drum of A. L. Drum & Company, Chicago, closed the case of the Denver Tramway, which has been in progress since March, 1923, before Special Master Henry A. Dubbs, appointed by the United States Court.

This is the first large street railway system to conduct a confiscation case originating in the United States Court, necessitating the presentation *de novo* to the court of all details of inventory and valuation with detailed testimony as to the principles of valuation adopted with respect to the basis of reproduction costs, depreciation and the cost of development as measuring the going concern value of electric railway properties. Usually the valuations are fixed by the public service commissions and reach the Federal court only on appeal. The decision in this case by the court will, therefore, be of great interest to all other electric railways.

In the JOURNAL for June 9 details of the valuations prepared by A. L. Drum & Company were printed. These valuations which were submitted summarize as follows:

SUMMARY OF COST OF REPRODUCING AND DEVELOPING THE DENVER PROPERTY AS OF DEC. 31, 1922

	Present-Day Cost Prices Current Dec. 31, 1922	Three-Year Average Cost Average Prices 1920-1922
Total physical property	$27,330,568	$29,071,181
Going concern value...	4,000,000	4,000,000
Water rights.....	290,662	290,662
	$31,621,230	$33,361,843

Dr. Delos F. Wilcox, retained by the city of Denver, submitted valuations summarizing as follows:

	Normal Reproduction Cost Basis	Reproduction Cost at 1922 Prices
Total cost, new.....	$12,051,260	$16,997,710
Total cost less depreciation.....	7,215,229	9,356,454

The company has been operating under an 8-cent fare with a 7½-cent ticket fare since March, 1921, under order of the Federal court, and the city is endeavoring to have this fare reduced to 6 cents, which the company contends will be confiscatory.

Arguments by attorneys for the company and the city will be heard on Oct. 8 by the master.

Auction Sales in New York.—At the public auction rooms there were no sales of electric railway securities this week.

Receivership Application Dismissed.—Vice-Chancellor Backes has dismissed the application of William Harris for a receivership for the Public Service Railway, Newark, N. J.

Authorizes Preferred Stock Issue.—The West Penn Company has authorized an issue of $50,000,000 of 7 per cent cumulative preferred stock and has afforded holders of its 6 per cent preferred stock an opportunity to convert share for share into the new 7 per cent preferred stock. This privilege has also been extended to preferred holders of the West Penn Railways.

Reports Surplus. — For the twelve months ended Aug. 31, 1923, the North American Company, including subsidiaries, reports a surplus of $13,701,719, after taxes, interest and preferred dividends, but before consideration of depreciation, which was equal to $5.65 a share on 2,426,464 shares of common stock.

Another Move Against "L" Consolidation.—The preferred stockholders of the Chicago Elevated Railways have filed a petition with Judge Hugo M. Friend in the United States District Court asking for a temporary injunction to restrain company from selling $14,000,000 stock certificates. Argument on the petition will be heard on Oct. 9.

Authorizes Trust Certificates. — The San Diego Electric Railway has been authorized by the California Railroad Commission to issue $712,000 of 6 per cent equipment trust certificates and to execute a mortgage as security for the payment thereof. The equipment to be purchased with the proceeds of this issue includes fifty double-end, double-truck, four-motor electric street cars and ten Fageol coaches, costing $950,000. The order for the cars was placed some months ago and was referred to in the ELECTRIC RAILWAY JOURNAL, issue of April 21, 1923.

Funding Bonds Offered.—Hill, Joiner & Company, Payne, Weber & Company and Halsey, Stuart & Company, Inc., are offering at 97 and interest, to yield about 6¾ per cent, $1,150,000 of first lien and refunding mortgage 6½ per cent gold bonds of the Eastern Wisconsin Electric Company, Oshkosh, Wis. The bonds, known as series B, are dated Sept. 1, 1923, and are due Sept. 1, 1948. The proceeds will be used towards the retirement of underlying bonds amounting to $1,182,000 of the Eastern Wisconsin Railway & Light Company's first mortgage 5s. due Oct. 1, 1923.

No Revision in Exchange Plan.—In a recent letter sent to the shareholders of the Quebec Railway, Julian C. Smith, president of the Quebec Power Company, states that the holders of the Quebec Railway, Light, Heat & Power Company need expect no change in the basis of exchange for shares of the Quebec Power Company when their concern is taken in. He says that the management of the Quebec Power spent many months in study and examination with a large staff of experts in order to arrive at a proper value for the income bonds and shares of the Quebec Railway and that nothing has developed since which would in any way modify the conclusions arrived at. He therefore advises the shareholders that the management of the Quebec Power will make no change in the offer which was contained in its letter of July 26, 1923. The financial conditions under which the companies are to merge have been outlined previously in ELECTRIC RAILWAY JOURNAL.

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Traffic and Transportation

Mr. Dalrymple in Chicago

Interesting Side Light by Glasgow Manager on British and American Methods

James Dalrymple, general manager of the Glasgow Municipal Tramways, who was brought to Chicago by ex-Mayor Edward F. Dunn in 1905 to give his opinion of municipal ownership of the street car lines, has been in Chicago for the past two or three days inspecting the surface lines and conferring with the Mayor. The corporation of Glasgow sent Mr. Dalrymple to America and Canada this time to collect ideas, information and data of benefit to its tramways.

Mr. Dalrymple has visited Montreal, Vancouver, Seattle, San Francisco and Los Angeles and will inspect the Detroit municipally operated street cars on his travels from Chicago to the East. He plans to attend the American Electric Railway Association convention in Atlantic City.

It will be remembered that Mr. Dalrymple was very much opposed to municipal ownership for Chicago eighteen years ago, giving as his reason that politics would interfere too much with such operation. The Glasgow manager did not express himself at this time relative to whether or not he thinks Chicago is now ripe for municipal ownership. He gave some very interesting statistics on the Glasgow Tramways which make it possible to arrive at some comparison between his property and properties here in the United States on which municipal ownership is advocated.

Average Haul 1.9 Miles

Operating 209 miles of single track in the city of Glasgow, the average fare is 2.58 cents, and the cost of operation per passenger 1.8 cents. In the fiscal year of 1922 296 rides were made per capita, while the passengers per car-mile were 15.5. Some idea of the size of the property may be gained from a comparison of the average haul per passenger, amounting to 1.9 miles in Glasgow, against 4.16 miles on the surface lines in Chicago and 6.95 miles on the elevated of Chicago. The Chicago Surface Lines give a ride of 35 miles for a 7-cent fare as compared with a 6.84 mile haul for a corresponding 7-cent fare in Glasgow.

A zoning system of fares introduces rather a complicated system of fare collection necessitating the conductor or collector making a continual trip among the passengers collecting the zone ticket, as a zone limit is reached. This difficulty is partially overcome by the fact that the capacity of all the cars in Glasgow is limited to six standees. Mr. Dalrymple said that with the American methods of fare collection the conductor did not come in contact with the passenger often enough.

Eighty-four per cent of the people in Glasgow, which means 84 per cent of the 417,000,000 passengers hauled a year, pay 3 cents or less per ride, and due to this low fare and the fact that the residence district is located very near the central manufacturing or business district, the noon peak load is as heavy as the morning or evening peak. This can be easily accounted for when it is realized that the Glasgow Tramways serve 30 square miles as compared with 200 square miles of the Chicago Surface Lines. Three thousand seven hundred trainmen are employed to serve the double-deck cars. Their wages average $16 per week. The average wage of the 5,600 trainmen in the transportation department of the surface lines is $34 a week.

New Fare Plan in East Liverpool Will Effect Time Saving

A new system of fare collection will shortly become effective on the Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, between Wellsville and Midland. If the plan proves satisfactory, it will be introduced on other local lines as well as the Steubenville-Beaver Interurban system.

Under the new scheme, as devised by Superintendent of Transportation M. T Montgomery, passengers, instead of depositing money in the fare box, upon entering the car, or paying upon leaving the car, will purchase tickets from the motorman. By indicating their destination, they will receive a ticket on which is stamped the amount of fare which they have paid. This ticket is held by the passenger until he leaves the car, and then will be deposited in the fare box. The motorman will know whether the passenger is leaving the car in the zone to which his fare has been paid by the color of the ticket. Ten sets of tickets will be used on the main line and will be arranged in front of the conductor, so they can be readily detached as the passenger enters the car. The register will return the correct change to the passenger, which will save time which is usually required in sorting the change from the fare box. Special provision is made for student tickets, which will be good for forty-six trips per month and will be sold from and to all points on its lines at the rate of 1½ cents per mile or fractional part thereof.

While a receipt system has been in effect on the interurban system, the plan, as worked out by Superintendent Montgomery, is practically new on the city lines. The system is patented and will be put into effect just as soon as the tickets can be printed and holders provided.

Omaha Fares Unchanged

Commission Decides Seven-Cent Fare Shall Continue for an Indefinite Period

Citizens of Omaha who make use of street cars need expect neither a reduction nor an increase in carfare, according to a report issued by the State Railway Commission. Although the commission finds that the Omaha & Council Bluffs Street Railway has failed to earn 7 per cent on a valuation of $13,800,000 set by the commission, it has approved the present schedule of rates for an indefinite future period, "the company indicating its willingness to continue the effort to make present rates meet the necessities."

Opposes Accounting Methods

The statement of the railway commission was in part as follows:

> The company made claim to a value of its physical property and working capital in amount of $23,301,177, using price levels of 1919 in arriving at the result. It set forth a value of $19,915,254 for its physical property, using average prices of 1916 to 1919. It claimed a value, after allowing depreciation, of $21,466,772 for its physical properties and laid claim to additional intangible value of $1,825,000, making total valuation of $23,291,772, on which it was alleged it was entitled to a fair return.
>
> The commission's engineering department found that the fair cost of the properties to the company, plus necessary working capital, had been $11,317,618, and that the fair experienced cost of the company, depreciated to meet the present condition of the plant, was $8,600,000. The commission's engineer testified that his figure did not represent fair value because he had not added to it anything for increased price level or for intangible elements recognized by the courts. He left those facts for the commission to consider.

The opinion also criticises the method by which the company has kept track of the changes in its property in the last twenty years. The company is notified that it will soon be called upon to amend its accounting practices in certain unnamed respects.

The commission also finds that at the time of the reorganization of the Omaha & Council Bluffs Street Railway in 1889 securities were issued which did not represent property brought into the consolidation or payments of cash for the securities. The commission holds there is no warrant for the assumptions of the company that the property was worth the sum of the bonds and preferred stock at the beginning of 1903.

R. A. Leussler, vice-president and general manager of the railway, said:

> I am very much disappointed in the decision. The company clearly showed the value of its property to be much more than the figure found. The commission found the company entitled in the last three years to approximately $1,000,000 in return more than it earned. The company attempted, from its books, to show that the experienced cost of constructing the plant had been not far from $21,000,000. Elaborate exhibits were presented to prove the point. The commission rejected the evidence as entirely unfounded.

The final step in the evolution of the financial history of the railway came in 1902, when there was a further reorganization and the injection of eastern capital. All the properties west of the river were owned by the Omaha Street Railway and came into the new reorganization which brought in also a long time lease of the properties in Council Bluffs, Iowa, and the toll bridge

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across the Missouri River, which was owned by the Council Bluffs corporation. Concerning this financing the commission says:

The Omaha Street Railway came out of the period of reorganization and with bonds somewhere between $1,500,000 and $2,250,000. Most of its property was at the retirement stage due to obsolescence, this property including inadequate horse cars, horse car roadway too light for electric lines, a large number of horses necessarily disposed of when the lines were electrified, and the power plant and cable of the Cable Tramway.

By canceling out the bonds common to the old and new companies we find that the process of reorganization had transformed $5,000,000 of common stock, $4,000,000 of preferred stock, and $4,850,000 of refunding bonds. The properties had gained $1,470,000 in cash and the lease of the Council Bluffs properties. Nothing in the record indicates the price at which the bonds were marketed. If they sold as low as 80 and the Council Bluffs lease were brought in at a value of $1,000,000 to those who had it to offer the common stock in the predecessor company was ultimately represented in the new company by an equal amount of common stock, $60 of preferred stock and $60 in bonds. Efforts to secure an accurate statement of the terms of consolidation failed and the records of the present company's office do not seem to contain the data.

The proceedings, which this finding of the commission is presumed to conclude, began in 1918, with an application on the part of the railway for an increase in fares as an emergency. The commission denied the application on the ground that no emergency existed. An appeal was taken to the Supreme Court of Nebraska, and in July, 1919, the court reversed the commission and ordered it to grant emergency rates to last until the commission had ascertained the value of the company's properties and had made a rate based upon that value and the necessary operating expenses. The commission soon issued orders to increase the fare to 7 cents. The valuation of the properties, the taking of testimony, and the reaching conclusions have covered a period of almost three years.

Corporation Counsel W. C. Lambert, who represented the city, was quoted as follows:

While no reduction in fare has been obtained, a figure has been set by the order, much less than the company claimed as the value of the property which will be of great advantage in all controversies over rates in the future.

The order specifies that as conditions change, the board may make changes on its own motion or through application of interested parties.

Conducts Traffic Survey

In order to improve its service and to be able to take better care of the car needs of a rapidly growing city, the Georgia Railway & Power Company, Atlanta, is conducting an unusual survey of traffic conditions in Atlanta. Uniformed attendants of the company are riding on the street cars and interurban cars with the passengers, asking a series of questions of many hundreds of the company's patrons in order to obtain first-hand information as to what the Atlanta public desires in the way of street car service and improvements. The company plans later to take action in the more important matters thus learned from the public.

City Restrained

A Permanent Injunction Has Been Granted Preventing the City of Youngstown from Interfering with Buses

Judge Lyon at Youngstown, Ohio, has granted a permanent injunction to the jitney association preventing the city from interfering with loading or unloading in Central Square.

The jitneymen say that if a new ordinance is passed and upheld in the Common Pleas Court they will carry the case to the Supreme Court.

In his decision, Judge Lyon pointed out that section three of the ordinance gave the director power to make regulations under authority given him by section two. This, Judge Lyon said, was evidently a mistake, as section two only defines the boundaries of the congested district. The court is of the opinion that the reference should have been made to section one, which authorizes the director of safety to regulate traffic in the congested area. Without authority to enforce regulations by the director, the ordinance is worthless, the court held.

Court Rebukes Council

Judge Lyon took occasion to score City Council for its action in attempting to give such wide authority to an administrative officer. He said that all decisions from the Supreme Court have been against such practice. He called attention to the fact that the director of safety was authorized to make regulations that should properly have been a part of Council's duty.

In passing on the case, Judge Lyon said if it had not been for the mistake in drawing the ordinance, he would have had to uphold it, much as he would have disliked to do so, as Toledo passed a similar ordinance some time ago and it was upheld by the courts, and this decision would have been binding on the court in the present case.

The suit was brought by John Hogan in behalf of the jitney operators following the issuing of an order by Safety Director Hamilton, barring jitneys from the congested district. This order was issued on authority of an ordinance passed by Council in July.

The order applied to buses of the Pennsylvania-Ohio Electric Company as well as jitneys and the traction company had worked out a plan for loading buses just outside the congested district boundaries. This plan, however, did not have to be put into effect when the temporary injunction was granted.

The attack on the order by Hamilton was based on the ground that Council had no right to pass an ordinance depriving jitney owners of the right to use the streets. The arrest of Hogan for loading his jitney in Central Square, which brought about the test case, was also attacked on the ground that it was based on the wrong law.

The city, on the other hand, defended its position on the ground that a previous ordinance had barred jitneys from Central Square and they had been allowed to go back only by tacit agreement to ignore the law; hence the new order was not taking away any rights that the jitney owners legally possessed, the city contended.

While the case was before the court, the new state law, placing jitneys under regulation by the Public Utilities Commission, went into effect. Jitney association officials say this takes away from the city all power to regulate the buses and another lawsuit to test this point is expected.

Denies Fare Increase.—The Illinois Commerce Commission dismissed a petition of the Chicago Elevated Railway asking for a reduction in fares to Evanston, Wilmette, Oak Park and other suburbs. Commuters, temporarily at least, will pay the prevailing rates.

Extends One-Man Car Service.—The Worcester Consolidated Street Railway is making extensive additions of one-man cars to its lines, both city and suburban. Seven have been put into service on city lines which have never had that type of car before. One-man car service had also been started between Worcester and Leominster, a line of 20 miles.

Approves New Rates.—The Public Service Commission has approved a tariff providing numerous changes in local passenger rates applying between all stations on the New York state lines of the Olean, Bradford & Salamanca Railway, effective Oct. 8. In general, increases are made in interurban fares (fare basis increased from 4 cents to 4.5 cents per mile), commutation fares, baggage charges and special car rates. Present mileage book rates are canceled. Provision is made for the sale of monthly school tickets (forty-six single trips) at one-half the regular one-way fare.

Decision Postponed.—The New York Transit Commission recently announced that it had postponed its decision until October, 1924, although it was favorably inclined to change the Thirty-third Street station on the east side subway of the Interborough Rapid Transit from a local to an express stop. The commission says that it has in view the existing financial condition both of the city and of the Interborough Rapid Transit Company. It is estimated that the cost of the work would be from $1,250,000 to $1,500,000, which would be exclusive of the cost of acquisition of any real estate or easements that might be required.

Express Service Planned.—Negotiations have been completed whereby competitive railway express service will be re-established in Indianapolis and in points south of Indianapolis to Louisville. This announcement was made by Bert Weedon, traffic manager of the Interstate Public Service Company, operating a traction line between Indianapolis and Louisville. Mr. Weedon, for the interurban company, and J. E. Skaggs of Atlanta, Ga., representing the Southeastern Express Company, signed a contract for the service on the

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Interstate line. The company soon will establish in Indianapolis a motor pickup and delivery service and will operate station service at other points south of Indianapolis. Through express trains are to be scheduled, serving both Indianapolis and Louisville, these trains making connections with trains for points south over the Southern railway system.

No Accident Record Rewarded. — Accidents on the line of the Groton & Stonington Traction Company and the Shore Line Electric Railway have practically all been minor ones during the past six months. This fact was brought out by Superintendent O'Brien, who gave a brief discourse on accident prevention at a recent meeting of employees and officials of the properties in Mystic, Conn. Gold pieces were awarded to the trolley employees who had no accidents or who had been exonerated from accidents, as well as having a clean record for courtesy and punctuality. D. C. Peck, manager and R. W. Perkins, president and receiver, spoke on accident prevention and complimented the men in minimizing the number of mishaps on the road. James Hammond of the New London Chamber of Commerce gave an interesting talk on the trolley situation from the point of view of an outsider.

Legal Notes

CALIFORNIA—*Care Required in Crossing Tracks of Electric Railway.*

As much care is required of a person crossing the tracks of an electric railway upon a private right-of-way in the open country as is required of a person crossing the tracks of a steam railway. [New York Lubricating Oil Company vs. United Railroads of San Francisco, 215 Pacific Rep. 72.]

FEDERAL COURTS—*Payment for Transportation by Railway Operated by the State Held Not for Services Rendered to State.*

Payments by a railway company which was being operated by agents of the state, but not owned by the state, for coal transported by the company, which came from the operating revenues of the corporation and not from the state funds, though they might later appear in a deficit which the state agreed to make good, are not payments by the state within the exception from the 3 per cent internal revenue tax on payments for transportation by water consigned from one point in the United States to another. [Case of Boston Elevated Railway, 288 Federal Rep. 864.]

FEDERAL COURTS — *Confiscatory Rate Valid if by Contract — Order of Commission on Seating Capacity.*

When a contract between a municipality and an electric railway company fixing rates is valid, the Supreme Court is not concerned with the question whether the stipulated rates are confiscatory.

Where a contract between a town and an electric railroad company prescribed the rate of fare chargeable between such town and a city, a statute construed as making such rates applicable in territory thereafter annexed to the town impaired the obligation of the contract by adding to its burdens.

An order of a state railroad commission, directing an electric railroad company to provide additional seating capacity on some lines and trailers on a line on which rates were fixed by contract with a municipality, was not beyond its power to require adequate service, where there was nothing in the contract in conflict therewith. [Georgia Railway & Power Company et al. vs. Town of Decatur, 43 Supreme Court Rep. 613.]

FEDERAL COURTS — *Annexed Territory —Order to Issue Transfers—Contract Fixing Fare Applies in Either Direction.*

Where contract between a municipality and an electric railway company fixed the fare chargeable between the municipality and another city, the application of such fare to territory afterwards annexed to the municipality impaired the obligation of the contract.

Where a contract between a city and an electric railway company, fixing the fare chargeable between such city and another city, contained no provision on the subject of transfers, an order of the railroad commission requiring the issuance of free transfers was erroneous.

A contract between the city of C. and an electric railway company limiting the fare chargeable from C. to A. to 5 cents, required passengers to be carried in either direction between C. and A. at the stipulated rate, especially where this construction agreed with the practice followed for many years. [Georgia Railway & Power Company et al. vs. Mayor and Council of City of College Park, 43 Supreme Court Rep. 617.]

MICHIGAN — *Duty of Motorman to Know that Passengers Are Safely on Board Before Starting Car.*

Where a car had stopped, not to permit boarding or alighting of passengers, but to permit the conductor to replace the trolley, and plaintiff in accordance with custom attempted to board the car at that place, and did succeed in gaining entrance to the steps, from which he fell, held, that it was the duty of conductor, before signaling to proceed, to ascertain that all passengers were safely on board; "on board" meaning within the closed doors. A passenger standing on the steps cannot be said to have voluntarily remained there, so as assume the risk of injury from maintaining that position, if he could not have reached a position on the platform or in the car, without pushing or shoving through passengers who had crowded the only other available standing places. [Morris vs. Detroit United Railway, 193 Northwest Rep. 871.]

MINNESOTA—*Purchaser of Electric Line Subject to Contract Prohibition Against Use of Steam Power.*

Where a municipal corporation and an electric traction company have agreed upon the terms by which streets may be crossed by an electric railway, and the use of steam as a motive power is prohibited by such contract, a purchaser of the electric traction company's line takes it subject to such prohibition. But such a contract does not limit the power of the purchasing company, if it has such power, to acquire by condemnation the right to use the street crossings for a steam railway. [St. Louis Park vs. Minneapolis, Northfield & Southern Railway, 194 Northwest Rep. 327.]

MINNESOTA—*"Right" Defined as Used in Statute Regulating Traffic.*

The word "right" in Gen. St. Supp. 1917, sec. 2552, subd. 2, providing that at street intersections the driver of a vehicle shall give the right of way to any vehicle approaching from his "right," means the right of the vehicle in the direction in which it is approaching the intersection, and not the right hand of the driver if he is backing. [St. Clair vs. Duluth Street Railway, Northwest Rep. 690.]

OKLAHOMA — *Company Liable for Injuries to Livestock by Failure to Fence.*

Failure of a railway company to maintain a right-of-way fence, as required by sections 1435-1438, inclusive, Rev. Laws Okl. 1910, constitutes negligence, and such company is liable for injuries to livestock resulting therefrom. [Muskogee Electric Traction Co. vs. Minugh, 215 Pacific Rep. 747.]

TEXAS—*Instruction in Personal Injury Case Precluding a Verdict for Defendant, Though Plaintiff's Negligence Was Sole Proximate Cause, Held Erroneous.*

In an action for personal injuries sustained by plaintiff while riding in an automobile when struck by defendant's street car, the giving of an instruction that the jury could not find for defendant even though negligence of the automobile driver was the sole proximate cause of the injury, if they found that defendant was "guilty of negligence in any respect" held reversible error. Such a charge precluded the company from having its defense as to the proximate cause of the injury presented clearly and untrammeled by other matters to the jury, as it had a right to have done. [Texas Electric Railways vs. Sikes et al., 251 Southwest Rep. 589.]

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Personal Items

J. H. Aitken Leaves Schenectady Railway

J. H. Aitken, secretary, treasurer and purchasing agent of the Schenectady Railway, will resign on Nov. 1 after twenty-one years' service.

Mr. Aitken became purchasing agent of the Schenectady Railway in 1902, when the General Electric Company took over the ownership and management of the lines. In 1905, when the General Electric Company sold the road to the New York Central and Delaware & Hudson companies, the present owners, Mr. Aitken succeeded James O. Carr as secretary and treasurer. He retained his purchasing agent duties and since 1905 has served the company in all three capacities.

It is said that Mr. Aitken wished to resign months ago, but that the company officers prevailed upon him to remain for the time being. Conforming to this desire Mr. Aitken withheld his resignation until the Sept. 26 meeting of the board of directors in New York, when it was received and accepted. Mr. Aitken said he would rest and travel for some months before entering upon some new business undertakings.

No announcement has been made of Mr. Aitken's successor.

Hamilton Baluss Retires from Railway Field

Hamilton Baluss, general manager of the Susquehanna Traction Company, Lock Haven, Pa., resigned that position on Oct. 1 to take an extended vacation. Mr. Baluss has been a prominent figure in the railway field since 1898, when he entered the employ of the Detroit, Ypsilanti & Ann Arbor Electric Railway. He left that company to go with the Van Dorn & Dutton Electric Company, Cleveland. Later he became identified with the Grand Rapids, Holland & Chicago Electric Railway, and following that he was employed by the Chicago & Joliet Electric Railway. He resigned his position with the last-named property to become general manager of the Marquette, City & Presque Isle Electric Railway of Marquette, Mich.

Following this appointment, Mr. Baluss went to the property he is now with, as general manager. He later became general superintendent of the Cincinnati, Georgetown & Portsmouth Railroad of Cincinnati and left there to become general manager of the Westchester, Kennett & Wilmington Electric Railway of Kennett Square, with which he was connected for nearly twelve years. When the war broke out Mr. Baluss wanted to get "in" and accordingly became chief army inspector of the Philadelphia district of the United States Ordnance Department. He retained this position until Jan. 15 following the armistice, but when things became normal again Mr. Baluss thought that his best work was done in the railway field, so he went back to his old work as general manager of the Susquehanna Traction Company. He has kept that position up to the present time. Mr. Baluss was graduated from the Detroit High School and took up the study of law.

New Youngstown Manager

C. S. MacCalla, Recently Appointed, Has Entered Fully Upon His Duties

C. S. MacCalla has entered actively upon his duties as vice-president and general manager of the Pennsylvania-Ohio Electric Company and the Youngstown Municipal Railway and other subsidiaries of the Pennsylvania-Ohio System operating city railway lines in and interurban lines between Youngstown and Warren, Ohio, and Sharon and New Castle, Pa.

C. S. MacCalla

Mr. MacCalla brings to his new field of activity a wide and varied experience in public utility operation, both in the railway and in the light and power divisions of the electrical industry. He was born in Wallingford, Pa., in 1876. Immediately upon leaving Lehigh University, where he was graduated in 1896, Mr. MacCalla began his work with public utilities, spending brief periods in the installation department of the Philadelphia Bell Telephone Company and as a "trouble shooter" for the Edison Electric Light Company, Philadelphia, now the Philadelphia Electric Company. Then followed four years with the Edison Electric Illuminating Company of Brooklyn (Brooklyn Edison Company) successively as draftsman, construction boss and general construction foreman.

As indicated in the ELECTRIC RAILWAY JOURNAL for Sept. 8 at the time of the announcement of Mr. MacCalla's appointment to the properties at Youngstown, his active electric railway experience began in 1901 when Mr. MacCalla joined the foreign department of the General Electric Company as principal assistant engineer in charge of the installation and initial operation of the Sydney, Australia, tramways system for the New South Wales government, the work including the installation of the steam-electric generating plant, substations and railway equipment, the system being the then largest three-phase plant south of the equator.

In 1903 Mr. MacCalla went to the Pacific Coast, where he was identified with the Washington Water Power Company, Spokane, Wash., for fifteen years, successively as assistant to the general manager, assistant general manager, general manager and vice-president and general manager, continuing in the last named position for five years, and having full charge of operations, both power and railway, in Spokane and some thirty-odd smaller cities and towns within a radius of 100 miles. He equipped the Spokane city railways with one-man Birney safety cars, the installation being the first in any city of more than 100,000 population. Returning to the east, Mr. MacCalla was elected vice-president and general manager of the Virginian Power Company, Charleston, W. Va.

General Tripp Going to Japan

General Guy E. Tripp, chairman of the board of the Westinghouse Electric & Manufacturing Company, and Loyall A. Osborne, president of the Westinghouse International Company, left New York for Japan on Oct. 4. They will sail from San Francisco on Oct. 10 and expect to visit Shanghai, Hongkong, Peking and the Philippines before returning home.

C. L. Harris has succeeded M. B. Gouty as chief engineer of the power station of the Indiana Service Corporation.

H. L. Hawkins, engineer of maintenance of way of the Seattle & Rainier Valley Railway, is in addition fulfilling the duties of master mechanic.

Paul R. Goldey has succeeded M. T. Montgomery as superintendent, claim agent and purchasing agent of the Atlantic & Suburban Railway, Pleasantville, N. J.

John T. Harrington, who has been vice-president and general counsel of the Pennsylvania-Ohio Power & Light Company, Youngstown, Ohio, has been elected president of that company. Mr. Harrington will continue as general counsel of the company.

Carl E. Keefer, machinist in the Altoona and Tyrone electric plants of the Altoona & Logan Valley Electric Railway, was appointed master mechanic effective on Aug. 15, succeeding Robert Long. Mr. Long resigned to take a position as test engineer of the Texas Oil Company, with headquarters in Columbus, Ohio.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Orders Continue at High Level

A compilation of orders for new passenger cars placed during the first six months of 1923 was shown in several tables in the issue of Sept. 29. The number of cars ordered during this half-year period is slightly greater than one-half the total number of passenger cars ordered during the entire year of 1922. This augurs well for the car building industry and also shows that the high buying levels of 1916 and 1920 are being reached or exceeded.

The outstanding fact shown by these tables is the large number of one-man two-man double-truck cars which are being ordered. There were a total of 1,011 of these reported for city service and thirty-six for interurban service. Buying of single-truck one-man cars of the 28-ft. body type still continues, particularly on small electric railway properties, but the total number of these ordered is very much less than for preceding years. There were a total of 147 of this type ordered during the first six months of 1923 as compared with a total of 762 for the entire year of 1922.

The largest individual orders placed were for 520 one-man two-man cars for the Philadelphia Rapid Transit Company, and 200 of a similar type for the Brooklyn City Railroad. Both of these companies ordered cars with front entrance and center exit doors arranged for pay-as-you-pass fare collection. Of the cars ordered by the Philadelphia Rapid Transit Company, 135 are of the double-end type with end doors only.

In the tabulation of passenger cars ordered by individual companies the railways in each state were alphabetically arranged and the various states were grouped into four districts, in a manner similar to that followed in the Annual Statistical Number of the JOURNAL for previous years. As was to be expected the district north of the Ohio River and east of the Mississippi River purchased the greatest number of cars.

Predicts Good Electrical Future Abroad

In the opinion of A. W. Burchard, vice-chairman of the General Electric Company and president of the International General Electric Company, the future of the electrical industry in Europe is promising. Mr. Burchard has just returned from a two-months' trip after visiting foreign affiliated companies in England, Spain, France, Belgium and Holland.

After looking things over abroad, Mr. Burchard estimates the business of the International General Electric Company will amount to about $21,000,000 this year. Bookings of the General Electric Company since the first of July amount to between $5,000,000 and $6,000,000 weekly, with cash on hand about the same as it was at the first of the year—about $86,000,000.

Comparing the situation today with what it was a year ago, Mr. Burchard says that the business in the company's factories abroad is better, particularly in France and Italy. He said the Italian factories were running at capacity and that in England the British Thomson-Houston Company, the affiliated foreign company, was employing more men on its payrolls than ever before and was running at capacity. He said that the electrical industry in England, regarding unemployment, was in very good shape and that there was nothing like as much unemployment as there was in other lines such as the textile industry.

The Compagnie Française Thomson-Houston, the affiliated French company, had secured a contract for the electrification of the Paris-Orleans Railroad, amounting to about 100,000,000 francs, and Mr. Burchard said that about 25 per cent of this order will be manufactured in America by the General Electric Company.

Another Brazilian Electrification

A contract for the electrification of the Campos do Jordao Railway, in Brazil, has been awarded to the English Electric Company by the government of São Paulo, according to the London *Engineer*. This contract covers the electrification of an existing meter-gage railway and includes the supply and erection of about 30 miles of overhead catenary construction, on the 1,500-volt d.c. system, and from 15 miles of 30,000-volt 3-phase transmission line. The contract also includes the building and equipment of a substation, as well as motor coaches for passenger and goods service. The 30,000-volt, 50-cycle supply current will be transformed down to 2,000 volts at the substation, where a 500-kw. synchronous motor-generator set will convert it into direct current at 1,500 volts.

The coaches are to seat forty passengers each and the goods wagons are to be of the covered type and are to carry 10 tons. Electrical equipment of each type of motor coach will comprise four self-ventilated traction motors, each wound for 750 volts. The motors are connected two in series and the two pairs in series parallel.

The electrification of this line is of particular interest by reason of the fact that one-third of the total route length is level, the remainder, consisting of some 8 miles of track, having gradients which vary from 6 per cent to 10.5 per cent. In view of this, the motor coaches are to be equipped with four different braking systems, viz.: hand, air, rheostatic and electromagnetic track brakes, of which the last named is intended for use in emergencies only.

ELECTRIC RAILWAY MATERIAL PRICES—OCT. 2, 1923

Metals—New York

Copper, electrolytic, cents per lb.	13.25
Lead, cents per lb.	6.875
Nickel, cents per lb.	29.50
Zinc, cents per lb.	6.65
Tin Straits, cents per lb.	41.875
Aluminum, 98 to 99 per cent, cents per lb.	25.20
Babbitt metal, warehouse, cents per lb.:	
Fair grade	52.00
Commercial	25.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$4.825
Somerset mine run, Boston	2.375
Pittsburgh mine run, Pittsburgh	2.05
Franklin, Ill., screenings, Chicago	1.30
Central, Ill., screenings, Chicago	0.95
Kansas screenings, Kansas City	2.625

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	3.15
Tie plates (flat type), cents per lb.	2.575
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.125
Steel bars, cents per lb.	2.40
Ties, white oak, Chicago, 6 in.x8 in.x8½ ft.	$1.50

Hardware—Pittsburgh

Wire nails, base per keg	3.00
Sheet iron (28 gage), cents per lb.	3.75
Sheet iron, galvanized (28 gage), cents per lb.	5.00
Galvanized barbed wire, cents per lb.	3.80
Galvanized wire, ordinary, cents per lb.	3.35

Waste—New York

Waste, wool, cents per lb.	12–16
Waste, cotton (100 lb. bale), cents per lb.:	
White	11–13.50
Colored	8–13

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal.	$0.97
White lead (100 lb. keg), cents per lb.	11.375
Turpentine (bbl. lots), per gal.	$0.98
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4.75

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	16.00
Rubber-covered wire, No. 14, per 1,000 ft.	$6.60
Weatherproof wire base, cents per lb.	18.00

Paving Materials

Paving stone, granite, 4x8x4, f.o.b. Chicago, dressed, per sq.yd.	$3.50
Common, per sq.yd.	3.10
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.79
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	54.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.75
Cement, Chicago consumers net prices, without bags	2.20
Gravel, ¾-in., cu.yd., f. o. b. N. Y.	1.75
Sand, cu.yd., N. Y.	1.25

Old Metals—New York

Heavy copper, cents per lb.	10.75
Light copper, cents per lb.	9.75
Heavy brass, cents per lb.	5.75
Zinc, old scrap, cents per lb.	4.25
Yellow brass, cents per lb. (heavy)	6.00
Lead, heavy, cents per lb.	5.75
Steel car axles, Chicago, net ton	$17.75
Old car wheels, Chicago, gross ton	19.25
Rails (short), Chicago, gross ton	19.25
Rails, (relaying), Chicago, gross ton	33.50
Machine turnings, Chicago, net ton	8.25

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Rolling Stock

Kansas City Railways wants to remodel eighty-five of the "600" type of cars so that they can be used as one-man or two-man cars. The cost of remodeling these is estimated at $38,165.

Saginaw Transit Company has placed orders for fifteen Reo and ten White motor buses. The cost of this equipment is $122,000 and first deliveries will be received by Nov. 1.

Illinois Traction, Inc., Illinois Valley Division, formerly the Chicago, Ottawa & Peoria Railway, is considering the inauguration of service with light-weight one-man cars in place of its present heavy two-man cars.

Trenton & Mercer County Traction Corporation, Trenton, N. J., has been given permission to destroy two single-truck cars and charge the sum of $6,200 to the company's depreciation fund. The two cars destroyed were a line and an emergency car, which had been replaced by double-truck cars for the same service. The new cars cost $7,500 each.

Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis., has purchased nine cars which have been used on the lines of the Milwaukee Electric Railway & Light Company but have been rebuilt. The purchase includes six forty-six-passenger interurban cars weighing 24 tons each equipped with four 70-hp. motors. The other three cars are of the city one-man, p.a.y.e. type.

Cumberland County Power & Light Company, Portland, Me., received delivery last month of six cars, the order for which was placed in April of this year. The specifications of these cars follow:

Builder of car body	Wason
Type of car	D. T. one-man or two men
Seating capacity	Forty-six
Total weight	31,000 lb.
Length over all	40 ft. 3 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 2¾ in.
Height, rail to trolley base	10 ft. 1⅛ in.
Body	Steel
Interior trim	Mahogany
Headlining	None
Roof	Arch
Air brakes	G.E.
Axles	Brill
Bumpers	Brill
Car signal system	Consolidated
Center and side bearings	Brill
Control	K-35 J.J. G.E.
Couplers	Brill
Curtain fixtures	Brill
Destination signs	Hunter
Door-operating mechanism	National Pneumatic
Gears and pinions	General Electric
Hand brakes	Brill
Heater equipment	Consolidated
Headlights	Golden Glow
Journal boxes	Brill
Lightning arresters	General Electric
Motors, type and number	G.E. 24 7B-4
Motors	Inside hung
Enamel	Sherman Williams
Registers	International
Sanders	O.B.
Sash fixtures	Mahogany
Seats	Brill Waylo
Seating material	Wood
Springs	Brill
Step treads	Brill
Trolley catchers or retrievers	Keystone
Trolley base	V.S. 13
Trucks	Brill 77 E 1
Ventilators	Brill
Wheels	Steel—26 in.
Special devices	Full safety equipment and selective valve

Bryan-College Traction Company, Bryan, Tex., has purchased three large motor buses.

Lackawanna & Wyoming Valley Railroad, Scranton, Pa., has purchased four new passenger cars for service between Wilkes-Barre and Scranton. The total cost is $115,000 and the cars are to go into service on or before April 1, 1924.

Indiana Service Corporation, Fort Wayne, has placed orders with the Differential Steel Car Company of Findlay, Ohio, for six Differential door-chute trail cars of 60,000 lb. capacity, of the following specifications:

Tilting body made of ½-in. steel plate, reinforced; body divided into three compartments, each of which is to be 8 ft. 1 in. long at the floor; two center partitions to extend to top of sideboards, with end sheets rounded and with center section 14 in. above the sideboards; each compartment equipped with two doors, one at each side, hinged at top to permit of dropping; body 19½ in. from floor to top of sideboards, 7 ft. 6 in. wide and 27 ft. 1 in. long; equipped with electric dumping motor of 5 hp. capacity; M.C.B. trucks, 50 ton, and M.C.B. radial couplers; 33 in. wheels; car is 40 ft. 6 in. over end sills, 8 ft. 2 in. maximum width and about 6 ft. 6 in. from rail to top of sideboards when on 33 in. wheels; equipped with air and hand brakes. Tilting body is so arranged that it can be moved from central position about 24 in. to either side and revolved through an angle of 45 deg. and automatically stopped when it reaches this discharge angle; time required for this operation, including return of body to central position, is about one minute and is effected by one man moving a controller handle in the direction the car body is to be tilted; dumping controller fitted with automatic cut-off so that body will stop when it reaches the discharge angle of 45 deg.; controller lever located on platform of car.

The company has also ordered four Differential bottom dump ballast-spreading cars of 60,000 lb. capacity, equipped with M.C.B. trucks and M.C.B. couplers. Some specifications of these cars follow:

Both air and hand brakes; center dump doors may be operated by means of worm gear, or may be opened and closed by means of hand wheels on end platforms or at the sides of the car; doors divided into three parts, each one of which can be kept closed and the others opened for discharging material; doors built of steel plate and may be used to spread ballast as it is dumped.

Track and Line

Wisconsin Railway, Light & Power Company, La Crosse, Wis., has completed its double-track system on Main Street.

Kansas City Railways has made application to Judge Stone of the Federal court to spend $277,167 on improvements. Among the projects listed is the rebuilding of several lines.

Southern New York Power & Railway Corporation, Oneonta, N. Y., has made application to the Public Service Commission for permission to construct and operate over tracks in Chestnut Street between Main and Market Streets in Oneonta under a franchise granted by the city.

San Francisco, Cal. — Construction work on the Embarcadero subway under the Ferry Street car loop will begin within the next few months. The cost of the project, which is estimated at $425,000, will be divided among the Harbor Commission, the city and the two railway systems, viz., the Municipal Railways of San Francisco and the Market Street Railway.

Ohio Valley Electric Railway, Huntington, W. Va., will relay its line on a concrete base, and the city will repair depressions in the pavement. The relaying is caused by the removal of the Twentieth Street viaduct in Huntington to the center of the driveway. This was decided upon after an inspection made jointly by the company officials and city commissioners.

Trade Notes

Westinghouse Traction Brake Company, Wilmerding, Pa., has announced the appointment of John B. Wright as assistant to the vice-president, with headquarters at the general offices in Wilmerding, Pa. In addition to this position Mr. Wright will also retain the title of assistant district manager, in charge of the company's commercial activities in the Pittsburgh district, a position which he has held since January, 1920. Mr. Wright has been a member of the Traction Brake organization since 1899.

Elliott Service Company, New York, has announced through James Elliott, president, the development of a service which will make it possible for the electric railway in any city—either alone or in co-operation with other interests and under the auspices of a representative civic organization such as the chamber of commerce—to conduct a carefully organized year-round public safety campaign for less than the cost of one fatal accident. The service includes complete plans for organizing a community wide safety campaign and all of the materials which it is necessary to use in such a campaign. The plan is based on the experience of all of the cities that have conducted successful public safety campaigns within the last five years. The materials will enable any city to carry on a Safety Week to start the permanent campaign; safety instruction in the public schools; a continuous safety poster campaign; a free safety school for commercial drivers, and a permanent educational publicity campaign. C. W. Price, who directed the Public Safety Campaigns in New York City, Washington, Baltimore, Pittsburgh and Louisville, Ky., is now vice-president of the Elliott Service Company, in charge of the Public Safety Division. Where necessary, the campaign will be started under the personal supervision of Mr. Price, Dr. E. George Payne, and Louis Resnick, all of whom have had wide experience in work of this kind. The Elliott Service Company heretofore has confined its safety activities to the development of materials for use in industrial safety campaigns. The complete service of this company on public safety will be shown for the first time at Atlantic City during the convention of the American Electric Railway Association.

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New York, Saturday, October 13, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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HENRY W. BLAKE and HARRY L. BROWN, *Editors*

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Some Aspects of the 1923 Convention

THE convention this week at Atlantic City is one of the greatest the American Eletric Railway Association has held. It establishes a new record both as to registration, the final being 4,347, and as to amount of exhibit space sold, which was 76,276 sq.ft. The exhibits were most interesting and attractive, and the exhibit hall was never before so beautifully decorated. The layout of exhibit space was also favorably commented upon this year.

A feature of the exhibits that was noticeable and much talked about was that 24 per cent of the total space sold was for buses. More than thirty buses were shown, but strangely enough not one railway car (except the Toonerville Trolley, which made quite a hit for one of the exhibitors). On the other hand there was no end of railway equipment and maintenance materials exhibits, but no maintenance equipment for buses. While it is realized that it entails a very high expense to ship a complete car to Atlantic City, nevertheless it seems rather surprising that there should have been a total absence of cars at this convention in view of the very great interest and activity that have been shown in car design and construction during the past year.

The convention meetings were well attended and all arrangements seem to have been perfectly made. The program of the American Association was particularly full and this necessarily limited discussion to a very small amount. However, it is questionable whether substitution of discussion for some of the formal matter would have added value to the proceedings.

There has not been time as yet really to get a perspective of what was mainly accomplished by this convention. It differs from some preceeding conventions in that there seems to be no outstanding theme, though the meetings were certainly constructive and helpful. Apart from the meetings, however, two observations may fairly be made as characterizing the forty-second convention. The manufacturers were made most optimistic by the real buying interest of the railway men, the comment being that heretofore the visits to exhibitors' booths were more a matter of curiosity and handshaking than for the purpose of preparing for purchase. This of course is a very definite reflection of the improvement that has come in financial conditions in the industry.

The other observation in mind is that this convention undoubtedly marks the turning point in the predominent sentiment of the railway men from one of antagonism toward the bus to one of appreciation that it is a new transportation tool which they may well endeavor generally to bring into use in its proper sphere. The desire to quash the bus by fair means or foul has now largely been replaced by the more constructive attitude of studying how best to capitalize on the new vehicle.

What Is a Public Service Commission?

FIVE public service commissioners from as many states addressed the association at the Atlantic City convention. It was to be expected that these commissioners, devoting their time as they do to the study of utility problems, are all consistently in favor of the principles of commission regulation as an improvement over older methods of legislative and court procedure in governing utility operation. Nor was it surprising that, in analyzing the practice of commission regulation, these men should bring forward such varied reasons for lack of perfection that it might have seemed, even to themselves, that they were of different minds fundamentally.

But it is both important and significant that a real analysis of what they said shows that there is one fundamental idea underlying their thinking. This is that there is as yet neither in law nor in the public mind a clear conception of the commission's true function. The very practice, indeed, of some commissions shows this. This situation has been discussed in these columns before (see ELECTRIC RAILWAY JOURNAL, Feb. 11, 1922, page 223), but it should serve a good purpose to call attention to it once more. It is a matter of prime importance to utilities and also to the public.

One commissioner pointed out shortcomings in the law which forced his commission to decide questions on only a part of the considerations. Another commissioner showed how restricted regulation is incompetent to do the greatest good. Another said that the commissions were in many cases made mere magistrate courts for the purpose of making a record for appeal. What they all thought, taken together, means that commissions are still in the formative state. As courts of equity were created by a condition with which the courts of law could not adequately cope, so are commissions now being created by the condition that the public and the utility have learned that legislatures, courts of any kind, city councils, etc., could not adequately handle the character of problem presented by utility-public relations. Courts of equity needed years to grow into the position of respect and usefulness that courts of law previously held, and likewise commissions will take a certain formative period to reach the degree of perfection and respect most necessary for them to perform their functions with full effectiveness.

Commissioner Maloy was fundamentally sound when he urged a return to first principles in analyzing the commission situation. Commissions should not be confused with other institutions and they should not be

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forced into a procedure out of tune with the purpose of their function. Commissions can work most effectively only when they are allowed to consider all the elements of a case confronting them. Commissions will never attain their utmost of usefulness until they have been given the support of all kinds which will encourage men of high caliber, of courage, of knowledge and of ability to accept and retain commissionerships. The fundamental principle of commissions should always be held in view as the goal to aim at. This principle is that a commission should sit as a business administrative body with full consideration of the economic, social and engineering features of the cases confronting it, to decide from the facts presented what is the best move in the interests of the public. Since eventually this procedure is also in the best interest of the utility, utility men can do no more effective work than to lend every effort to the continued upbuilding of commission regulation according to fundamental sound principles. In the end this will produce the greatest stability in utility operation.

Engineering Association Did a Good Job Last Year

THE decision to issue the Engineering Manual in bound form had a stimulating effect upon Engineering Association activities during the past year. The several committees naturally desire to have the book as nearly up to date as possible along their respective lines of work. They have, therefore, delved into almost-forgotten sections of the Manual, revising many, recommending the omission of others, and adding a few. The revision committee, also, has worked faithfully on a thankless task and has done it well. The Manual will seem more authoritative, somehow, in the bound form in which it is to be issued, and it certainly will be less clumsy.

The engineers also made a creditable record in getting the results of their work promptly into the hands of the American Engineering Standards Committee. They were stimulated by the time limit, lately removed, on the acceptability of applications under the abbreviated procedure. It was gratifying that so many standards were ready to be submitted without much revision. Co-operation with other organizations, such as the American Society for Municipal Improvements and the American Society for Testing Materials, also has brought excellent results.

At the Atlantic City convention the purchasing agents and storekeepers held a profitable meeting under the auspices of the Engineering Association. This solves a difficult association problem to the entire satisfaction of the specialists concerned, as is shown by the fact that they want the arrangement continued. This meeting will be reported in next week's issue.

The past year demonstrated the benefits of the sponsor system in committee work. The close co-operation thus maintained with the executive committee resulted in official backing for all worthy projects. The plan should, and presumably will be continued.

There must be something deeply absorbing in engineering to give engineers the incentive and patience to do committee work like that which is done for the Engineering Association so faithfully. It cannot but be a grind to work out specifications item by item. Its only object is to save money for the industry.

Great Committee Activity Shown by Reports

THE great amount of work that has been done by the various committees of the American Electric Railway Association and the affiliated associations has been impressed upon the editors by the work of the last two weeks in abstracting their reports. The reports of the committees have been prepared thoroughly and conscientiously, as the results achieved indicate.

Greater efforts than usual were made by both committees and association staff to get these reports completed and printed ahead of time, with the result that practically all the important reports could be edited and printed with less of the last-minute rush than usually characterizes the pre-convention days. Not only did this assure more careful work, but it permitted those in attendance at the convention to have before them copies dealing with the principal business of the sessions with which they were concerned.

The promptness with which this material was prepared has also been of great assistance to the editors in preparing this report issue. The issue, therefore, contains an extended report of the proceedings of the American, Engineering, and Transportation & Traffic Associations, according to the usual custom. The immense amount of material to be handled necessitates that the report of the Accountants' and Claims Associations be deferred until a later issue.

This paper wants to acknowledge the assistance of the executive secretary of the association and his staff for the splendid spirit of co-operation they have shown in furnishing advance copies of committee reports and papers, which have done much to make possible an early and full presentation of the proceedings of the sessions. Without this assistance it virtually would have been impossible to give as much attention as has been done in this issue to the discussions at the sessions, as otherwise the editors would have had to devote a very much larger portion of their time during the convention to abstracting reports and addresses.

Educational Committee Getting Down to Brass Tacks

AT THE Atlantic City convention educational representatives of member companies and professional educators met with the committee on education of the American Association for a luncheon conference on the subject close to their hearts. The conference lasted throughout the afternoon, so intense was the interest. There was an insistent demand for a definite program for educational work on an electric railway property, and steps in that direction were approved. President Budd, in a brief but factful address, put the association solidly behind the committee's work. He showed how essential is the furnishing of public utility information to employees and told how this is being done on the Chicago Elevated Railways. Mr. Budd practices at home what he preaches abroad. His experience will be helpful to next year's committee.

The machinery for doing a comprehensive piece of educational work in the association has been assembled. By the next convention there should be some tangible results on a number of properties, to be reported at the second annual educational luncheon. There is no subject in which the railway manager is more interested today than in educating his promising employees.

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A.E.R.A. President Sees Industry Going Forward

By C. D. Emmons
President American Electric Railway Association
President United Railways & Electric Company of Baltimore

Bachrach

C. D. Emmons

Biggest Exhibit Bespeaks Live Industry—Public Relations Generally Improved and Essentiality of Railway Service Better Appreciated—Unfair Tax Burdens Need Adjustment—The Use to Which Railways May Put the Bus—Reasons for Opposing Municipal Ownership Stated—President Considers Year One of Progress

THIS is the greatest convention the association has ever held. In the exhibit halls is the largest exhibit of electric railway equipment, materials and supplies that was ever gathered under one roof. There is every indication that this will be the largest attended convention we have ever had, and I am sure that there never was a convention when more important subjects were up for discussion, or when it was more urgent that the closest attention be paid to the addresses and discussion.

The great exhibit and the large attendance here are the best answers one could make to the occasional detractor of the electric railways, who professes to believe that they are "dead." Here are representatives of electric railways that carried approximately 15,000,000,000 passengers in the last calendar year. Here are represented investors who have put more than $5,500,000,000 into electric railway properties to serve the people of this country. Here are representatives of electric railways and manufacturing companies that give employment to 500,000 men and women. Here are represented companies that purchase every year many millions of dollars worth of coal, steel, oil, copper, lumber and an infinite number and vast quantity of manufactured products, and by their purchases make no small contribution to the prosperity of our great nation. Who dares look upon this convention and say that such a tremendous gathering represents a "dead" enterprise? None but one who has his own ends to gain at the expense of truth and fair play would be so rash.

We meet at a time when the electric railway industry is in better condition than at any moment since the World War upset the equilibrium of the country. Much progress has been made since the convention in Chicago a year ago. More will be made in the year to come, for the public has learned that the service the electric railways are rendering is indispensable to its comfort, convenience and prosperity. In some places this knowledge has not come without interruption of service, but wherever service was interrupted, the fault lay not with the railways, which sought nothing but fair treatment.

Taking the country as a whole the public now has a better understanding of the mutuality of interest between the electric railways and the people, and this improved understanding has brought about revisions of rates of fare, partial alleviation of burdensome conditions, movements for protection of established and necessary service from incursions by irresponsible competitors and, in general, has paved the way for further relief from hampering obligations that have reacted against the public good.

Much has been done, but much remains to be done before this industry shall reach its maximum efficiency and be able to give the best service. We are encouraged by what has been accomplished during the last year; we look expectantly toward the year to come, confident that it will bring greater improvements.

Uppermost in the minds of many of you are the problems that have arisen in connection with the increase in the number of automobiles. Some of you have seen your business in sparsely settled districts drop until it has no longer paid the expense of operation. For a time it seemed as if you might have to quit, and so you would, had the public not found that the electric railway is the cheapest, most reliable, most responsible transportation agency.

Interurban roads have suffered not only from unfair, parasitic bus competition, but also because of the great increase in the number of privately owned automobiles, and many an urban railway has had to face the same situation. Nevertheless, it has been proved that the place of the electric railway is secure. Wherever a test has been made, the inevitable conclusion was that business could not prosper, that manufacturers could not conveniently carry on their enterprises, that home building could not expand, that public comfort could not be advanced without the electric railway.

One of the notable demonstrations of these facts was in Saginaw. More than two years ago, because of local political agitation and a popular misconception of the cost of supplying public transportation, Saginaw refused to make a reasonable agreement with the electric railway company, with the result that street car service was suspended. Immediately a flock of jitneys of all descriptions settled in Saginaw and attempted to give service. It was not long before the public discovered that there was a vast difference between the responsible, reliable, safe service given by the electric railway and the unsafe, hit-or-miss service given by the jitneys.

Of course such service was impossible, so Saginaw tried hard for two years to get some reliable person or corporation to install a city-wide bus service on the same basis as electric railways provide service—putting up the money themselves—but no satisfactory arrangement could be made with anybody. There were unreliable propositions by the score, including one to finance a company through popular subscriptions, which flattened out when only $5,000 could be raised, but not one reliable one that voters would indorse.

The details of the Saginaw experiment have been given in the trade press, particularly in the September issue of *Aera*, and I will not attempt to review them here. But I do want to lay emphasis on the fact that after two years of inadequate, dangerous, irresponsible, unsatisfactory bus service, the people of Saginaw went to the polls and registered a tremendous majority for the return of electric railway service. They had had two years of bitter experiences with an inferior substitute, and those experiences showed them that they had been wrong in their first conclusion, and today they are awaiting the resumption of the street car service that built up their community, that increased the value of their property, that helped make their business

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ventures profitable and that gave them stability as a community which fly-by-night bus service never can give any community. Saginaw's experience was merely a repetition of that of the city of Bridgeport, of the city of Toledo and of Des Moines.

Unfair Tax Burdens Must Be Remedied

There are more than 12,000,000 automobiles registered in the United States. The number is likely to be greater, for the automobile fills a popular desire. However, I feel the saturation point is rapidly being reached, for there are serious problems of congestion in the large cities, the accident hazard steadily grows worse, and the situation but emphasizes the injustice of the paving obligations which many states and communities impose upon electric railways.

As you all know, the paving charge which so many of us have to meet is in fact a subsidy of automobile traffic paid by the car riders. Originating when horses hauled street cars and pounded the pavement between the rails, this charge became illogical and unjust when electricity became the motive power. The modern electric car does no damage to the pavement between the rails or outside them. The pavement is used entirely by other vehicular traffic, which causes whatever damage is done.

The report of the committee on special taxes will go into detail on this subject, and I want to recommend that you give it careful attention. It shows that 9.6 per cent of the operating revenue of railways reporting to the committee is paid to the federal, state and local governments in taxes and imposts. The taxes include special taxes for the support of schools, parks, bridges, highways, soldiers' bonuses and many other purposes; there are license fees of wide variety; many communities demand that the railways carry free of charge their policemen, firemen and other employees. In some places the United States government does not pay for the transportation of letter carriers, and we all know that it pays but a small part of the cost of carrying the mail. None of us raises objection to fair taxation, but as matters stand today we are unfairly taxed and imposed upon.

We have no quarrel with the private automobile owner and we have no quarrel with the bus except when the bus enters territory that is rightfully that of the electric railway. I say "rightfully" because the states and communities, in giving the companies the right to do business in the streets, retain to themselves the power to regulate service and control rates of fare. Having done that, the duty of the public to the railway should be obvious—the public must protect the railways in their rights, else the public itself will be the loser. I can think of no better presentation of the point I am trying to make than was made by the New Jersey Supreme Court a few weeks ago. In its decision handed down on July 18, 1923, in a case where a bus operator sought to be relieved of conditions made by the Public Utility Commission when it granted the operator a temporary permit to operate in certain communities, the court said:

"The state assumes to regulate the rates for transportation, and the character of the service rendered. Morally and legally it should protect the business of the established utility from impairment and encroachment. To do otherwise would soon create a situation where the public would be without transportation service. No capital could be obtained for an enterprise where no security was offered to the investor. Without capital there would be no transportation facilities, which, in this age, are indispensable to the transaction of business and the enjoyment of life."

In Illinois there have been two notable decisions by the Supreme Court of that state holding to much the same view. Maine and Maryland have also acted, through their commissions, to protect the established transportation systems. Courts and commissions are recognizing that the electric railways are as necessary to the communities as the water department or the fire department. Commissions are refusing to grant certificates of public necessity and convenience to petitioners who would duplicate electric railway service, and the public press is for the most part supporting them strongly.

The people have learned that freight trucking over highways is extremely damaging, not only to the highways but to the public purse, and this knowledge has brought about enactment of laws that will, when they have been perfected, put a proper share of the cost of maintaining public highways upon the vehicles that are most destructive to them.

It is also very interesting to note that the automotive industry is showing every desire to co-operate in bringing about co-ordination of electric railway and motor transportation. There was a time when the automotive industry seemed to think that the vehicles it produces could supplant the electric railways, but experience has shown them what it has shown the public as a whole, that the electric railways have a distinct field in handling mass transportation, that electric cars afford cheapest means of transportation of the masses, that such competition as trucks and buses attempt to give is ruinous, and that when buses are operated in public transportation the street railway company in each community is best equipped to operate them. So, today we find the automotive industry declaring with us that buses should be feeders or auxiliaries to electric railway service.

The United States Chamber of Commerce is at work upon a report on transportation, and through P. H. Gadsden, who is chairman of a subcommittee, the case of the electric railways is being adequately presented. I am sure that the report of the chamber will present the facts of transportation in this country in such completeness and so clearly that a long step will be taken toward the permanent stability of this all-important factor in human happiness and prosperity.

Railways Use Buses in Their Place

At our convention a year ago we adopted a report of the committee on trackless transportation in which was the following statement:

> We believe firmly that all of the transportation requirements of any community should be furnished by one agency and that that agency should be the electric railway company. It alone has the trained organization and ripe experience required for handling passenger transportation problems, and the development of any other agency for handling those problems would result in a duplication of service which could produce only a higher cost of transportation to the public. . . Hence it is our duty as public servants, charged with the responsibility for conducting highway transportation in our respective communities, to study and consider the availability of every feasible unit or method of furnishing this service.

Since that report was adopted there has been a great increase in the number of electric railway companies operating buses in connection with their rail service. More than 100 electric railway companies, ranging in size from the largest to the smallest, have invested upward of $6,000,000 in buses, and hundreds of thousands of dollars in garages and service stations and equipment. Electric railways now are operating more than 1,000 buses. Two companies alone have invested more than a million dollars in buses during the last year.

Whether the bus transportation business is profitable at present is open to argument—in some places it is and in others it is not. Where buses can be operated in densely populated districts and where the hauls are short, they can be operated profitably at street car fares, but in general transportation they can serve the public only at a higher fare. Problems connected with proper design of bodies, proper apportionment of weight on axles, proper tires and other equipment, as well as accounting systems that will make it possible to determine the real cost of operating buses, have yet to be worked out.

The important fact, from the standpoint of the public, is that the electric railways are giving the people the kind of service they demand, and are giving it on regular schedules, regardless of weather, and at the lowest possible rates of fare. That they will continue this policy is assured. The public in most communities has come to understand that the street railway companies are making every effort to provide adequate service, and that they cannot do this unless a fair deal is accorded them by the people.

A Few Comments on Detroit

This better public understanding is being reflected in the matter of rates of fare. During the last few months there has been a decided change in the attitude of politicians and agitators, and a more favorable attitude by the press. It has been due to certain developments that have demonstrated beyond all doubt the close relation be-

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tween costs and fares. Perhaps the most effective demonstration has been in Detroit, to which advocates of municipal ownership have pointed rather proudly until recently. The people there were promised "the 5-cent fare," extended service, the finest equipment and payment for the property out of earnings, by the municipal ownership advocates. "No more bond issues," was another promise.

Such promises are easily made, but not easy to live up to. Were it possible for a municipality to employ labor and buy materials at lower prices than privately owned companies must pay, demagogic promises might be kept. But one cannot escape facts, and the fact in the case of Detroit is that when it became necessary to increase the wages of employees of the Department of Street Railways those in charge of the railways could turn only to the car riders for the additional money, and they increased the fare to 6 cents, plus 1 cent for a transfer. They did right, but they did nothing different from what every privately owned property has had to do in similar circumstances. In a statement made by Mr. Steffens, former city comptroller of Detroit, printed in the Detroit *Free Press* of Aug. 25, this former city official, who by the way is a municipal ownership advocate, said that "an increase to 7 cents would have been the most business-like procedure," and forecasts are made that another fare increase cannot long be delayed.

The Detroit fare raise is at such variance with the announcement of "$1,000,000 profit in the first year of operation" that the people of that city must be wondering what became of the million. Those who are not acquainted with finance assume that a "profit" is money in the bank, or, at least, money available for use. In this case the rather insubstantial "profit" was invested or pledged before the public found out that the city had it, so that now the city turns to increased fares and to another bond issue to provide a semblance of the service promises made prior to the city's taking over the railways.

WHY A. E. R. A. OPPOSES PUBLIC OWNERSHIP

In this connection I think it is timely and proper to state again the attitude of the association toward public ownership. That we are opposed to it is common knowledge, but why we are opposed to it may not be understood by the public. Our opposition is not because we fear the loss of our property —the laws of this country protect all enterprises from confiscation without payment of the full value of the property taken. Our opposition is not due to fear of loss of profits, for some of the largest railways in the country have made no profits for several years —they are devoting all their energies to service of the public without one cent of return to the stockholders. Nor is our opposition due to fear that we may lose our jobs—whether railways are privately or publicly owned there must be trained, intelligent, progressive men to operate them.

Why, then, are we, and all other business organizations, opposed to public ownership? Because, gentlemen, it is foreign to and in conflict with the fundamental principles of the American government; because it is socialistic; because it is, in nine instances out of ten, wasteful, saturated with politics and inefficiency, and because, once it is established as a principle, it means the end of the representative form of government and the beginning of socialistic government. We all know what has come of experiments in pure democracy and socialism. I am sure I am safe in saying that the intelligent people of this country will not countenance the destruction of sound government. The problem before all who would preserve a prosperous, sane nation is to demonstrate to the unthinking the falsity of demagogues who advance the socialistic cause and the ruin that lies in adoption of their nostrums.

*Adding the Bus to Existing Facilities**

By L. S. Storrs

President the Connecticut Company
New Haven, Conn.

L. S. Storrs

Independent Operation Would Result in Survival of the Fittest, to the Detriment of the Public—How the Two Agencies Should Be Co-ordinated Is Pointed Out

THE outstanding feature of this convention is the important place which the motor bus occupies. This is true not only in this meeting of the American Association and the exhibit halls but also in the meetings of the affiliated organizations. Last year a moderate exhibit was made of these facilities and some little attention was given to a discussion of the subject. The year before there were no exhibits of material interest, and the discussion of the matter was largely limited to executive session where the subject was hotly argued.

This is a natural progress. But a short time ago the motor advocates were urging that agency as the coming means of public transportation and pointing to an assumed analogy between the conditions confronting the horse cars of a short generation ago and the then newer method of propulsion, electric power, and what they claimed were the conditions of the present day between the electric car and the motor.

The essential difference between the two periods is the fact that great mass movements of people cannot be successfully conducted by the motor. A few practical demonstrations were sufficient to clear up any misconception there may have been in this line. Today we find the careful students of the transportation problem in practical agreement, that the two agencies must be co-ordinated.

Few, if any, electric railway executives will disagree with Mr. Reeves' fundamental principles that service must be co-ordinated and, in most instances, rendered by the traction utility, and that with independent operation the result would be merely the survival of the fittest, to the detriment of all concerned, the public most of all.

The problem is divided into the three classes into which the traction utility, itself, automatically falls: That of the metropolitan area, in which the main stem of the traction is the high-speed line, either subway or elevated, with distributing surface lines. The surface lines may or may not be operated by the general traction utility. The problem as to co-ordination is narrowed down to the question as to what is to the best interest of the numerous local centers as against what is of benefit to the metropolitan area as a whole.

The question of the suburban and interurban routes is entirely different from the urban problem. The highways that have been improved at the expense of the public have made possible great speed, which, coupled with the flexibility of the motor stage, has been the controlling element in the development of the competitive motor. Nor is this phase of the problem similar in different parts of the country. Climatic conditions and the relative level and open roads of the Pacific Coast make possible a form of stage operation entirely impossible in areas of more rigorous climate and hilly country.

In the cities throughout the land, the transportation problem is, necessarily, one in which the general benefit of the community as a whole must prevail, as against the particular interest of any individual or group.

It is as essential for the growth and continued development of the cities that the civic side of public transporta-

*Abstract of written discussion on co-ordination of electric railway and bus operation presented before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

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tion should outweigh all others as that the city should be properly zoned and the various functions of the city group kept within proper territorial limits. For this reason the traction utility is most distinctly monopolistic in character. Any competition that tends to restrict the proper earning capacity of the general municipal transportation utility will render that utility incapable of performing its proper function. The utility management is the only one capable of unifying all transportation service in any city, to the ultimate advantage of the entire community. When charged with the obligation of adding to the existing rail facilities the mobile motor auxiliary, this group of experts certainly can do better work and accomplish more satisfactory results than any other.

In the ultimate analysis "public opinion" will dictate the method of operation and the means by which this desired co-ordination is to be accomplished. Public opinion is slow to recognize the actual economic principles of a utility problem.

Why Some Buses Can Charge Low Fares

The great factor that rendered possible the marked advance in urban motor transportation was the necessary increase in the rate charged for the service rendered by the electric railways. With the ability of the independent bus operator to confine his activity to the area of greatest density, the high factor of loading has enabled him, generally, to keep his rate lower than has been possible on the electric railways which must serve the entire community with a varying load factor. This, coupled with the natural public preference for the individual, as compared with corporate methods, has made it almost impossible to bring about a complete co-ordination of service in any community.

The prime essential of any plan to bring these two agencies into a common effort is recognition that this new medium, even if operated by an independent owner, is really but a single unit of many that are required to provide the transportation requirements of a community and as such must be operated where the service rendered is really necessary. Practically, the trouble with this is that the bus will then be in a part of the city which has not reached the maximum density of population, while the bus owner will prefer to operate in areas where he will obtain a constant heavy load, and where he can operate at a less rate of fare than the prevailing street car rates. The densely settled areas are always to be found along routes of public transportation which have been developed by the electric railways. Here, as always, the preference of the individual will be in conflict with the benefit of the community as a whole.

Another factor that works against the inauguration of a co-ordination of the two agencies is the reluctance of the railway executive to establish a service in an untried area, with the certainty that, once established, he must continue the service indefinitely, whereas the independent can abandon the operation if it is found to be unprofitable.

It is comparatively easy to imagine a city where the electric railway and bus operations are thoroughly co-ordinated, where the electric railway gives regular service over the rails laid as the city was growing in well defined residence, industrial and business areas, with the buses confined to areas that have grown up in recent years, and where the utility has not been able to expand due to lack of funds. But assume that in such a city the independent bus operator had been allowed to run in competition with the electric railway through the densely populated areas, unregulated and uncontrolled, and had taken so large an amount of the railway revenues that the utility rate had to be advanced above the bus rate in an effort to make the income cover the necessary outgo. What would be the public reaction to a proposal to co-ordinate the service, make the bus supplemental to the electric railway and thus give a unified service to the entire community?

Theoretically, this is the desired outcome, but I contend the matter is merely one for academic discussion up to the point that either one or the other facility faces bankruptcy, and of course it will be the utility with its obligations to render service throughout the entire city that would go.

How to Establish Co-ordination

This is all leading to the statement that the necessary preliminary to any effort to co-ordinate these two agencies is a public opinion that will support a legislation which recognizes that the two agencies are merely different means of providing a convenient and needed public transportation service which must be unified in order that the various communities may have a thoroughly efficient transportation service at the lowest possible rate.

In any state where the legislative acts have been changed to recognize this situation, it is a much easier task to accomplish a co-ordinated public transportation service. In such states there are places, outside of the city areas served by the transportation utility, where the independent operator should find sufficient inducement to provide service. The real co-ordination devolves upon the transportation utility, and a full measure of bus operation should be undertaken as rapidly as the need for service is apparent and funds available to provide the equipment.

Under all other conditions we can talk all we please about co-ordinating these facilities, but can accomplish nothing until the public opinion is of a temper to accept the needed regulation.

There is no question but that this competition which we have all had to contend with has provided a very valuable spur to all engaged in the transportation utility. Coming as it did at a time of advancing costs the drain caused upon our revenues by this competition made it all but impossible to continue operations free from receiverships. It has been necessary to put into effect so many economies that the entire theory and system of electric railway methods bears but little resemblance to those which were the common practice of a decade ago.

Gradually, but no less certainly, the transportation utility will adopt this newer form of vehicle for public service. Its actual place has as yet to be developed. There are, of course, many instances where its value is clearly apparent, but until each individual unit is operated so as to bring in the maximum revenue and perform a service of the greatest advantage to the public the true function of the motor bus will not be shown.

Co-ordination Defined

There is one question that must be answered. It is essential that the definition of this term "co-ordination" be thoroughly established so that there be no misunderstanding in the future. Do all parties have the same understanding as to what is to be co-ordinated? To all careful students of public transportation the idea of competition is repugnant. This method of diverting a portion of the public charge for transportation from the agency that is constantly endeavoring to render a satisfactory service at the lowest possible cost is merely the club wielded by the public itself in an effort to obtain from the transportation agency either a lower rate or a more convenient service than it is possible to render. In the long run the public, the community as a whole, will suffer. We cannot, therefore, contemplate any so-called co-ordination that would inject an intense competition between the electric car and the bus.

Operated as an auxiliary to the rail lines, the bus can perform a most useful function in the community. Its maximum value cannot, however, be determined until after a long period of actual use and careful experiment.

There are, of course, areas in many cities that have heretofore been without any convenient public transportation, in which even the independent bus operation has not ventured, which should receive bus service. In some instances, by an abandonment of a portion of a rail route, a more serviceable route can be established by motor. At certain periods of the day temporary bus routes entirely impossible by rail can be operated, to the great convenience of a portion of the population. A continuance of service, by bus, may be possible where the cost of changes or repair of unprofitable rail lines would otherwise necessitate the complete abandonment of all service.

The public cannot escape a very distinct benefit from the present attitude of both the executives of the transportation utility and the manufacturers of the motor vehicle in the mutual efforts to find a common ground for co-ordinating all means of transportation.

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Coffin Prize Awarded to Chicago, North Shore & Milwaukee R.R.

Report of Charles A. Coffin Prize Committee Presented Here in Full, with Remarks of President Emmons and Response of Messrs. Budd and Homan

THE committee takes great pleasure in reporting on the conditions and circumstances surrounding the first award in the electric railway field of the gold medal offered by the Charles A. Coffin Foundation, established by the General Electric Company in honor of the many years of service to the electrical industry of its former great president.

It will be recalled that under the conditions of the foundation it is provided that an annual award of the Charles A. Coffin Medal will be made to that electric railway company in the United States which during the year has made the greatest contribution toward increasing the advantage of electric transportation for the convenience and well-being of the public and for the benefit of the industry. It is also specified that the company receiving the medal shall receive $1,000 for its employees' benefit or a similar fund.

Every electric railway company in the United States was invited to participate and urged to send to the committee a representation of its activities and accomplishments comprised within the field of the award.

This being the first year of the contest, it would seem that a larger number of entries were not received either because the time at the disposal of the companies was too limited for a thorough presentation of the results they had obtained, or else they have not, as yet, grasped the advantages accruing not only to themselves but to others in competing for the prize.

Before taking up the details of its work the committee desires to point out to the industry what a splendid service is to be accomplished by the annual award of this prize. The committee has made a detailed study of the merits of each claim presented in the contest this year and it has been greatly impressed with their contents. It feels that if nothing else were accomplished than to bring to light before the industry the detailed accomplishments of the various companies as set forth in their petitions the result of the Coffin Foundation would be of significant value. Those companies which have responded to the invitation to compete for the prize this year have done so with a very clear conception of the opportunity afforded and have put much thought and a great deal of labor on the preparation of their report. Of course, only one company can receive the prize, but all this work of the other contestants will not be lost, for in addition to the benefits they themselves have received from doing the work of which their statements speak, the ideas and information thus made available will be helpful to the entire industry, as it will be made available through the industry's publications.

The Charles A. Coffin Medal, Awarded for the First Time This Year.

But this is not the greatest thing accomplished by the Coffin Foundation prize. It establishes a means of giving recognition every year to that company which has made the most distinguished contribution to the development of electric railway transportation, and thereby serves to stimulate new initiative and increased endeavor toward the further development of this essential business.

For the contest this year the committee agreed upon and published eight points which would be considered the principal factors in making the award. It subsequently agreed upon the relative rating to be given each of these points in summing up the claims of the various companies. These are as follows:

1. The particular initiative, skill and enterprise manifested in popularizing electric railway service—more riders and more revenue.
2. Outstanding success in gaining public good will.
3. Economies which have been introduced in operation resulting from original ideas.
4. Economies in operation viewed as a measure of the extent to which the company has taken advantage of new developments in operating and maintenance practices and equipment originating with others.
5. Improvements in construction practice which have resulted in reduced first cost, reduced maintenance or greater reliability of service.
6. Particular success in conducting a safety program and actually reducing the number and seriousness of accidents,
7. Outstanding accomplishments in development of good relations between management and employees.
8. Special accomplishments, aside from good management, tending to reduce the cost of new capital.

Seventeen electric railway companies made submissions for the prize this year. Their statements range in size from a small brief to a large volume of matter, with numerous illustrations and various data. The committee had two meetings, with all members present, and spent considerable time in analyzing the statements and accompanying data.

As the study proceeded, it became evident that the railway represented by one of the members of the committee was one of the best three or four in the contest. This member of the committee thereafter retired from the deliberations.

In the final consideration, taking into account the relative standing of the several contestants on the basis of the weighted percentages given on the individual factors, the manner of presentation and the general importance of the subject matter of the report as a whole, there was no question as to the winner. There were two or three very

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close contestants for first honor, but it was perfectly clear which one held leading place and this was unanimously agreed to by the members of the committee sitting, and by the two consulting engineers who had been requested to sit in at the proceedings.

From the representations of the winning company, the committee finds that on this property there has been carried to fruition most of the things that have been talked about for years as the remedies for various troubles. On this property the remedies have not only been talked about; they have been executed. Thus the winner stands out as a railway that has largely accomplished the tasks of gaining public good will, of merchandising transportation, modernizing service and equipment, improving the financial structure, and so on. There is no one great achievement on which the committee has based its award, but rather upon the accumulated results of a great many smaller accomplishments, although the committee was greatly impressed by the particular success of the company along the lines of gaining good will and selling its service.

Accomplishments of the Winner

As evidence of popularizing its service, the company shows that its revenue has increased 10 per cent in a year, its carload freight business has increased 40 per cent, its merchandise freight business has increased 50 per cent. New trains were added to connect with some of the fast trunk line trains and the running time between terminals, already fast, was reduced five minutes more. New types of equipment have been added and many detail improvements looking toward greater comfort of the passengers have been worked out. Motor buses have been extensively put into service as feeders for the railway. One-man cars have been purchased and placed in operation in services for which they were adapted. Extensive advertising in the form of posters, billboards, motion pictures and exhibits has helped materially.

Among the points cited contributing particularly to success in gaining public good will are the inauguration of a half-hour limited service between two important towns where the traffic hardly warranted this, immediate attention to complaints with reply to the person making the complaint, dinners to public officials, business associations and newspaper men when anything new is inaugurated, refund of unused tickets made within five days, freight overcharges refunded promptly, often in the absence of any claim. Above all is the general policy that economies are never made at the expense of the public.

The company is on the lookout for every possible economy as evidenced by the fact that a tour of the country was made during the year by a group of its men to find new ideas from other companies which might be applied to their property. Some of the particular economies that have been effected during the year include an important reduction in power consumption resulting from the coaching of motormen, use of lighter and more efficient car equipment, a study of the proper type of equipment for various classes of service and the balancing of motors and trailers in various classes of service; more scientific schedule making and elimination of stops, especially during the peak periods, and improvement in the average line voltage which permits more coasting. This endeavor to reduce energy consumption is facilitated by the use of meters on all passenger cars which give accurate records of the energy consumption per car-mile. Notable economies in the matter of accounting are also cited in the claims. A scheme was devised which saved 40 cents per 1,000 in printing tickets. Keeping stock records of tickets under a new plan saved 50 per cent of the time required. This also was responsible for saving the time of one traveling auditor, and 75 per cent of the time of ticket agents required in making reports. The substitution of a visible file for the ledger form of ticket records resulted in 10 per cent economy and gave more accurate results. A machine for analyzing ticket sales saved the time of one and one-third clerks. The use of billing machines in two merchandise dispatch stations saved four clerks and these machines are being installed in all stations now.

Construction methods which are contributing to the general success of this company include the placing of high-tension apparatus outside the buildings in the latest substations. All new alternating-current apparatus is of 60-cycle frequency in spite of the fact that all of the long-term power contracts were made for 25-cycle energy. A program of rock ballasting the entire system is 60 per cent completed. The old light rail is being replaced with 100-lb. rail. Concrete and brick platforms are replacing wood at the stations.

In fostering greater safety in operation, the company has succeeded in reducing injury and damage claims to 1.82 per cent of the gross. The record was one accident per 16,081 car-miles in 1922. The company's safety department is given the same status in operation as the other departments. Several community safety organizations have been formed through the influence of the company's safety department. In the schools 570 lectures were made to 22,500 pupils. During the present year 152 meetings of employees, groups and committees have been held and brought out 884 recommendations, of which 707 have been carried out, looking to greater safety. A "safety first" car goes over the property for meetings of the trackmen. First-aid drill teams have also been a notable part of the company's safety work, the membership of these teams being rotated so that all employees get the instruction.

In the work of developing good employee relations, the company has had particular success in paying one-half the tuition for extension courses, in providing classes in public speaking and in employing a prominent educator for a series of lectures on public utility operation. A most commendable piece of work has been the endeavor of the company to Americanize its foreign-born employees. This has been done through education and preparation for citizenship, good recreation, etc., and it has resulted in a very low turnover in labor. A forward step has also been made in providing very much better housing conditions for track employees. Other practices contributing to good employee relations have been a systematic plan of advice, together with plans and estimates for building houses, various social activities under the direction of a company club and the maintenance of a "placement" service, the duty of which is to find the job where a man will fit.

On the matter of "special accomplishments, aside from good management, tending to reduce the cost of new capital," the company cites the fact that it has reconstructed its financial structure to provide a flexible financing plan which also results in a material reduction in the cost of financing and makes possible a proper proportionment between bonds and stocks. The company is also having success in selling its stock to customers and employees.

From this very brief summary of the particular accomplishments set forth by the winning company as its claim for the honor of receiving the Coffin Medal, some idea may be had of the considerations which led the committee to its decision. The committee therefore now takes greatest pleasure in announcing that the Charles A. Coffin Gold Medal of 1923, for outstanding contributions to the art of electric railway transportation, is hereby awarded to the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.

The report was signed by James H. McGraw and C. D. Emmons, chairman.

Britton I. Budd, though a member of the committee, did not take part in the final decision, nor sign the report for reasons already given.

After reading the committee report, President Emmons called Britton I. Budd to the platform and said:

"It gives me great pleasure, Mr. Budd, to present to you the Charles A. Coffin Gold Medal for 1923. You have well earned this in the accomplishments of yourself and your organization in the operation of your great railway system. It is further a particularly happy circumstance that you are personally to receive this medal at a time when you are to assume the responsibilities of directing the destinies of the American Electric Railway Association for the coming year."

Mr. Emmons tendered the gold medal to Mr. Budd and also a certificate which he stated he knew Mr. Budd would be proud to hang up in his office.

In responding Mr. Budd stated that on behalf of his organization he wanted to express thanks for the recognition of whatever has been accomplished. He

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stated that whatever had been done may be attributed to teamwork on the part of all—directors, officers and all employees. They have teamed as one in the common purpose of endeavoring to give service and win good will. They have done little that is unusual or original, he stated. Practically all the discussions of the great American Electric Railway Association have simply been taken advantage of and applied to the end of producing better and more popular service.

Mr. Emmons then called Louis Homan, supervisor of bridges and buildings of the North Shore Line and president of the Employees' Mutual Benefit Association, to the platform. Addressing him, Mr. Emmons said:

"The fact that your company has secured the award of the Coffin Foundation is proof positive that the greatest spirit of co-operation must have existed between all the men concerned in the operation of your railway system. I hope that you will carry back to your associates the congratulations of the American Electric Railway Association on their achievements as railroad men which have resulted in their attaining this award."

Mr. Homan thanked the association on behalf of the 1,500 employees of the North Shore Line and stated that the gift would be greatly appreciated and would stimulate the employees to greater effort to give good service, and in this way to carry out the idea of the donor, namely, to make electric railway service more popular.

*Industrial Relations on the Pennsylvania Railroad**

By Elisha Lee
Vice-President Eastern Region
Pennsylvania Railroad System

Elisha Lee

Employees Elect Representatives to Joint Committees, Which Have Jurisdiction Over Wages, Working Conditions and Discipline—The Plan Is Working Satisfactorily.

IT IS a pleasure to have the privilege of talking to you on the subject of industrial relations on the Pennsylvania Railroad. There is a community of interest between your industry and the steam railroads in many fundamental respects. Both are engaged in a necessary public service. For that reason, public policy as applied to both has for many years taken the form of regulation of a very special and frequently burdensome and restrictive nature. For the same reason also the regulations between employer and employees in both industries vitally concern the public itself and assume an importance that is peculiar to transportation as an industry altogether necessary to the life and prosperity of the people.

Before describing our plan and its operation in detail, I should like to say something that is perhaps of a general nature but which is nevertheless fundamental to a proper realization of what we are doing. Few questions have received as much public consideration in recent years as this so-called problem of industrial relations. We have had two President's conferences on the subject. The churches have taken it up through social service agencies whose commissions are actively engaged in studying its various phases. Other organizations have been contributing liberally to the discussion. We have whole books on labor terminology alone and a veritable mass of literature, reports, studies and investigations as to how employer and employee shall live together.

Unfortunately, too, there are many studying and writing and talking about the labor problem who seem to be unwilling or unable to see any middle ground between the national unionism of Mr. Gompers and the attitude of the employer who says in effect, "You cannot organize at all. I shall run my business as I please." Both are wrong. In this respect employee representation has been derided as an attempt to bust up the unions and to frustrate organization. On the Pennsylvania it is neither. Many of the employee representatives with whom our relations are most cordial and friendly are members and officers of some of the strongest labor unions in the United States. We are dealing with 100 per cent union committees representing the signalmen, and the men in engine and train service.

In any industry the personal interest of its workers is necessary to its efficient operation. It is the height of misguided folly for any man who calls himself a labor leader to encourage the thought that an employee's allegiance as a worker belongs to someone who stands over his employer with the weapon of the closed shop, the sympathetic strike and restriction of output. We have outgrown Prussianism in labor relations just as we have outgrown it in international relations.

It is our feeling on the Pennsylvania that we have found a way of solving this problem not only to the satisfaction of our officers and employees but to the satisfaction of the shippers, the farmers and the business men in the territory served by the Pennsylvania Railroad. Of course there has been criticism, some of it, as many of you know, from sources which should have given us the greatest encouragement. The answer to most of it, however, is obvious. There are 240,000 officers and employees on our railroad. You cannot humbug 240,000 intelligent men and get away with it.

Naturally skepticism met our proposals when we undertook to work out a plan of co-operation with our employees. Certain labor organizations falsely alleged that we were engaging in an anti-union crusade. Many of our employees, while not openly opposing the plan, had little faith in it and did not take it seriously. Today the vast majority are convinced, after the test of time has proved the worth of our plan, that this plan is on the level.

Some confusion, perhaps, was caused in the minds of many persons outside the railroad by the controversy between the Pennsylvania Railroad and the Labor Board, but I believe that it has now been dissipated to a large extent and that more and more the success of our joint efforts is becoming recognized and appreciated.

Basis of Plan

Essentially the Pennsylvania plan is very simple. We start out in the belief that both officers and employees are honest and sincere; that we are really friends and partners in the business; that we have the same stake in the success and prosperity of our railroad; that the real measure of our mutual success is satisfactory service, and that when reasonable men sit down around a table to talk over their differences in friendly fashion, they will come to a satisfactory understanding.

Our plan presupposes peace. It has been established to maintain peace. It is not an armed neutrality, nor does it embody a code of rules for carrying on a constant row. The success of our plan demands mutual trust. We get our facts straight and then we proceed to act on them in joint conferences at which we are all equals.

The first step in formulating the present plan of employee representation was taken with the representatives

*Abstract of a paper before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

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of engine and train service employees on Dec. 29, 1920, when the "Memorandum of Understanding" with those employees was adopted, effective Jan. 1, 1921. This document provided for an orderly procedure for handling all controversial matters between the men of this service and the management. It provided for regular monthly meetings between the employees' committees and the superintendents, general superintendents and the four general managers.

But more important than this was the provision for a joint tribunal of men and management, known as the joint reviewing committee, with plenary power in the settlement of disputes referred to it. The decisions of this body, reached by a two-thirds vote of the individuals composing it, are, so far as the management is concerned, final and not subject to veto or appeal.

Following the issuance of Decision No. 119 of the United States Railroad Labor Board, providing for termination of the national agreements, agreements were made with all other classes of our employees covering this method of handling controversial matters.

As it was impossible to meet the employees individually or en masse, we asked them to vote by secret ballot for employee representatives on each division, in the shops, in the freight houses, and in all classes of the service. The only limitation placed upon them was that the representatives must be employees. Membership or nonmembership in any organization does not concern us. As a matter of fact the representatives selected in several classes are all union members and, as I have already pointed out, we have had for many years most cordial relations with our train and engine service representatives, all of whom are union members.

The structure of our plan is very simple. All the employees in a particular class and at stated times elect employee representatives. Local committees are formed on each division and in the shops. General committees are chosen to deal with the general superintendents and general managers. Meetings with division and general division superintendents and general managers are held at fixed times, so that there can be no delay or evasion in the consideration of disputed questions, or discussion of problems of the management and of the men.

The keystone of our whole plan is the joint committee for each class of employees, which is the highest authority on the railroad in the determination of any questions affecting wages, working conditions, discipline and discharge of employees. These committees are composed of an equal number of representatives of the employees and the management. Two-thirds vote is necessary to decide any question. If the committee cannot agree by at least two-thirds vote, the committee itself decides how the matter shall be settled. No executive officer of the company nor even the board of directors has veto power over the joint committee's decisions.

Since these committees have been working in the last two and a half years, only two cases have arisen on which the reviewing committee was unable to reach a settlement itself. One of these cases was referred to three arbitrators, one representing the employees, one the management and the third an outsider, chosen by those two. In the other case, a representative of the management and a representative of the employees were named to inquire into the facts. In both instances the findings were accepted by the reviewing committee and adopted as the basis of its own findings.

In this connection let me say, however, that our plan of employee representation does not start and stop with the settlement of grievances. That is only one phase of it. It is important, of course, in the current operation of the railroad, but there is another phase that is of much greater significance. I refer to what might be called the constructive side—the increasing interest of employees in the problems of management in helping to bring about greater efficiency and greater production, and in eliminating waste. It works in several ways.

In the first place, because machinery is provided for the prompt settlement of an employee's grievance, he can put all his mind on his work knowing that his case is going forward and that he will get a final decision in a reasonable length of time. He becomes a more contented and therefore a better workman.

In the second place, the representatives of the employees in their monthly meetings are getting closer to the management, getting a better understanding of what it means to operate a railroad, taking a broader interest in the everyday problems of operation and actually helping to solve them.

Critical Test of Method

It is possible to apply several critical tests of the methods which have been jointly worked out and agreed upon between our officers and employees—tests which no reasonable man can afford to ignore.

Is it fair to the employees themselves?

There is abundant evidence on that score. The results of the elections recently held for shop craft representatives, where more than 85 per cent of eligible employees voted, show how widespread and genuine is their satisfaction with the plan in both theory and practice. Our men have a more influential voice in determining matters affecting them than the employees of any other industry that I know about. Their wages and working conditions compare favorably with those on other railroads and in outside industries. As a matter-of-fact, the data about wages and cost of living in outside industries which is taken into account in determining wage schedules on our road is jointly collected, jointly compiled and jointly discussed and applied.

Every man has the same right of franchise in electing representatives. Employees and management have equal votes in reaching final decisions. Hearings of grievances are prompt, settlement is expeditious and certain, evasion on the part of either side is impossible, fair play is assured. Settlement of questions locally is becoming more general. Officers and employees have come closer together. They are seeing things as they look to the other fellow. We talk the same language.

Is it fair to the company?

I do not think it is necessary to argue the point that when men and management understand each other's problems, when they see and realize their mutual interest in the success of their joint enterprise and work whole-heartedly toward a common end, that enterprise itself is bound to progress.

Is it fair to the public?

The record is eloquent on this point. It goes back to the shopmen's strike of 1922 when two-thirds of the P.R.R. shopmen remained on the job and the company was enabled to handle more than its ordinary share of the country's business and serve the public without interruption while other railroads were seriously affected.

In addition, let me cite you briefly some of the accomplishments of the P.R.R. during the first eight months of this year. So much progress was made in the shops and on the road, in repairs and operations that long before Oct. 1, the goal of all the railroads of the country, the Pennsylvania Railroad had more than 87 per cent of its locomotives and 95 per cent of its freight cars in good repair, available for service.

Average carloads were increased, car movement was speeded up, carrying capacity of coal cars increased so that on Sept. 1 the improvement and betterment of service and facilities were equal to the addition of 50,000 new freight cars and about 550 new locomotives to our equipment.

At the same time this period saw the greatest volume of business in our history handled with a minimum of delay or inconvenience. From Jan. 1 to Sept. 22, the Pennsylvania Railroad handled about 20 per cent more loaded revenue freight cars than in the same period of 1922, 38 per cent more than in 1921, and 14 per cent more than in 1920, the previous record year.

Our plan may not be perfect and it may not fit other industries or railroads, but it is working and so far as we can find out is working successfully.

We do not feel that we have a finished product, or that we can now sit back and let things ride. Human nature is not built that way. The real test of what we are doing is sincerity and it is necessary in a large organization like ours, with its complex relations, to be everlastingly at it. Ours is a give and take proposition and lasting success requires that everyone right down the line, officers as well as employees, shall live up to the spirit of our relationship in all his dealings.

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Essential Operating Costs*

By F. W. Doolittle
Vice-President North American Company, New York

F. W. Doolittle

Speaker Contends that Narrow Margin Between Receipts and Expenditures Does Not Allow Adequate Return on Investment—Average Fares Now One-Half Cent Too Low

THE extremely narrow margin between revenues and expenses has focused the attention of the electric railway industry on every item of expenditure. The records are full of instances in which the anemic dollar of the day has been helped to do the work of its more vigorous forerunner. Every month patience and skill devise new and improved methods.

After all these efforts to pit skill and genius against the problem of vanishing net, the operator must face the task of securing labor, materials, and capital in a highly competitive market where further economies are a matter not of what he can or would like to pay, but of what other lines of business can afford to pay. Nor are these the only items beyond the immediate control of the operator. There are taxes of various forms, and burdens imposed by the community as to standards of service and of equipment which, equitable or unequitable, add to the cost of the service.

What are the costs of service, and to what extent can they be lessened by changing the conditions under which service is rendered?

It is not my purpose to compare the costs in one city with those in another, hoping by such a comparison to disclose the methods of operation and management and the conditions likely to result in minimum costs. It would serve as well and be vastly easier merely to advise the industry to recruit its personnel in China, its capital in that country which the census shows to have the lowest interest rate, to pay its taxes in the islands of the sea, to purchase its power of Sir Adam, and to develop the density of traffic of the Interborough.

What we are here concerned with is rather an analysis of the types of expenditures made by the industry, with only such emphasis on their relative amount as is of use in measuring the effect of changed conditions on the cost of service.

Classification of Costs

The costs borne by electric railways may be classified briefly for this purpose as wages, materials, sundry services, contributions to cost of government, retirement insurance, cost of capital. Many factors combine to vary the relative amounts of these costs, the price level in the community served, the density of traffic and the burden of general and special taxes being of particular importance. A fair measure of the relative importance of the several classes of costs based on conditions obtaining for the industry as a whole is:

	Per Cent of Operating Revenue
Wages	41
Materials	14
Sundry services	7
Taxes, including imposts	10
Depreciation	8
Cost of capital	20

Depreciation and Cost of Capital

This last item, showing 20 per cent of operating revenue for costs of capital, means 6 per cent on an investment not more than three and one-third times annual revenues, and 7½ per cent only when the investment is two and two-thirds times annual revenues. The fact is that a ratio of $4 of investment to $1 of revenue is more common. These items are, of course, not all mutually exclusive. The item "Materials," for instance, includes a very substantial amount of wage; and probably half of the 10 per cent shown for taxes represents wages and materials expended in connection with the construction and maintenance of paving, the cleaning and policing of streets, the transportation of police and firemen, and other similar items included as a part of the general tax burden but not represented by specific tax levies.

Of the total cost, 28 per cent appears as depreciation and cost of capital. The industry is not now earning, and has not for many years, if ever, been earning the full measure of these costs. At the present time such figures as are available lead to the conclusion that about three-fourths of the amounts necessary properly to cover these items are being earned, i.e., the present average fare of about 7 cents provides only a little more than 2 per cent of the cost of the property for depreciation, and a little less than 6 per cent on the investment to cover the cost of capital. That is, the fare fails by at least half a cent to cover the full cost of the service.

Here and elsewhere in these remarks averages of costs and fares are used for illustrative purposes, and these averages probably fairly reflect existing conditions. Of course, the conclusion is not warranted that because the fares charged by a particular company are above the average its net earnings are also above the average. Costs of operation depend upon many factors and cannot be measured or compared on any single unit basis.

Depreciation and cost of capital are measured in terms of investment in this discussion. The actual figures show that about 2 per cent for depreciation and 5¾ per cent for return have been earned, and these percentages would, of course, be very substantially reduced if values were made to reflect present-day prices. It is not appropriate to interject at this time a discussion of the theories of valuation, but certainly it is of interest to note the distribution of its income made by electric railways when measured in terms of the average fare of 7 cents. Out of this wages absorb by far the largest single amount, being nearly three times as great as the cost of capital.

In order that all essential costs may be met a half cent should be added to the average 7-cent fare, as shown in the following summary:

	Cents
Wages	3.09
Materials	1.05
Sundry services	.53
Taxes, including imposts	.75
Depreciation	.60
Cost of capital	1.51
Total	7.53

Under the existing 7-cent fare the amounts available for depreciation and cost of capital are substantially less than true costs, amounting respectively to but 0.45 cent and 1.13 cents.

In the fall of 1920 labor and materials had increased 136 per cent and fares 42 per cent above these figures for 1913. A year later fares reached their maximum, with an increase of 49 per cent over pre-war levels, while labor and materials had declined somewhat, but still showed an increase twice as great as fares, standing at 99 per cent. At the present time the disparity is greater than it was two years ago—being 43 per cent for fares and 103 per cent for labor and materials.

Possibilities of Reducing Costs

It is of interest to consider the possibilities of lowering fares by reducing the cost of service. The average wage paid is now very close to 60 cents per hour, and is more than twice the rate paid in 1913.

If the street railway operators could persuade their employees to work for 30 cents an hour the cost of service could be reduced by 1½ cents per passenger. It requires no extended argument to prove the futility of such an attempt. Employees are recruited in the open market in competition with other industries. Wage scales generally average twice those in effect before the World War, and what is more, they have during the past year been increasing, not decreasing.

If we could go back immediately to pre-war prices paid for materials it

*Abstract of an address before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

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would permit the fare to be reduced by but half a cent. Material prices, it is true, have declined a third from the high point of two and one-half times 1914 levels, but prices this past summer have averaged more than 10 per cent above those current two years ago.

The items of sundry services and taxes, amounting to 1¼ cents per fare, present not only the difficulties which would be experienced in attempting to reduce wages and the cost of materials to pre-war levels, but also the difficulty arising from the tendency of taxes to increase because of the widening spheres of governmental activity.

Treatment of Taxation

Taxation is in its very nature highly complex. The natural complexity of the problem has been increased by cross purposes and lack of scientific procedure on the part of those charged with the duty of spreading the tax burden. It has become impossible to distinguish the underlying principles, unless it be opportunism. It is perfectly apparent that the various branches of the government extend their activities, and as costs of all sorts increase the number of dollars which must be collected as taxes must increase in like proportion. The device of the indirect tax has undoubtedly contributed to a growth in governmental activities which never would have been tolerated had each individual been clearly aware of the amount which he himself was contributing. Whether or not the electric railways as a whole are required to pay into the public treasuries more than their just proportion of the public burden cannot be stated positively. Certainly it is the duty of the industry to its patrons to examine carefully into this question in order that it may resist being made a collector of excessive taxes and avoid passing on an improper burden to the users of its services.

The following facts are pertinent. Of the amount available to all the electric railways operating in one important state in the year 1909, for taxes and return on investment, one-eighth was paid in taxes levied directly and seven-eighths was available to cover the cost of capital. In 1921 one-third of the amount available went for taxes and two-thirds to return on capital. Actually during this period taxes more than doubled, while the amount available for return decreased. All of the other utilities in the state, including electric, gas, telephone, heating and water, taken together, paid 10 per cent of the amount available to the government as taxes in 1909. In 1921 they paid less than 19 per cent. It would appear that equalization within the public utility group is faulty if more than 32 per cent of the net of electric railways is taken in taxes and less than 19 per cent of the net of all other utilities.

In addition to these taxes directly levied, there are, of course, large amounts collected in the form of services, such as free transportation of police and firemen, paving construction and maintenance, and other items substantial in amount but difficult to value accurately. Taxes and imposts add at least three-quarters of a cent to the average fare. Their reduction or elimination is largely beyond the control of the industry, and recent experience indicates that no relief as to this burden on the car riders can be expected until they sense its injustice and act.

Those who place property at the disposal of others can, of course, do so without charge if they so desire, but if the property is to serve permanently and if capital for additional property is to be secured it is essential that the charge for service contain two components: one a return on the value of the property consistent with returns available in other enterprises in the highly competitive market for capital, and the other an amount which will permit units no longer useful to be retired. The basis of calculating this amount, usually referred to as depreciation, has been and still is the subject of much discussion. Without attempting to review the divergent opinions, one theory will be stated for the purpose of directing attention to a cost which may be essential under certain conditions. This theory holds that value as a basis for rates is investment; that amounts collected for retirement purposes and not disbursed to the owners in liquidation of investment are in effect prepaid accounts on the part of patrons and as such are entitled to receive interest credits operating either as additional revenues or lessened expenses.

Treatment of Depreciation

Those who grant the equity in theory of this procedure may still question it in practice on the ground that a property is never entirely renewed at one time, that consequently the reserve is never all drawn down, and the minimum balance is therefore an amount necessary only in theory, and in fact not an essential cost.

So long as the property remains in private ownership there is force in this contention. However, it is the undoubted right of the city, state and nation to acquire public utility property, whatever may be the advisability of such action, and acquisition, we may, expect will be made as cheaply as possible. There is sufficient precedent for deducting accrued depreciation in fixing the price to make it unsafe to ignore this possibility. If the purchase price is so fixed the owner will sustain a material loss unless there has been collected from the users of the service an amount equal to the amount the property is marked down, and he cannot protect himself by the claim that the property will never be entirely renewed at one time. For example, a property costing $50,000,000 may have lived 40 per cent of its useful life and be taken for the public at $30,000,000. If it has been estimated that the property will never be put in better than 85 per cent condition and that, therefore, the reserve accrued against retirement need never be within 15 per cent, or $7,500,000, of the accrued depreciation, there will be available to the owners to offset the mark down in price only $12,500,000 instead of the $20,000,000 necessary to make the investor whole. Unless those who advocate limiting the reserve to a sort of equalizing fund can guarantee that public acquisition will be on a basis consistent with the limited reserve such a hazard exists and protection against it is an essential cost.

Slowness of Turnover

Ten years ago the average ratio between investment and annual revenue was probably 5 to 1. Since then revenues have increased substantially though less rapidly than operating expenses, while investment has changed much more slowly. As a result the ratio of investment to annual revenues has declined, without, however, showing a similar change with respect to net earnings. In spite of the improvement in investment ratio the turnover of capital is still so much slower than in industry as a whole, and even than in other utilities as to sharply differentiate electric railways. For example, as shown by Bliss, twenty-four industries represented by ninety-four companies averaged, during the six years 1916 to 1921, an investment of only $1.16 per dollar of annual revenue. Four of these industries had annual revenues in excess of assets.

Because of the slow turnover in the electric railway business at least 40 per cent must be added to the other costs of operation to cover depreciation and cost of capital, an essential cost perhaps not readily appreciated by the users of the service whose business experience is along other lines. There is another aspect of this situation that should be referred to and that is the cost of money to electric railways as compared with the going rate in the open market. In common with other privately owned industry, electric railways have felt the severe and in many ways unfair competition of tax-exempt securities. In addition to this adverse factor the narrow margin between revenues and expenses has been reflected in the cost of capital. An electric railway receivership in any city in the country adds to the cost of service in every other city.

Relation of Traffic to Costs

In the transportation business a surprisingly large part of the costs go on from day to day without particular relation to the volume of traffic handled. An analysis of the expenditures of typical electric railways indicates that almost 50 per cent of their costs are independent of traffic. These statements refer, of course, to variations from the normal amount of traffic for which a property was constructed, and apply more particularly to decreases in the volume of traffic. A decrease in traffic of 20 per cent results in an increase in cost per passenger of 12½ per cent. Compare this with the bituminous coal industry, itself a business of large fixed costs, when a decrease in output of 20 per cent is accompanied by an increase in cost per ton of but 5 per cent.

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Referring to the cost of approximately 7½ cents per passenger, of which, however, only about 7 cents is being collected, it is of particular interest to note that a 10 per cent decrease in the volume of traffic increases the cost per passenger nearly half a cent. In the period from August, 1920, which was by no means the peak of street railway business in this country, to August, 1921, there was a 10 per cent falling off in the volume of business handled by electric railways. Due to the very large percentage of fixed costs this decline in traffic alone produced approximately half a cent per passenger increase in costs. Other things being equal, an increase in business from the low point back to the 1920 level would be accompanied by a decline in the cost per passenger, but a further increase would be accompanied by relatively small further decrease in cost because of the necessary additions to plant to carry the increased business.

Is that part of the fare representing the increased cost due to lessened volume of business an essential operating cost? From the standpoint of the railways it is, of course, essential, but from the standpoint of the use of the service it is not, and can be avoided by discouraging competitive comers.

CONCLUSIONS

From this hasty survey of the essential costs of the electric railway industry the following conclusions may be drawn:

The electric railway is not now earning and has not for years, if ever, earned a return on the capital invested commensurate with the risks of the business and the opportunities in other lines. In 1913 the average fare was too low by 0.15 cent. It is now too low by 0.53 cent. If value is based on present prices failure to earn proper returns is and has been much greater.

Disregarding the present failure of fares to yield a proper return, the possibility of going back to the pre-war basis of the 5-cent fare is as remote, apparently, as is the possibility of returning to the $5 pair of shoes, the 5-cent cigar, or the 1-cent newspaper, and largely for the same reasons.

To cut 2 cents from the present fare would require that wages be reduced to an average of 20 cents an hour. If all materials and supplies cost nothing and if all taxes are remitted it would scarcely serve to cut 2 cents from the average fare. If nothing whatever were earned as a return on the investment it would still leave the average fare a trifle more than 6 cents. A larger volume of traffic would help substantially, but with the tendency of communities to divide their business, with the tendency of wages to increase, with stable prices for materials and a constant increase in the tax burdens, and with constant demands for increase in quality of service to be rendered for a single fare, the average company cannot for many years hope to make any substantial reduction in the rate of fare which should be charged.

Co-ordination of Trolley and Bus in California*

By D. W. Pontius
Vice-President and General Manager
Pacific Electric Railway
Los Angeles, Cal.

D. W. Pontius

Material Progress Has Been Made Since the Paper Read Last Year—Agreements Have Been Reached in Several Municipalities, Keeping Railway in Control of Transportation Situation

IT WOULD seem pertinent that at this time I continue the subject of "Trackless Transportation" on which I addressed the association at Chicago last year, and supplement the remarks I made at that time with a review of the present situation, and relating the progress made in trackless transportation in southern California.

Last year the estimate was that there were 380 buses and trucks operated directly in competition with the Pacific Electric, with an annual operating revenue of approximately $3,325,000. At this time, a close estimate is that there are 396 competitive buses and trucks with an annual revenue of approximately $3,750,000.

The number of operating bus companies has not increased and, through constant vigilance and protesting of applications for permits before the State Railroad Commission, no new applications of a paralleling or competitive nature have been granted during the past two years.

The increase in bus and truck revenue of competitive lines is attributed to the continued phenomenal growth of southern California in population. Better to illustrate this growth, the population of Los Angeles in 1920 was 576,000; in 1921 was 611,000, in 1922 was 722,000 and in 1923 is 987,000.

In the city of Long Beach, where two bus companies with seventy-seven buses were operating on a 5-cent fare, the situation is unchanged and we cannot justly complain, as they are not permitted to parallel the Pacific Electric lines.

In Pasadena, a year ago, we were facing not only the problem of track renewals to cost in excess of $750,000, but had directly paralleling bus competition, with not enough traffic to justify two classes of transportation on the same streets. The railway company stood ready to make the necessary expenditures, but because of the political situation the city authorities felt that the people would not approve of ruling out the paralleling bus service over the same streets where car lines were operated.

The Chamber of Commerce of the city and one of the prominent newspapers backed the bond issue and the City Board of Directors, while another leading newspaper, and an organization of Pasadena business men, bitterly fought the bond issue and favored the railway company establishing bus lines to be operated in conjunction with the street car lines.

After many unsuccessful conferences with the City Board of Directors of Pasadena, the city discontinued negotiations with the railway company and called an election for a bond issue for the purpose of installing a municipal bus system, which resulted in a spirited contest at the polls. The result of the election was the defeat of the municipal bus project by an almost two-to-one vote.

Shortly after the election, negotiations were again resumed between the city and the railway company, resulting in a very satisfactory agreement. Paralleling bus competition within the city has been entirely eliminated. Under the agreement with the city, the established cash fare is 6 cents, or ten tickets may be purchased for 50 cents, good within the local limits of the city, with transfers to or from cars within the prescribed local limits. This is with the understanding that if, after one year, it is found that the local service in Pasadena is not paying its way, the railway company may submit the matter to the Railroad Commission for an increase in fares, and if the city so desires, at the end of one year, it may submit the matter to the Railroad Commission with a view of having the fares reduced.

The equipment and street car tracks in Pasadena have been rehabilitated, and all will soon be in absolutely first-class condition. On Los Robles Avenue, where it was necessary to rebuild the tracks at a cost of approximately $350,000, if the line was to be continued, street car service has been discontinued temporarily, and bus service has been installed. Indications are that the bus service will remain perma-

*Abstract of a paper before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

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nently, as the travel on this line is not exceptionally heavy.

A very satisfactory street car service, augmented by bus service, is now being given, and everyone seems satisfied. At this time we are operating forty-five buses, and, with shops and garage headquarters, have a total investment in trackless transportation in the city of Pasadena of approximately $500,000.

In the Santa Monica Bay district, referred to last year, we offered to install supplemental bus service, but our offer was rejected by the City Commissioners; one commissioner favoring our plan and two opposing it. In that city a bus company was formed by some of the men who were individually operating local buses. The service rendered is anything but satisfactory to the people of that district, and the bus operators are not complying with their franchise requirements. It remains to be seen what the final solution of the transportation problem in that district will be.

Spirited Contest in Los Angeles

Probably the hardest battle ever sustained by electric transportation companies to retain their right to serve a city, to repel an alien interest, and to protect itself from unwarranted and unfair competition, was made in Los Angeles recently, culminating in an election wherein the people were to decide whether the existing railways—the Los Angeles Railway and the Pacific Electric Railway—were to be permitted adequately to serve their transportation needs, or a franchise was to be given the People's Motorbus Company to establish bus lines.

The bulwark of the People's Motorbus Company in its fight for place was the use of the names of William Gibbs McAdoo, of national political fame, and Marco H. Hellman, a local banker of known great wealth, in an effort to add substantial prestige and persuasive publicity to the venture.

The franchise for the bus line being applied for by referendum petition forced the city to call an election to determine the matter, notwithstanding that the railways made application for the operation of bus service in certain districts of Los Angeles eighteen months previously, on which applications the city had never acted.

The franchise applied for was directly to parallel the street car lines on the same streets, and skim off the cream of traffic, and not to develop any new territory. The result of the election was the defeat of the People's Motorbus Company franchise by over 12,000 votes out of 86,000 cast, despite the admitted expenditure of $125,000 by Messrs. McAdoo and Hellman and their associates in carrying on their part of the campaign.

Had the McAdoo-Hellman proposition come to a vote within a short time after it first was submitted to the people, every indication was that the vote would have been against the two railways. But a campaign of education was carried on through the newspapers. Pamphlets were distributed from house to house under the direction of an organization of business men of Los Angeles and the railway companies. Officers of the two railway companies appeared before clubs and civic organizations, not only alone, but in debate with the McAdoo-Hellman representatives. Mr. McAdoo himself took the platform. Before election day the voters were well posted on the situation and gave us the assurance that invested capital in the electric railways in Los Angeles was entitled to a square deal—and we got it.

A crosstown bus line on Western Avenue is now in operation, extending through a portion of Hollywood, on the north, and across the western portion of Los Angeles, to Slauson Avenue, on the south, a distance of 11 miles. A second bus line will be established within the next thirty days over Sunset Boulevard, Vermont Avenue and Eighth Street, between Hollywood and the business district of Los Angeles, a distance of 10 miles. A third line will be established over Vermont Avenue and Eighth Street between the northern part of Hollywood and the business district of Los Angeles, a distance of 6 miles. These three lines will require a total of approximately seventy buses.

The fare directly in the Hollywood district is 6 cents, while the through bus fare over the routes named is 10 cents, carrying with this fare the privilege of transferring to the street car lines or either the Pacific Electric Railway or the Los Angeles Railway.

My prediction is that within another year the Los Angeles and Pacific Electric Railways, through the Los Angeles Motorbus Company, will be operating in Los Angeles more than 100 buses, and will have an investment in trackless transportation in the city of more than $1,000,000.

In addition to the bus service installed in the city of Pasadena and in Los Angeles the Pacific Electric is now operating feeder or auxiliary bus lines, as a part of its railway system, in the cities of Santa Ana, Alhambra, Beverly Hills, Glendale, San Bernardino and Redlands, and within the next six months we shall have in operation fifty buses as feeders to our interurban system.

In a great many instances the bus lines are being operated at a slight loss, taking into consideration operating expenses, interest, depreciation and taxes; however, the loss should not be looked upon as a serious matter for the reason that the bus service has been installed to take care of the growing traffic in districts not served, instead of extending electric lines.

State Legislation

The last Legislature of the state of California not only passed many regulatory measures concerning bus lines, but adopted an entirely new method of licensing and taxing them. One of the most notable features was the elimination of the direct car tax upon a horsepower basis, substituting therefor a nominal license charge, and imposing a tax of 2 cents a gallon on gasoline, with a view to raising additional revenue for the road fund. It is estimated that the gasoline tax, which covers all automobiles, buses and trucks, will produce a revenue of $12,000,000 annually. This, added to the license fee of approximately $3,000,000, makes a total of $15,000,000, an increase over the previous year of approximately $6,000,000.

In the application of the new laws relative to trucks, a maximum weight has been fixed at 22,000 lb. The weight allowed in any specific case, however, is variable, depending upon whether machines are equipped with solid or pneumatic tires; solid tires being penalized by an additional charge and decrease of weight load. Another important feature is the regulation of truck speed, determined by weight of load and class of tire equipment. Buses and trucks operating in common-carrier service under the new law are required to pay to the state 4 per cent of their gross revenue.

Automobile common carriers and school buses are now required by law to stop at all grade crossings except within the limits of incorporated cities, and a number of other features beneficial to the railways and decidedly in public interest are embodied in the enactment.

The bill was bitterly contested before the Legislature by the motor bus representatives. The railways took the stand that reasonable regulation of buses and trucks operated in common-carrier service is desirable, and that the railways also operating buses were willing to pay the taxes the new law provided. While the bill is not all that could be desired, it is a long step in the right direction.

Railway Extensions

The management of the Pacific Electric still has confidence in the success of the electric railways. It will be only a short time until an expenditure of $4,500,000 will be under way, building a subway for taking interurban and suburban trains off the congested streets in Los Angeles.

During the past year only two rail line extensions of importance were made, one in the city of Long Beach and the other, known as the Alhambra-San Gabriel extension, in the San Gabriel Valley, which is destined to open up quite a large territory for subdivision and home extension, representing an expenditure of $288,000. Passenger and freight equipment has been purchased during the past year to the extent of $6,000,000, and a large portion has already been delivered.

I am pleased to say that the Pacific Electric has made a better showing during the past year than at any time since placed in operation and is now financially making its way.

Our relations with the public generally, throughout the territory served, are most cordial. During the past two years there has been a growing spirit of fairness toward the railways, and it is expected that by keeping faith with the public and making a sincere endeavor to serve adequately and treat

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courteously our patrons, we will retain and enjoy their good will. Their attitude is best reflected in their actions at the polls in Pasadena and Los Angeles, at a time when the interests of the electric railways were being jeopardized.

The management of the Pacific Electric has confidence in the future and has definitely entered the motor bus field, or more properly speaking, the motor bus has been adopted as a factor in Pacific Electric Railway operation for use on auxiliary and feeder lines.

I do not concede that buses can take the place of the electric railways, but because of their adaptation as feeders and auxiliaries to main or trunk lines, they have proved their usefulness in connection with such transportation.

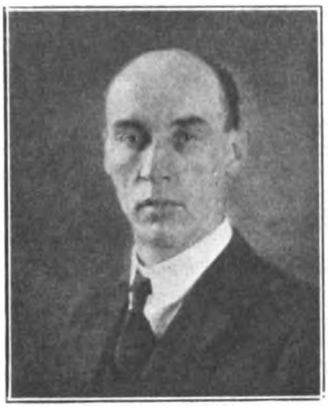
As I stated last year, the problem of the electric railways is not to put the buses and trucks out of business but to see that they are used in districts not adequately served by rail transportation. If the railways expect to hold the business in their territories they must either extend their lines or install supplemental bus service to take care of traffic requirements, or face destructive competition.

Buses are not practical for the handling of mass traffic, and the two electric railways operating in Los Angeles and vicinity are more needed today than at any time during the past.

*Industrial Standardization Urged**

By P. G. Agnew
Secretary
American Engineering Standards Committee

Much Progress Has Been Made by Co-operation of National Societies and the Industries Generally—International Co-operation Is the Next Step



P. G. Agnew

THE United States is justly regarded as the home of mass production and of interchangeable parts manufacture. The extensive development of standardization activities by engineering societies and by trade associations have taken place almost wholly within the last quarter century. At the present time there are literally hundreds of such organizations engaged in standardization activities in some form.

As examples there may be mentioned the extensive lists of specifications and dimensional standards of the American Electric Railway Association; the great group of purchase specifications and methods of testing for a large number of materials, which have been formulated by the American Society for Testing Materials; the dimensional standards for parts and supplies for automobiles, developed by the Society of Automotive Engineers; the large amount of dimensional standardization and specification work carried out by the railroads; and the standardization rules of the American Institute of Electrical Engineers.

In many cases, standards so developed have come into such general use as to make them essentially national in character. In far more numerous cases, such standards are receiving increasing recognition, but systematic co-operation and understandings with other interested bodies will be necessary to make possible full national recognition.

The American Engineering Standards Committee, whose organization came about as a result of the large number of bodies, technical, industrial, and governmental, doing industrial standardization work, is the agency through which such work in this country is passing from standardization by associations, societies, and governmental agencies to standardization on a national scale. Through its methods and procedure, which are the result of extensive study and discussion on the part of the numerous bodies concerned, and which have been further developed by four years of experience in active work, the standardization work of the many bodies concerned is being broadened and unified into national industrial standards.

From the first the work has grown steadily and rapidly. To one who has not been in close touch, the extent to which it has reached out into various industries and drawn in organizations, industrial, technical, and governmental, is astonishing. Work has been done on more than 150 standardization projects. Of these forty have been completed. More than 200 national organizations are participating in the various projects through their accredited representatives. These include more than 1,000 different individuals.

A systematic plan of co-operation has been adopted by which all organizations interested in any particular standardization project participate (1) in deciding whether the work shall be undertaken at all, (2) in formulating the standard, and (3) in bringing about its ultimate approval as an "American standard."

In one important particular the method of work of the committee differs from that of the foreign national standardizing bodies. When the committee was formed there were already a large number of organizations doing standardization work. This led to a policy of decentralization, each sectional committee being organized by and under the leadership of one or more of the principal bodies interested. Such bodies are known as "sponsors." This plan makes the committee the most decentralized of all the national standardizing bodies.

Approval of Existing Standards

For some time the unification of existing standards will necessarily form an important part of the committee's work. The rules of procedure provide that an existing standard "may be approved by the main committee, if, in its opinion, the standard has been developed by an organization and procedure substantially in conformity with these rules, or it has, by actual practice, proved its right to become a standard," without the standard having gone through the machinery of a sectional committee.

At one time the committee intended to withdraw the provision in this procedure providing for the approval of existing standards, but the development of the method of handling the approval of such standards, and further experience with it has shown it to be a valuable and flexible method of bringing about national agreements on standards. Hence it is now planned to continue the provision indefinitely.

An organization like the American Electric Railway Association may have many relations to the work of the American Engineering Standards Committee—as a co-operating body, with representation on sectional committees; as a sponsor; as a body submitting existing standards for approval; and as a member body having direct representation on the main committee.

Sustaining Membership

I have often been asked as to methods of financing the work of the American Engineering Standards Committee. A plan of permanent financing has been worked out through sustaining memberships. Industrial concerns are being asked to subscribe directly. The schedule of subscriptions recommended is on a basis of approximately 1 cent per $1,000 of annual gross receipts. More than 200 sustaining members have now been enrolled.

It is already apparent that such sustaining memberships are going to play a very important rôle in the actual work itself, since they provide a direct channel through which the firms in-

*Abstract of a paper before the annual convention of the American Electric Railway Engineering Association, Atlantic City, N. J., Oct. 8-11, 1923.

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terested in standardization work may be kept in direct and intimate contact with the standardization work which concerns them.

Relation to the Government

Few people who are not in immediate contact with the standardization activities of the federal government have an adequate realization of how extensive these activities are. Nearly all of the ten regular departments and the various independent establishments are doing more or less standardization work which directly or indirectly affects the industries generally. This falls into two general categories: first, that carried on chiefly in the form of specifications by the purchasing agencies of the government; and second, that carried on by the research and investigational bureaus. Such research agencies as the Bureau of Standards, Bureau of Mines, Bureau of Public Roads and the Forest Service are carrying out much important research work, the results of which are of great value to the industries concerned, and many of them have an intimate bearing upon problems of industrial standardization. These bureaus co-operate effectively with trade associations and national engineering societies engaged in the various special fields of engineering and industrial standardization, and they are now actively participating in the extensive program of standardization work going forward under the auspices and procedure of the American Engineering Standards Committee.

The federal government is one of the largest purchasers of industrial products, both as to the amount and the range of supplies which it requires. One of the early acts of the first Director of the Budget was the organization of the Federal Specifications Board, composed of representatives of the various purchasing agencies of the federal government under the chairmanship of the director of the Bureau of Standards. Its purpose is to unify government specifications and to bring them into line with the best commercial practice. Government specifications are being submitted to the A.E.S.C. for criticism and to determine their acceptability to industry. The Federal Specifications Board, together with the Bureau of Standards, maintains a liaison representative for co-operative work with the A.E.S.C.

The division of simplified practice of the Department of Commerce concentrates its work upon the elimination of unnecessary lines, types, and sizes of manufactured products, particularly in those situations in which decisions must be made upon a non-technical basis.

A.E.R.A.'s Relation to the Movement

The A.E.R.A. is represented on the main committee by the chairman of its standards committee, Martin Schreiber. From the first, the association has taken an active interest in the work of the A.E.S.C., and is co-operating extensively in a large number of projects.

Naturally much less has yet been accomplished in international industrial standardization than in national work. Yet beginnings have been made in several fields and in some lines substantial progress has been made.

From the very nature of industrial standardization it should be evident that there must be a full, mutual understanding and appreciation of the problems and point of view of the various parties at interest. This is true regardless of the scale upon which standardization in any particular project is carried out. The secretaries of the national standardizing bodies made the question of interchange of information a principal consideration in their conference in London two years ago, and again in Switzerland this summer. Information on the status of all projects before the national bodies is regularly and automatically interchanged among all of the national bodies, and the way has been paved for a very extensive interchange of information on a project at all stages of progress in its development.

It seems to me that the problems now confronting many of the national standardization movements are much the same as those that surrounded the movements toward trade associations in this country a few years ago, while international standardization will follow in much the same way, but without going so far or so rapidly. Whatever the ultimate outcome may be, it seems to me that the next step in any case is the same—to develop as full and as free an interchange of information as conditions will permit.

*Maintenance of Men**

By Hart E. Fisher, M. D.
Chief Surgeon
Chicago Elevated Railroads

Hart E. Fisher

Care Should Be Used in Selection of Employees to Eliminate Defectives—In This Way Accidents that Are Due to Man-Failure Can Be Lessened Materially

IN ANY public utility company will be found departments organized to carry on the different functions of the business. In railroad companies the transportation department is in charge of the operation of trains and service directly to the traveling public; the electrical department has supervision over all things electrical, pertaining to transportation; the maintenance of way department, supervise the construction and maintenance of tracks, roadway and buildings. There should also be a department for the maintenance of men—in charge of all activities having to do with the health of employees in their relation to the industry. Not every railway line should have a medical department with the various branches of its work, as this would be impractical from an economic standpoint; but there is no road so small but that it can well afford to adopt a regular medical policy.

This maintenance of men is incorporated in the Chicago Elevated Railroads in the work of the medical department. The management believes, and experience has proved, that the real work of a medical department is along the line of prevention; that the company should do all that is humanly possible to correct conditions so that environment of employees is sanitary and healthful; to adopt appliances and practices that will prevent injury to employees or passengers, as well as to select those employees who are physically and mentally fit for the duty of transporting the public, and after employment, to maintain these workmen in a healthy condition.

Causes of accidents and inefficiency on the part of employees are prevented by careful physical examination of all new men and frequent re-examination of old employees at regular intervals, as experience and conditions warrant. Also examine all employees after any unusual occurrence or accident, to determine if any physical or mental condition exists which might have been the cause of such accident.

Physical Illness or Defects

Defective vision, undetected, is a direct cause of accident in a great number of cases. A person with defective vision—near or far—is a poor judge of distance, and slow at what is known as accommodation. For that reason he does not see the source of danger as readily as the man with perfect vision. Frequently, when a man is told that he has defective vision, he replies that he can see as well as you or I. That may be a fact as far as

*Abstract of a paper before the annual convention of the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., Oct. 8-11, 1923.

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the man is concerned because his defect has come on gradually, but nevertheless he is under a constant strain and it is only a qustion of time before the sight becomes more impaired and an accident occurs. This eyestrain is also the cause of incivility on the part of trainmen to passengers, as the eyestrain causes a nervous tension, and, if headache is present, you will have an irritable person to deal with.

Sometimes an injury, trifling in itself to the normal eye, will result disastrously to an eye that has defective vision.

Stereoscopic or double vision is a direct cause of accident. Astigmatism, with the accompanying sudden fogging of vision, both partial or incomplete in one or both eyes for a short period of time, will occur just when normal sight is most needed. Eyestrain is often conducive to dizzy spells at a time when one needs normal equilibrium, and the sufferer is himself injured or causes injury to a passenger.

The remedy for defective vision is properly fitting glasses to relieve the nervous strain and correct the error of refraction. However, glasses often are, in themselves, a source of danger. They may be left at home, lost, or broken and the employee who goes to his work without them runs the risk of having an accident because he is not accustomed to working without glasses. Very often the lenses fog from the cold or from perspiration, partly obscuring the vision and the man is hurt. Even soiled or smeared lenses are causes of injury. One of the greatest risks is that of the glasses being broken and a piece injuring the eye when the object which struck the glass could not have struck the eye itself. Colored or tinted glasses are taboo, especially in train service, where they may cause a change in the man's ability to distinguish signals.

Any man who is color blind has no place in railroad or marine work if he is to handle the public safely and competently operate trains or train signals. Those colors most often confused by the color blind are unfortunately the very ones that designate train signals—red, danger; green, clear. Some color-blind men work, apparently with safety, when no examination is made. They watch the switch points when they see a signal color or the signal arm, and if two lights are used they know which is the red and which green by the way it is lighted—top red and bottom green, or vice versa. It is essential that more than one color test be made, and be sure that your doctor is not color blind himself. Do not take for granted that having once tested an employee for color blindness and found his sight normal that he will always remain so. I have, personally, found four cases developing in motormen who had previously passed many tests as normal. Disease had been the cause of the defective color sense developing and was detected in the regular reexamination of employees.

Defective hearing is a frequent cause of accident. It comes on gradually. The deaf one finally has an accident because he did not properly understand orders, or in his effort to hear, he became confused and accident resulted. Some people who believe they are becoming deaf, after removal of impacted ear wax, find that they hear perfectly. Deaf people are prone to become irritable due to their defect and act impulsively, thereby causing accident. Defect in hearing is often the source of complaint by passengers of incivility on the part of an employee by reason of his speaking too loud, not paying attention when addressed, or because he gives wrong information due to not having heard the question correctly.

Some deaf people operate trains with apparent safety by watching the hammer of the signal bell, looking out to see that all is clear before starting, etc., where no examination is made. Placing of an employee who is deaf on the witness stand, in litigation, makes a very unfavorable impression on the jury. There are a great many people with defective sight, color blindness, and deafness driving automobiles who are the cause of accidents.

Very often an employee who has an accident remarks that he cannot remember what happened. He is correct or he undoubtedly had a fainting spell, heart failure (syncope), and of course he cannot recall the details of his accident. Examine these cases and see if the heart is not the offender rather than the employee's carelessness. Defective hearts are also the cause of absenteeism from work. Employees should be carefully examined for heart conditions after such illness as rheumatism, infection, and contagious diseases.

A man may have a sudden weak spell due to his defective heart, exaggerated by indigestion due to overeating just prior to going on duty, and the temporary loss of his full faculties results in an accident. There is no place for sentiment when a motorman is found to have a defective heart, and you will have to play absolutely safe here.

Neglected teeth are responsible for a large amount of the rheumatism and so-called stomach trouble. If we urge upon employees the great benefit to be derived from caring properly for the teeth, the rate of absenteeism can be greatly reduced.

An employee with hernia or rupture is liable to be overcome by a sudden weak spell or pain in the groin or back, causative of injury. If you question a man who has dropped some object on his feet or suddenly let loose of something with disastrous results, he will very often say that he had a pain or felt weak and let go. Examine him for rupture. If these cases have trusses on, they are handicapped by the truss, which often slips on exertion and is the cause of injury. Operate on all hernias in young or middle-aged men, and, when they are found in old men, place the man on a job where muscular effort is not necessary. Symptoms of hernia direct a man's attention from his work. An unsupported hernia is liable to strangulate and cause the death of the patient.

Trainmen, because of the nature of their work, are obliged to be on their feet for long periods of time, and if they have varicose veins or flat feet they very quickly become fatigued, less agile, and mentally irritable to passengers and may cause injury to a passenger by reason of having their minds diverted from their work.

It is said that with old age one also becomes cross, crabby, neglectful. If examination is made of these employees you will find, no doubt, that they are suffering from some illness which is undetected or of which the patient knows but keeps from his company. Ofttimes an old employee is found going to sleep on duty—examination may show that he has Bright's disease, diabetes, or some illness which causes a temporary drowsiness to come on over which he has no control. This is frequently the explanation of accidents or collisions when the motorman or engineer has a clear view ahead, as well as for running past stations or meeting points. Employees must have the full use of legs, arms, and fingers properly to protect themselves from injury.

Mental Causes of Accidents

Observation of an employee gives a clew to his mental or physical defects, which, undetected, may lead to accident. A neat, clean man is often a safe and healthful man, while the slovenly, careless person is very liable to be an inefficient and unsafe worker, as well as an unhealthful individual. The nervous, excitable man because of his quick, impulsive manner of doing things is frequently the direct cause of accident either to himself or to a passenger; more often, probably, he gives rise to many complaints from passengers on account of his actions. The loud, boisterous fellow is conducive to accident and offensiveness to passengers. Courtesy cannot be expected from the boisterous, loud chap because he knows no such thing as courtesy.

The worried, troubled, or agitated state of mind is the cause of innumerable accidents in industry today. Worry over financial matters, grief over family illness or death, anger or strife in the home or at work, hatred, malice, or envy of one's fellowmen are all conducive to accident. When a man is angry and in a temper, he acts impulsively, taking chances and doing things which he would never think of doing in a peaceful frame of mind.

If the work at hand calls for constant repetition, the man assigned to that task should not be of a nervous or temperamental type. There is also the fixed mind such as that one which minimizes all rules, work, or anything coming from the employer. The radical is in this class. So is the old employee who has been in the habit of doing a thing his way and will not be told how to do it in a better or safer manner.

One of the greatest factors in accidents is fatigue of mental faculties on account of the routine nature of the work. A man listening to the constant click-click of the wheels passing over the fish plates is soon lulled into a drowsy state of mind and his faculties

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become clouded. Although apparently in full possession of his senses, he fails to apply his brakes in time and an accident occurs.

You can overcome this fatigue due to routine, monotonous work by having the employee change his work or rest at certain periods. For example, have motormen stand up when they approach stations, meeting points, junctions, etc.

*Reviews of Report of Committee on Bus Operation**

By H. W. Alden

President
Society of Automotive Engineers
New York City

H. W. Alden

Co-operation of Electric Railway and Automotive Interests Is Essential to Proper Development of Transportation—The Bus Is Here to Stay and Should Be Incorporated in the General Transportation Scheme

IT IS not too early for the designer and builder of motor buses to get together with the user. Only by sincere and hearty co-operation can satisfactory progress be made. Plain speaking on both sides, if of a constructive nature, is to be welcomed by both sides. I feel that at this, our first official appearance with you, we should not be too argumentative. It is of far more importance that we both get together as we are doing now.

Your committee is to be congratulated on the breadth and scope of its investigations. It should furnish an excellent foundation for future endeavors. Judging from the phenomenal growth of bus transportation, both in city and intercity work, it is very evident that the motor bus fills a certain need in the life of the nation. Here it may be overdone. Here it will be foolishly handled. Out of it all, however, will gradually emerge a new form of passenger transportation, giving a service which the street railway never can give. In the last analysis, however, it will remain only when and where it can make money for the operator. This is the final test—it must be a revenue producer.

In getting together by very limited discussion, I wish to give credit for great assistance in preparing these notes to the publishers of *Bus Transportation*, Colonel Green of the Yellow Coach Company and to Mr. Horner of the General Motors Corporation. Your attention is also directed to a paper by W. P. Kennedy before the metropolitan section of the S. A. E., on the subject of trolley buses, and to the discussion of this paper. In both there is a great deal of valuable information.

Proceeding now to the report proper, the first thing that struck me was that the companies investigated were all street railway companies. I can readily understand that to carry on a complete investigation covering the operation of outside or independent bus lines might have been quite difficult and might have been contrary to the policy of the association. It would seem, however, that the figures presented by the report would have been somewhat different if independent companies had been included, because a great many bus companies are making money.

The general summary of the results reported by your twelve companies investigated shows a net loss. We should not jump at the conclusion that this is a chronic and expected condition. Your report, however, does show that four out of the twelve companies had a revenue in excess of expense. Two of the twelve had such ridiculously low revenues that it would seem that they had tried to operate under impossible conditions.

It would appear to us that your association ought to extend its official investigations to independent companies. It is realized, of course, that the conditions under which many of the independent companies operate are free from some of the handicaps that the street railway companies are saddled with. On the other hand, the street railways have always been firm believers in trying to get a clear picture of what the other fellow is doing and making it a matter of permanent record.

Furthermore, the investigation covers only single-deck buses. Now there are many places where a double-deck bus is to be desired, as evidenced by its success in London, New York City, Chicago and Detroit, in all of which cities the revenues exceed expenditures by a comfortable margin.

It is gratifying to us motor people, however, that in spite of the rather gloomy picture painted, the consensus of opinion among your operators seems to be that the motor bus is here to stay. The early years, so to speak, are, however, painful. They appear to be so in this case. However, I am informed that in 1921 composite results of fifty-two city railways showed 46.5 cents a mile revenue and 45.7 cents a mile expense. This is not a particularly rosy picture either.

Sound and Economical Reasons for Using the Bus

In analyzing the reasons cited by your companies' investigators as to why motor bus transportation was undertaken considerable light is thrown on the subject. These can be roughly classified as follows: (a) To meet competition; (b) to give better service; (c) to fulfill an obligation resting upon the transportation system which has the monopoly of transportation; (d) to feed new territory at a minimum investment and expense.

These are all very sound and economic reasons. I venture to suggest, however, that in some cases, at least, the proper equipment was not chosen. Too much care cannot be given to this

*Abstract of a contribution to the discussion on bus operation before the annual convention of the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., Oct. 8-11, 1923.

COMPARATIVE STATEMENT OF MAINTENANCE COST PER 1,000 CAR-MILES FOR CARS AND EQUIPMENT OF CITIES NA

Account	Atlanta				Memphis				Birmingham				Little Rock		
	July, 1923	Year to Date, 1923	July, 1922	Year to Date, 1922	July, 1923	Year to Date, 1923	July, 1922	Year to Date, 1922	July, 1923	Year to Date, 1923	July, 1922	Year to Date, 1922	July, 1923	Year to Date, 1923	July, 1922
Superintendent of Equipment	.848	.863	.875	.931	.86	.81	.86	.87	1.7	1.5	1.6	1.7	1.82	1.96	1.72
Passenger and Combination Cars	8.802	10.498	9.586	10.136	13.75	14.37	14.36	14.43	10.5	12.8	17.00	15.70	11.77	12.78	13.83
Freight and Express Cars	.45	.008	.005	.012	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Service Equipment	.138	.265	.222	.202	.96	.47	.37	.23	.1	.4	.6	.3	.15	.14	.08
Electrical Equipment of Cars	5.812	5.123	4.997	6.047	5.82	4.89	5.47	5.42	7.1	6.9	8.4	8.3	6.97	8.94	6.34
Shop Equipment and Tools	0.48	0.46	.102	.102	.13	.20	.08	.13	.2	.2	.1	.2	.14	.29	.53
Shop Expenses	1.494	1.133	.715	.866	.83	.99	.87	1.03	1.2	1.2	1.3	1.2	1.42	1.35	1.42
Miscellaneous Equipment	0.56	.119	.042	.079	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total Maintenance	7.245	18.055	16.545	18.377	22.35	21.73	21.31	22.11	20.7	23.1	29.00	27.6	22.28	25.46	23.93
Renewals and Replacements, Mechanical Department Only, 1922	No record				$11,409.27				$58,915.46				None		

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point. Differences in types of vehicle may easily be the difference between red and black figures at the end of the year.

Proper routing is another important element, probably not any too well understood as yet.

The speed of operations is a very important factor not very thoroughly covered in the report. A change in motor cars, gear reduction, etc., which would raise the average speed of a city bus even so much as 10 per cent might also change a loss to profit.

Little appears in the report on special forms of equipment for special services which may, when properly catered to, mean the difference between a deficit and a surplus. The motor bus is excellently adapted to give express service, which is something that even double-track street railways cannot give. The double-deck bus, furthermore, creates a traffic of its own and people delight in the upper-deck comfort. I mention these points simply to bring out the fact that when all of these features of motor bus transportation are studied and their revenue-producing capacity made available the net operating financial results might be quite considerably altered.

We have found in Detroit that twenty-five-passenger one-man buses can be operated with very much less money per mile than even the small one-man street cars, and are going to be very considerably used for outlying territory, operated in conjunction with the railway department for the city.

I had expected a complaint from your committee that much of the equipment that the members of your association had been compelled to buy was little more than built-over commercial cars and chassis. The motor bus builder is open to criticism, in nearly all cases, in trying to do just this thing. Some of the companies, of course, have recently made up and developed special equipment. Bus service demands special equipment from end to end, designed primarily for bus service, because conditions and requirements are totally different from those resulting in merchandise transportation.

On the subject of depreciation there is a wide variation in your practice. Surely these figures might be brought more nearly uniform. On the whole, it seems as if the figures taken are unnecessarily high. Given the right equipment; that is, one which will not soon become obsolete, a ten-year life is not unreasonable, when the vehicles are operated under good maintenance practice. Their table gives depreciation as about 13 per cent of the total expense on the average. This seems high. Of course, in the early days of any project it is wise to err on the safe side, but it would seem that there were enough well established data, as evidenced by the London General Omnibus and the Fifth Avenue Coach Company, to indicate 7 or 8 per cent as being an adequate depreciation. I note that your committee advises its members to study carefully the practice governing depreciation. This is very timely advice.

It is very gratifying to see the earnest purpose of your association to take up this new instrument, which our industry has produced, and to give it a fair trial. We know that we are just beginning to understand the problems to be met. We pretty generally appreciate now the necessity of quite special equipment. Working with you, we can more and more meet your requirements. On the other hand, you will have to give these new things a fair chance to see what can be accomplished with bus operation, as you have in most cases done with the idea of making it financially successful. The motor bus has many fundamental characteristics that make it excellently adapted to fill a public need and ought to enlarge your field of operation, enable you to hold business you otherwise would lose and, properly combined with your railway operation, it should lead to ultimate economy and operation of the entire system.

*Mechanical Men's Association Improves Maintenance**

By A. D. McWhorter
General Superintendent
Memphis Street Railway

A. D. McWhorter

How the Southern Properties Have Combined to Exchange Monthly Reports and Information—As a Result Maintenance of Equipment Figures Are Tending Downward

REALIZING that the individual can measure his standard of efficiency only by comparison, the Electric Railway Association of Mechanical Men, Southern Properties, embracing Birmingham, Nashville, Little Rock, Dallas, New Orleans, Mobile, Atlanta and Memphis, was organized in Memphis, Tenn., in April, 1922. The object of this association was to create friendly competition and increase the efficiency of the mechanical men and the mechanical departments by comparing monthly operating results of the various companies.

Previous to the organization of the association, several of the properties had been exchanging monthly reports on car pull-ins and average miles per pull-in. These reports are still being exchanged and, in addition, we are exchanging reports showing the total maintenance cost of equipment, subdivided as to the various accounts, also a statement showing cost of inspection and car cleaning. These reports are posted in the shops of the various companies and the rank and file of all the organizations are kept posted and know how they compare with the other member companies.

Each member sends his report to Memphis as early after the first of each month as is possible. A standard form of classification is used by all members.

*Abstract of a paper before the annual convention of the American Electric Railway Engineering Association, Atlantic City, N. J., Oct. 8-11, 1923.

OR MONTH OF JULY, 1923, AND FOR YEAR TO DATE COMPARED WITH SAME PERIOD OF PREVIOUS YEAR

Dallas				Mobile				New Orleans				Knoxville				
July, 1923	Year, to Date, 1923	July, 1922	Year, to Date, 1922	July, 1923	Year, to Date, 1923	July, 1922	Year, to Date, 1922	July, 1923	Year, to Date, 1923	July, 1922	Year, to Date, 1922	July, 1923	Year, to Date, 1923	July, 1922	Year, to Date 1922	Account
.867	.765	.63	.69	1.52	1.85	1.72	1.95	3.02	2.80	2.49	2.17	1.02	1.84	1.7	1.8	Superintendent of Equipment
16.906	13.604	13.29	15.39	18.50	17.80	19.00	23.10	14.68	16.25	29.17	31.30	10.30	19.55	30.5	23.2	Passenger and Combination Cars
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Freight and Express Cars
.445	.469	.63	.21	.58	.40	1.14	.40	1.20	.99	.90	.68	.05	.25	.8	.8	Service Equipment
6.037	7.813	7.96	7.21	4.30	4.80	5.60	5.00	10.81	11.56	17.34	15.79	7.10	11.80	12.3	12.7	Electrical Equipment of Cars
.176	.296	.21	.38	1.65	1.92	1.75	2.20	.42	.42	1.05	.94	.06	.18	.6	.5	Shop Equipment and Tools
1.73	1.729	1.70	1.60	...	...	...	...	.99	.98	1.00	.93	.20	.68	.5	.8	Shop Expenses
.602	1.095	.53	.50	.05	.30	.05	.29	.74	.90	1.22	1.29	.05	1.68	2.7	2.8	Miscellaneous Equipment
26.765	25.771	24.95	25.98	26.60	27.10	29.40	33.30	31.86	33.90	53.17	53.10	18.74	36.09	49.1	42.6	Total Maintenance
	$193,496.01			No record				$471,433.96				$85,735.82 All Depts.				Renewals and Replacements, Mechanical Department Only, 1922

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When these reports are received, we prepare a statement, compiling figures covering all cities, showing the monthly operation and yearly figures to date. A copy is sent to each member about the tenth of each month.

The results obtained, as shown in the accompanying tables, have been most gratifying to both the mechanical men and the management of the various properties. The maintenance of equipment figures are tending downward, so we feel that we are accomplishing something worth while.

We have two meetings each year, in January and July rotating among the various cities. We have two-day sessions. The first day is spent in discussing various problems that are common to all and giving each other the benefit of our experiences, etc. The second day is spent in inspecting shops and carhouses.

AVERAGE MILES PER PULL-IN AND PERCENTAGE OF INCREASE IN MILES PER CAR PULL-IN FOR EIGHT MONTHS OF YEAR ENDED AUG. 31, 1923

Property	Average Miles per Pull-In Chargeable to Carhouse.	Average Miles per Pull-In Not Chargeable to Carhouse.	Total Average Miles per Pull-In.	Percentage of Increase in Miles Operated per Pull-In.
Atlanta.....	8,143	16,971	5,502	71
Birmingham.	10,683	61,244	9,095	173
Dallas.....	2,353	6,639	1,737	16
Knoxville....	8,929	24,135	6,517	772
Little Rock..	8,944	19,045	6,086	251
Memphis....	15,128	42,601	11,164	2
Mobile.....	6,201	17,508	4,579	3
Nashville....	10,948	27,049	7,202	107
New Orleans.	45,394	40,679	21,454	665

*Control and Handling of Materials and Supplies**

By P. F. McCall
Superintendent of Materials and Supplies
Chicago, North Shore & Milwaukee Railroad

Handling of Stock in the Storeroom Is Facilitated by Proper Methods — Perpetual Inventory Is as Effective as Annual System and Less Subject to Mistakes

THE business of controlling and handling materials has certain fundamentals which may not be disregarded. Charged with the responsibility of requisitioning, receiving, storing and accounting for all materials used on the property, it behooves the storekeeper to employ methods which will keep his stocks intact until the materials are placed and charged to the proper accounts. The most effective methods of properly controlling materials include the use of a stock book, a standard classification of materials, accurate inventories and daylight storekeeping.

A stock book should be maintained for more important uses than as a mere history of material purchases and disbursements. Properly watched, it will eliminate that sad old story, "We are out of that item; come back next week," as the use of minimum records will point out the low level to which the stock may be carried safely. It will also disclose to the observing storekeeper obsolete or slow-moving items of materials; give an accurate check on scattered or isolated stock; show the turnover for any desired period, and as an indicator of future requirements will more than justify the expense of its maintenance.

Proper control of stocks is greatly facilitated by the use of a system for the classification of materials into groups according to their general or specific uses. Having determined a class to which an item of material properly belongs, a designated symbol or lot number, other than that furnished by the manufacturer, should be given that item.

The physical arrangement of the stock in the storeroom should follow the same order in which the items are listed in the stock books. By using a lot number system and applying the same lot numbers to the pages in the stock book or ledger a cross index system is given for ready reference. If values are carried in the stock book a consolidated report can be made out in classified order at any period desired, showing the value of stocks on hand, purchased and disbursed in each class.

The generally accepted idea of an inventory is that the stores department should be closed up for the time required to count and weigh each item at least once a year, but it is questionable if this is just the way to do it. On most properties the stores department has become a very necessary part of the railroad organization, and to close up this department for a period of several days necessarily has a very decided effect on others who rely upon it for service. Up-to-date manufacturing companies have ceased to close for inventory purposes. They have instead installed systems which will tell them at all times the amount of money tied up in their raw and finished products.

A perpetual system of inventory is just as effective as the general annual inventory and is less subject to mistakes because the organization is not rushing to get it finished. Further, the perpetual system permits of frequent small adjustments which are not possible under the annual system. On the railroads which I represent we maintained the perpetual inventory for a period of over five years before our officers decided that a general annual inventory should be taken, and we found that the total adjustment necessary upon the completion of the work was about one half of 1 per cent.

Good housekeeping is a very essential thing in the proper control of materials, and I know of no better way than to use what is known as the daylight system of storekeeping. The system is very simple and consists of skeleton shelving with trays, into which the materials are neatly piled in uniform count. The trays containing the materials are then piled on top of one another. A collective system of tagging is used, beginning at the bottom and running to the top, so that the amount shown on the tray next to the top which contains the highest uniform count, plus the broken amount in the tray on top, gives at a glance the exact number of pieces or pounds in each tray.

This same idea can be carried into shops and yards where bulkier items of materials are stored, such as ties, rails, lumber, etc. These materials can be handled in exactly the same manner as those in the storehouse, with the exception, of course, that no trays are used. Materials are simply piled in uniform units, which are very readily counted without being pulled down or moved for inventory or reordering purposes. After having used this system only a short time I found it necessary to make a check of our maintenance of way materials some ninety days ago, and it developed that we were able to take the inventory in just 50 per cent of the time formerly used to inventory the same amount of material.

The system discloses at once any careless or dirty methods of storing material, particularly if the shelving is painted white. The whole scheme is made much more pleasing by having a white storehouse interior. This may seem ridiculous in view of the character of materials handled on electric railways, but it is surprising how long the effect can be maintained.

Storekeepers owe it to their companies and themselves to insist upon the best housing facilities for their materials that the financial condition of the company will allow, keeping in mind that the materials in their care often represent more value than the cash carried in the treasurer's vaults. A clean, orderly system of housekeeping in storehouses and yards, together with an energetic effort on the part of the storekeeper to have his department render real co-operation and service to the department using the material, is bound to bring recognition from his executives and success to the department as a whole.

*Abstract of a paper before the annual convention of the American Electric Railway Engineering Association, under the auspices of the committee on purchases and stores Atlantic City, Oct. 8-11, 1923.

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Some Practical Results of Commission Regulation

In a Symposium Conducted by the American Association, the Public Service Commissioners Themselves Tell What Has Been Accomplished—The General Trend of Regulation Is Favorable, Although There Have Been Some Unfortunate Laws Passed that Have Made the Work of Regulatory Officers Difficult

A NUMBER of the leading utility commissioners were invited by President Emmons to take part in a symposium at the Wednesday morning session on the general subject of public utility commission regulation. The response to the request was excellent, and the papers presented showed that the speakers have been giving much thought to the problems of the day, one of the most pressing of which is the ever-present one of bus competition.

The symposium was opened by Dwight N. Lewis of the Iowa Board of Railroad Commissioners. He was followed by Henry C. Attwill, chairman Massachusetts Department of Public Utilities; Charles C. Marshall of the Public Utilities Commission of Ohio; Lewis E. Gettle, chairman of the Wisconsin Railroad Commission, and William Milnes Maloy, chairman of the Maryland Public Service Commission. The interest taken was so great that it was found necessary to defer until Thursday the paper by Henry C. Spurr, editor of *Public Utilities Reports*. Abstracts of the addresses appear below.

The Iowa Law of Convenience and What It Implies*

By Dwight N. Lewis
Member Iowa Board of Railroad Commissioners

WE HAVE recently had added to our duties the administration of a motor bus and truck law. Like the psalmist sang of himself, "It is fearfully and wonderfully made." In one section it provides that the board shall grant a certificate of operation to a bus or truck operated for public hire if it is shown it would promote public convenience so to do. The words "or necessity" were in the original bill, but were stricken out on later consideration of the measure. The penalty clause, also the one requiring the board to fix rates, were both stricken from the bill in final passage. The only penalty now provided is that the board may revoke the license.

The question is being presented to us constantly as to whether a particular bus or truck line will produce such competition as will be ruinous to competing steam or electric railways. The only question under the law for our board to determine is whether the public convenience will be promoted by the establishment of the proposed bus or truck line.

In every case presented to us thus far since the law became operative merchants, professional men, citizens of all classes of occupation have insisted that such service would promote the public convenience. Railway operators, both steam and electric, have appeared before us protesting the granting of the franchises on the grounds that adequate service was then being provided by the carriers already established on the proposed route, that the addition of parallel and competing transportation would be an economic waste, resulting disastrously to the carriers by rail. The law does not provide that we shall consider anything but the promotion of public convenience.

Dwight N. Lewis

Just what the promotion of public convenience means is not easy to determine. Must we take into consideration the possible effect of bus competition on the business of rail carriers, and its resulting consequences on the service which such rail carriers may eventually be justified in rendering to the public as a whole? Is the carrier by rail so sacred in the eyes of the law that there may never be a competing system of carriage permitted? Must all progress in the methods of carrying passengers and freight for hire be halted because the carrier by rail is already on the ground? If the public demands the right to ride in buses on the public highway or send its goods by motor truck, is it the business of a railroad or utility commission to say no? I am aware of the many commission decisions and some court decisions wherein it has been held that under the clause "public necessity" there was no necessity for the additional service by bus or truck when a carrier by rail, ready to serve, was already on the ground. How about it, however, when a commission is explicitly told by the legislature to consider the promotion of public convenience only? If, under these circumstances, we find it would be convenient for the public to have a bus line between two given points, competitive with a rail carrier, would it not further promote public convenience to have two bus lines or three or four, or a bus every five minutes maybe? *Reductio ad absurdum* perhaps.

It is not the business of an administrative body to determine the policy of the state. If the supreme legislative power says the promotion of public convenience is only to be considered, then it is not our province to inject other conditions into the act.

My own opinion might be that the rail carrier, with its hundreds of thousands of dollars of investment, ought to be protected; that it is in the interest of the public that the great tax-paying carriers by rail should not be hampered or destroyed by a bus or truck competition that may render service of a day or a month or a year, then find it unprofitable and quit.

You gentlemen engaged in the operation of systems of electric railway must meet and overcome the increasing competition of bus lines or get ready to quit. The outcome, it appears to me, is inevitable unless our legislatures come to the affirmative relief of the rail carriers.

It may be that the public demand for bus and truck service is a passing phase of transportation, but frankly, I do not think so. The ox train gave way to the steam train, the horse and cable car fell before the swiftly moving electric. Is the electric street car and the electric interurban line to pass into history with other discards of transportation and the motor bus and motor truck make of our highways the great means

*Abstract of a paper before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

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of public travel, as the caravans of old used the military roads of Rome?

It may be so, but before that day comes the public who builds and maintains these roads should protect itself against the additional expense, which the motor carriers should be compelled to pay, and better regulatory laws should be passed than the one under which we are trying to function in Iowa.

Altogether too late, the public may find that it has traded a cheap method of transportation for one that is costly, unsatisfactory and transient. In the meantime, what is an ordinary state commissioner going to do about it when his legislature tells him to grant a certificate if, upon investigation, he finds the proposed bus or truck service would promote public convenience?

*Public Regulation in Massachusetts**

By Henry C. Attwill

Chairman Massachusetts Department of Public Utilities

THE Great War, as we all know, put public regulation to a severe test, and in the minds of many well-informed people public regulation failed to meet the test.

Public regulation is good, bad or indifferent, according to the powers the public board exercises and more particularly according to the courage and the character of the persons who constitute the board. In Massachusetts I feel on the whole that the regulating bodies during the war met their responsibilities well. It is true that in Massachusetts the two largest railway systems passed from private management into public management and control, one the Boston Elevated Railway system, in my judgment permanently, the other the Eastern Massachusetts Street Railway, formerly known as the Bay State, temporarily.

It was not due to public regulation, as we understood the term, that the disaster was brought about in relation to the Boston Elevated Railway system, but it was due to the increase in cost of transportation which made that company unable to carry passengers in a single continuous passage in the same general direction over the system for 5 cents, as was required by an act of the Legislature passed in 1897.

Public operation is to continue until 1928 and thereafter until such time as the Commonwealth may determine to surrender back the control of the properties to the stockholders. The trustees have operated the road now since 1918 successfully and I believe to the satisfaction of the public.

The situation in relation to the Eastern Massachusetts Street Railway was somewhat different. There was no limited fare. The company could increase its fares with the approval of the state regulating body so as to meet the mounting cost of transportation. There again the Commonwealth, through its Governor, appointed five trustees to manage and operate that system. It did not, as in the elevated act, guarantee any dividends. It assumed no obligations whatsoever other than to guarantee the payment of certain serial bonds which under the act the trustees were authorized to issue, not to exceed in the aggregate

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$5,000,000. The operation of that road by public trustees ceases at the expiration of ten years. The other street railways in Massachusetts have continued under private management, substantially with the same laws that applied to them prior to the war.

In the latter part of 1919, the department of which I am a member was organized. It took over the powers that were formerly exercised by what was known as the Public Service Commission, and also the powers that were formerly exercised by what was known as the Board of Gas and Electric Light Commissioners. In view of the financial situation of the street railways in Massachusetts, its policy has been not to interfere with the management of those street railways in the determination of what fare should be charged to the public, or what fare areas should be established, so long as there did not appear in the new arrangement any undue preferential treatment or unjust discrimination.

Of course, they have been obliged to increase their fares to meet the increased cost, either by directly increasing the fare or by shortening the ride that formerly was given for the fare. With a few exceptions, the street railways of Massachusetts have steadily improved in their financial condition, and I believe that the financial crisis, so far as the railways are concerned, has been passed.

It will be observed that broadly the general policy of the commonwealth of Massachusetts is this: that it proposes to allow public utilities to secure sufficient revenue in charges to preserve the financial integrity of the utilities. We in Massachusetts believe that any other policy is suicidal and is bound to result in disaster both to the public and the utilities alike.

Notwithstanding the sound and conservative manner in which Massachusetts has dealt with her utilities, it has not, in my judgment, dealt with the so-called jitney or motor bus adequately. That has been left to the local communities to determine whether they will have motor vehicles carrying passengers for hire in competition with the street railways. The only thing the state board has to do with it is that the street railway or any person has a right to appeal to the state board in relation to the regulations which govern the operation of the motor vehicle.

We have been in much the same position as that referred to by the previous speaker; that the policy of whether they will compete under the act is not for us to determine so long as the regulations which govern them insure the safety of the passengers and adequate compensation in the event of disaster.

Street railways in my judgment must give the motor vehicle careful consideration. In Massachusetts the local communities have exercised on the whole splendid judgment in granting licenses to motor vehicles, but in some areas we still have unwise competition, but it seems to me the only intelligent thing for street railway companies to do is to pre-empt the field in relation to motor buses and establish such service wherever they can, where the buses will pay and the street car will not pay.

I think the railway companies have been too reluctant in the past to do that which private individuals are attempting to do with the motor buses. In Massachusetts there is no field for the motor bus and the street car competing with each other. Where such a situation exists it means that either one or the other, or both, will have to go out of business. After all, when all is said and done it is largely an economic question.

In conclusion, I am going to express to you some convictions that I have gained through my experience in public affairs. In order that I will not be misunderstood or that I will not be misquoted, I propose to read to you those convictions if you will bear with me for a moment:

It is only by wise and intelligent regulation of public utilities that their operation by private management can hope to succeed. Such regulation can only be exercised by the same board with broad powers, representing the public. Such a board must be constituted of men of intelligence, but above all men of character and courage. The members of the board must recognize that the utility, to serve the public, should be assured of conditions which will enable it, under honest and prudent management, to obtain a fair return upon its invested capital.

Courts, with but indifferent success,

*Abstract of a paper before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

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have tried to define what is a fair return. Their lack of success in defining with exactness and precision what is a fair return arises from the fact that the question is an economic one, rather than a legal or constitutional question. To obtain a fair return, a public utility ordinarily should be allowed to charge rates that will maintain its credit and enable it to issue its securities at par. This, of course, assumes that the company has been honestly capitalized and prudently managed. Given these conditions, any return less than that necessary to maintain its credit and yet enable it to issue its stock and bonds at par is an inadequate return and will result in injury to the company and the public alike.

Without credit and without the ability to secure new capital, no company can hope to give the service the public requires and demands. The public utilities, in my judgment, will never obtain the desired result by resorting to the courts. Ordinarily such action tends to create hostility upon the part of the public, whose good-will the utility should constantly cultivate. It is only by constantly educating the public that, after all, so long as only reasonable returns are derived by the public utilities their interests are those of the utilities, that successful operation by private management will succeed. On the other hand, this result cannot be secured unless the managements of the utilities realize that they are engaged in a public service in which the public is entitled to the best measure of service obtainable for the least charge reasonably necessary to maintain the utility in a sound financial condition.

*Killing the Goose that Lays the Golden Eggs**

By Henry C. Spurr
Editor of "Public Utilities Reports"

AESOP was a very keen observer. In story form he illustrated some very common traits of character. There was a certain man, he said, who was fortunate enough to have a goose that laid golden eggs, but not being satisfied with a golden egg a day he decided to hasten matters by cutting up the goose and seizing the whole treasure at once. The result was that he lost everything. Now, the man might have said to himself, "I have a very unusual goose. It is true that it lays golden eggs, but, unfortunately, it has an appetite, just like any other goose. Perhaps it will not do to kill it. I have a better plan. Instead of cutting up the goose I will cut down its food. Instead of giving it two handfuls of barley corn I will give it only one. I will thus save on the feed and make on the eggs." But in the end this policy would be as fatal for the goose and as bad for the man as the other.

Similar Treatment of Railways

For a number of years the public, by the machinery set up for that purpose, has been trying to find out how little corn the goose can get along on. We have been very much concerned about whether we should give the goose six, seven or eight handfuls of corn in exchange for the golden egg. Not only that, we have often been quite nasty to the goose. Notwithstanding the golden eggs, we have called the goose hard names. We have looked upon it with more or less distrust and suspicion. Our politicians have deemed it a fair object for abuse. There has been very little thought of treating it with kindness of generosity. Its appetite for corn has been a constant source of annoyance. Some have gone so far as to say the public is entitled to the golden eggs anyway, and that it doesn't matter whether or not the goose has any corn.

While the Board of Trade of Birmingham, England, was investigating railway charges it received a number of interesting letters from shippers. One of these, which the board said was characteristic, ran as follows:

"What we shippers want is to have our fish carried at half the present rate. We don't care a ——— whether or not it pays the railways."

Have we not seen many letters of this kind in the newspapers of this country on the question of the 5-cent street railway fare?

This attitude of the public toward the railways is, however, not so very surprising. It is a very common human trait or else Æsop's fable would have had very little point. The tendency to abuse our greatest benefactors is quite common. It often happens that

It's the man who does the best
That gets more kicks than all the rest.

These tendencies, however, while prevalent, are not universal and are subject to correction, and the problem is how to convince the public that the goose cannot live without food; that if there is any question as to the exact amount it needs, it is better to be liberal than niggardly; that after all a golden egg may be worth more than even seven or eight handfuls of corn.

The problem of how to make the public understand this is difficult of solution not only because of the weakness of human nature pointed out by Æsop but on account of the false attitude of the public toward its utilities.

The most serious obstacle in the way of a wise policy of utility regulation is the hostility of the public toward its utilities, and especially toward the railways. Perhaps street railways are worse off in this respect than all the others. The average citizen working in a shop or factory or holding some job behind a counter, or perhaps practicing law or medicine, is usually willing to admit that he knows little about the proper administration of a great private business enterprise, but no matter what the education or experience of the average citizen may be, he generally assumes that he knows more about how a street railway should be run than the men engaged in that business who have made a careful study of its problems. He therefore thinks he sees things to complain about which ought not to be complained about at all. It is largely a matter of attitude. As everybody knows, we do not care very much about what our friends do, but we are exceedingly fussy about the etiquette of our enemies. Hostility always breeds trouble.

It is therefore obvious that if this attitude of the public could be changed to one of friendliness toward the companies, as it should be, it would permit of the establishment of a most enlightened policy of regulation, which in my judgment would mean a minimum interference with the business policies of the companies and the allowance of a liberal return, such a return as would be really attractive to capital.

The public, with its mind open, could be made to see that perhaps it would be wise to allow the goose a little more corn than we have been giving it for its golden eggs. No such policy is possible, however, while the public mind is in its present state. No commission, adopting such a policy, could live. Even the allowance of very moderate increases in rates following the war put commission regulation under a severe strain, subjecting the commissions to violent political attacks in various parts of the country.

Public Hard to Convince

One would think, if the facts were with the railways; in other words, if they deserved the confidence and friendship of the public, they would get it On the surface it would seem that it would be necessary only to lay the cards on the table face up, as the saying is, but the cards have been in that position for a number of years. Under state commission regulation the books and other records of the companies have been opened for public inspection. We have found out all that we thought needed to be known about our railways and other utilities, especially how much money, if any, they were and are making. State regulation has shown the popular belief that utilities were operating at extortionate profits to have been a myth, but the average ratepayer's belief in the myth persists.

The public is very much like the insane man who thought he was dead. Nobody was able to convince him that he was alive. One day a physician had what he considered a happy idea. He would show the insane man that he was not dead. So he said to him:

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"You think you are dead."

"I am sure of it," interrupted the insane man.

"Well," continued the physician, "I shall prove that you are alive. Let me ask you a question. Did you ever see a dead man bleed?"

"No," answered the insane man.

"Did you ever hear of a dead man bleeding?" asked the physician.

"No," was the answer.

"Do you believe a dead man can bleed?" continued the doctor.

"No," was the prompt response.

"Now, I shall show you that you are not dead," said the physician, taking a scalpel and drawing a little blood from the insane man's arm. "You see that you bleed. That proves that you are not dead."

"No," replied the insane man. "That only proves that a dead man can bleed."

The public was sure that the railways, as well as the other utilities, were making enormous profits, and that they only pretended that they were not. The public said: "We will set up commissions and establish the facts beyond peradventure." But when the commissions began to report that the railways would have to have more money; that they were not making unconscionable profits; in many instances were not making any profit at all, did the average car rider say, "This proves that I was wrong. The goose really needs a little more corn"? No, what he said was: "This proves that the books have been tampered with and that the companies control the commissions." I base this statement on newspaper editorials I have read and on expressions of opinion of persons with whom I have talked.

If the public were actually insane on the subject, it would be useless to try to convince it of the truth, but it is not insane. It is merely very strongly prejudiced against its railways and other utilities. Therefore the task of opening its mind by winning its friendship, while difficult, is not an impossible one and it must be accomplished. The public must be protected somehow against the politicians and a certain group of radicals who are constantly feeding upon its fears, suspicions and superstitions and urging it to injure itself under the mistaken notion that it is merely injuring the stockholders of the railways.

There is every reason why the public should be friendly, rather than hostile, toward its railways. An ordinary business enterprise, employing as many men as a street railway and conferring as much benefit upon the community, would be looked upon with friendly eyes and pointed to with pride. Why should not a street railway company—especially under state regulation—be viewed in the same way? What industry is more vital to the welfare of the community?

The attention of the public must be withdrawn a little from the corn and fixed upon the golden eggs. The value of street railway service to the public must be constantly emphasized. From Jan. 1 to July 31 of this year 59,483,519 passengers were carried on the Rochester lines of the New York State Railways. The average daily number of passengers for the first seven months of the year was 280,582, almost the entire population of the city. The average haul was approximately 3 miles. This does not look as if we could get along very well without our street railways. Aside from the mere convenience of this form of transportation for the average citizen, think of what it saves him in money. Think of what it would save him even if the fare were 10 cents instead of 7 cents, as it is.

The residents of the city have a choice of three ways of getting to work. They can walk, use an automobile or take the street cars. Assuming that the average distance from their business is 3 miles, as the average haul indicates, the saving of time back and forth, allowing for all delays, would be from an hour to an hour and a half at least. Is not the time of the average citizen, whether for work or for play, worth much more than the street car fares? If the street cars are used in preference to an automobile the saving is considerable. I do not know whether this has ever been estimated, but some one who is good at figures ought to be able to demonstrate about what is the saving per passenger, and this multiplied by the number of passengers a day and a year would undoubtedly show an enormous saving to the community —golden eggs indeed. This would not be the whole story, because the appreciation in real estate values due directly to the operation of the railways, as well as the benefits to business concerns as the result of bringing employees and customers to their doors, would have to be taken into account. The street railways have always put more money into the pockets of the people than they have ever taken out.

The golden eggs are worth more than the corn. The public, by constant repetition of the facts, must be made to understand this. It must be made to see how it is protected by state commission regulation from unjust charges and why it is as necessary for street railways as for any other business enterprise to make some profit, why it is to the interest of the car riders themselves that their railways should be prosperous.

Stress the Interest of the Ratepayer

This is the important point. The interest of the ratepayer must be stressed rather than that of the company. The patrons must be made to understand their true economic relation to the companies. Let me illustrate: One day I saw an advertisement in a street car. It called attention to unjust paving charges. It stated that the railway was willing to pay reasonable taxes, but asked if the car riders thought this particular tax was fair to the company. It was an appeal for a square deal, but I imagine it received scant attention from the average street car patron. His attitude would probably be: "I should worry about any injustice to the street railway company on account of taxes. I have enough of my own to bother about." Perhaps he might go so far as to say: "I am glad of it. I wish the railway taxes were higher than they are and that there were more of them." The trouble with advertising of that kind is that it does not make the rider see his own interest in the matter. What happens when the company is required to do this paving? In one Pennsylvania town the company was forced to pave the highway from curb to curb. In the city of Rochester, N. Y., 56 per cent of the street area on streets on which the cars run is paved by the railway company. If there were no railways on these streets the cost of this paving would be assessed against the abutting property owners, where it belongs, as it is their property which is directly benefited and appreciated in value. The upkeep would be assessed against the city at large, because it is the general public that uses the pavement. But in addition to making the street car riders pay for the paving, they are often charged something in addition for using the pavement they have paid for.

Why, then, not point this out? Instead of asking, "Is this fair to the company?" why not ask, "Is this fair to you, Mr. Ratepayer? Do you want to pay somebody else's assessment, or any portion of it? How do you expect lower fares if you are forced to pay somebody else's taxes? Why should you pay for the use of the streets when the fellow who owns an automobile uses the streets without charge?" Why not say: "The company is making this fight for you, Mr. Car Rider." I mention this because I have seen both kinds of appeals to the public, the one emphasizing the interest of the company and the other, as it should, the interest of the ratepayer.

The jitney question should be discussed in the same way. The public must be made to understand that automobile competition with street railways when prohibited is not prohibited primarily for company profit but for the profit of the street car riders.

Same Principle Applies in Wagg Disputes

Perhaps nothing engenders more hostility against the companies than wage controversies with their employees, followed by a strike. The car riders themselves almost always side with the strikers. The politicians are in the same camp. Whatever the merits of the controversy may be, the patron of the railway must be made to see that the strike is really against them and not against the company, because it is the car riders who pay the wages. If the claim for the increase is just, well and good; the riders must be made to see that under state regulation, assuming an efficiently operated railway, they are the ones who must remove the injustice by any necessary increase in fares. If the claim for higher wages is unjust, let the riders understand that the company, in resisting, is acting in their interest. This is what I mean by

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stating that the true economic relation of the ratepayers to the companies must be emphasized.

Finally, if a cordial attitude of the public toward its railways is to be secured they must be kept beyond the reach of local politicians. When the railway company operating in Rochester asked for an increase of fare from 5 to 6 cents the local authorities would not allow the state commission to pass upon the question. They succeeded in getting a court decision that the commission was without jurisdiction. Then the city entered into a service-at-cost contract with the company in which the fare was fixed at 7 cents, but provision made for a sliding scale of fares and dividends. This was probably a good contract for the city. The city has a representative called a Commissioner of Railways to look after its interests. But certain newspapers, politicians and others refuse to let the company and the contract alone. They have demanded that the Legislature set it aside, and they are now demanding a new valuation. We have had one municipal campaign in which street railway issues were involved and we shall have more, with the result that undeserved animosity will be stirred up against the company which it will be very difficult to remove. State regulation is not perfect, but it is much better than this.

In conclusion, it should be obvious that no one suffers more from an unfriendly attitude toward the railways and the failure to understand the simple economic laws involved than the public itself. The ratepayers lose by it in the long run. Nothing is gained by killing the goose that lays the golden eggs.

*Utility Regulation in Ohio**

By Charles C. Marshall

Member Public Utilities Commission of Ohio

IN OHIO the regulation of railroads has existed for many years, but the regulation of public utilities began in 1911, when the first commission act was passed. In 1913 the present law was passed, and while this law was being shaped into form by the legislative committees many theories were presented to the General Assembly, resulting in a compromise bill being finally passed. This was due to the fact that the balance of power in the Legislature rested with the large city delegations that were holding out for a law reserving to municipalities the right to fix utility rates and the regulation thereof, with no right of appeal to a state commission. On the other hand, there were those who believed that the utilities were creatures of the state and that the reasonableness of their rates, adequacy of the service rendered by them and the general supervision thereof were of state-wide importance and that they should be regulated by a state commission. The result was a utility law vesting certain general powers of supervision and regulation of certain utilities in the state commission, but reserving to the municipalities the initial rate-making power with appellate jurisdiction in the state body.

We found at the beginning of the war period most of our utilities bound by rates fixed by municipalities, in most cases for a term of years covering the entire war period and longer, and because of the increased cost of labor and material many of them were unable to secure additional capital to make necessary betterments to their properties to enable them efficiently and adequately to perform their public obligations.

The Supreme Court of Ohio has held that the Public Utilities Commission does not have power to alter or revoke

C. C. Marshall

any contractual relations existing between a public utility and a municipality. I am not censuring the court, for I think that is the law in Ohio, but I believe that the State regulatory body should be vested with the power to change rates to meet fluctuating economic conditions and thus insure a proper return to the utilities at all times, and adequate service to the public. This is as important to the public as it is to the utility, for without an adequate return efficient service cannot be rendered.

REGULATION BY STATE COMMISSION BEST

Under the old order of things, municipal politics were controlled by bosses, who compelled the utilities to "pay the freight" necessary to carry the political machinery, and if the utility refused to be bled, its rates were so reduced that its service was inefficient, and the public suffered no less than the utility. In many of our municipalities an organized minority which wants to make the utilities a political football in every municipal election is still able to elect agitators as members of Council and thus inflict great injury upon both the utilities and the public they serve.

The system that permits of this form of regulation is faulty, is wrong. The fixing of the initial rates to be charged for a utility service by a Council composed of men elected by the people who pay for the service to be rendered and who have no facilities for ascertaining the facts on which to base a proper rate is like placing a man on the jury to try his own case. The remedy is to vest that power in a body of disinterested men where such disputes may be settled strictly upon the merits of the case.

Another great benefit resulting from commission regulation in the matter of rate controversies is the intelligent ascertainment of the proper rate to be charged, which intelligence can only be acquired by a governmental body equipped with an available trained staff of engineers, qualified in their respective lines properly to value the property of the utility. This kind of an organization, of necessity very costly, can profitably be maintained by the state to the benefit of all, while it is out of the question for each municipality to maintain or in many cases procure such services, due to lack of funds.

One of the most beneficial results of commission regulation is the authority vested in our state commissions to supervise and regulate the issuing of railroad and public utility securities. Since this supervision has been vested in the state commissions, at least in Ohio, the great majority of investors no longer have the fear of "watered stock and bonds" that existed when the issuing of railroad and utility securities was a matter vested solely in the officers of the railroads and utilities.

From the best obtainable statistics on Jan. 1, 1923, the amount of capital investment devoted to giving Ohioans gas, telephones, electricity and electrical transportation was $1,002,500,000 and the resident investors in such securities numbered 150,000.

STATE CONTROL OF MONOPOLY

I am a strict believer in the protection of honest effort and honestly invested capital of our railroads and utilities, by vesting authority in each state commission to compel any railroad or utility desiring to enter any territory already occupied by a railroad or utility giving adequate and efficient service to secure a certificate of public convenience and necessity, after public hearing of all the parties interested. In Ohio we have progressed to the extent that the Legislature has passed such laws applying to telephone and motor transportation companies operating on our public highways, but as to other utilities that does not apply.

I have heard the claim many times in my official career that the "certificate of public convenience and necessity law" created a monopoly, but I have seen many cases where utilities have been occupying certain municipalities or territories giving efficient and adequate service for reasonable rates, and new operators have come in and been granted franchises to enter and serve the same territory, thus creat-

*Abstract of an address before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

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ing unfair competition and eventually causing both companies to fail, depriving the public of any service. Little by little the thought has got into the brain of the public that the word monopoly isn't such a desperate word after all, and it is slowly but surely arriving at the conclusion that it is the sufferer by this form of competition, and, further, that the way to get the best service at the lowest rates is to have a monopoly in the territory where the utility operates and then strictly regulate its service and earnings.

In 1922 the city and suburban electric companies of Ohio carried 735,138,200 passengers and had an invested capital of $413,789,062, while the interurban companies carried 215,497,586 passengers and had an invested capital of $215,331,365. Those combined companies paid nearly $6,000,000 taxes.

In 1921 the operating revenues of these Ohio interurban railways were $24,097,851 and in 1922 $20,234,484, or a decrease of 16 per cent.

I am convinced that these companies are trying to meet their competition in the wrong manner. In many instances they are giving too much passenger service and neglecting to secure their share of the freight business that is justly due them. If these companies would develop the less-than-car-load freight business and operate only the number of passenger cars necessary to give adequate service, I am sure the increase of revenues will put most of these companies comfortably on the black side of the ledger.

The trend of the times is toward public utility regulation; it will progress; no man or set of men can stop it. Let us adopt progress in public utility regulation as our watchword, and be ever vigilant in reaching the coveted goal of full, fair and faithful service to all, at remunerative rates.

*Wisconsin's Policy and the Milwaukee Franchise**

By Lewis E. Gettle

Chairman Wisconsin Railroad Commission

EVERY municipality of considerable size has had its "traction question," which has been an inexhaustible source for political platforms for local congressional or even statewide contests. For half a century aldermen, mayors, legislators and governors have ridden into office on the waves of righteous indignation or perhaps ignorant prejudices directed against "traction interests." This sort of war still goes merrily on in some of the greater cities. The contest is generally bloodless, but often vast reservoirs of lethal gas are liberated and directed toward the enemy.

In our own state the financial struggle of most street railways and a great many interurban companies to give a reasonable minimum of service has been so intense that public sympathy and concern for the continuation of service have replaced much of the former intense antagonism. The commission in Wisconsin has promoted and fostered a better mutual understanding between companies and the public. Wherever it could possibly do so, the commission has approved economies of operation. In numerous smaller cities one-man car operation has wholly replaced the two-man car. Where there has been such substitution shorter headway has been provided and safety regulations have been stiffened. Such substitution has elicited various degrees of violence in opposition, mostly founded on suspicion, pride or prejudice, but after fair trial and after the public has understood the situation the substitution in question has received at least tacit approval.

In several cases the Wisconsin Commission has given expression to its conviction that the street railway cannot be supplanted by other modes of transportation, at least for many years, and that as competitive forms of transportation invade the normal revenues of the street railways public requirements for special drains on the companies' revenues should be discontinued or lessened. To this end the commission has gone to the length of straining its probable legal rights and prerogatives in ordering extension of lines and service thereon, against the vigorous protest of the companies concerned, but only on condition that the municipal councils would as condition precedent to the effectiveness of the orders relieve the companies of paving requirements which the cities might insist on being fulfilled. We believe that neglect to provide adequate intraurban transportation is a sanitary and social error the responsibility for which in the absence of a return to the company such as will attract capital necessary for extensions of service rests in part at least on the municipality itself. Undue residential congestion, the denial of play space, fresh open air, gardens and flowers to the teeming childhood of our fast-growing cities, borders on cruelty if not criminality. In this connection may I say that motor vehicle passenger transportation should be permitted and encouraged, not as a substitute for street railway service but as auxiliary and supplemental thereto. Electric railway service must continue to constitute the primary mode for rapid passenger traffic, on the cheapness and efficiency of which the public health, happiness and social welfare of the great mass of workers of moderate incomes so vitally depends.

If there were time I should like to tell you of a most interesting experiment that is being undertaken in our largest city. In brief, after years of the usual acrid, bitter warfare between the people, politicians and the traction company at Milwaukee a committee of citizens representing various shades of political affiliation, and acting in behalf of the mayor and council, under sanction of legislative acts, was met by representatives of the company and after more than two years of intense study and conference, with the aid of experts, a proposed "service-at-cost" contract has been worked out. This proposed contract covers the numerous fundamental questions which erstwhile furnished the battleground of non-co-operative operation. The management of the properties remains in the company until the city elects to purchase, but the city prescribes the quantity and quality of service and agrees to rates affording revenues equivalent to the cost of service. The city is also permitted to participate in the financing of the properties.

The outcome of this businesslike effort to substitute a fair and honorable solution of traction difficulties by mutual contract and co-operation, in place of destructive antagonism, may point the way out of the disgraceful episodes which have so generally characterized relations of traction interests with municipalities.

*Abstract of a paper before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

*Commission Regulation Not Court Trial**

By William Milnes Maloy

Chairman Public Service Commission, State of Maryland

W. M. Maloy

I THINK it is a very good thing for the electric railway industry that you have a group of commissioners meet with you. It can do nothing but engender confidence on all sides. This procedure is right in line with the policy which I have always felt desirable and valuable in conducting the Maryland

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commission, which is that all activities of the commission are conducted with fully open doors, everybody having facilities at all times to know the full procedure and activities of the commission.

The point I am particularly anxious to make is that it is desirable, in fact necessary, that we confine ourselves to first or basic principles in consideration of commission regulation. It does no good to blind ourselves to the fact that commission regulation has not in all cases been completely successful, although there is no doubt that much progress has been made. The reason it is not successful, as I see it, is that in too many cases the commissions themselves have conducted their affairs more on the basis of courts than of commissions, and more frequently, even when the commissions would do otherwise, the litigants, company and public, both forced the commission into a court procedure of making a record on the theory that this record is to be carried to a superior court. This makes nothing but a magistrate's court out of a commission, in practice, and thus militates against the realization of the benefits to the public which were anticipated when the commissions were organized.

I used to be a legislator and was chairman of the corporations committee and introduced the first commission law in the state of Maryland. I had high ambitions as to what the commissions would be able to accomplish. I saw first hand all the old experience and habits of lobbying, the politicians' attacks upon public utilities; I saw the futile attempts of the legislature to be a fair rate-fixing body. I also saw courts trying to settle utility affairs by court procedure according to law. When we enacted the public service commission bill I had high hopes that there would be set up a commission of high-calibered, courageous, capable men, respected by utility and public alike, who would be able as a strong administrative body, with delegated legislative rate-fixing powers, required to adopt judicial procedure to satisfy constitutional requirements as to due process of law and to consider utility regulatory problems and decide them on a business basis to the best interests of the public, whose creature they were.

I must say that my experience as a commissioner, not merely from the Maryland experience, but from watching commission regulation practices all over the United States, has been a disappointment to a certain degree on account of the point I emphasized above, that the commissions have been forced too much into court procedure. We have tried in our humble way in Maryland to follow the program according to the lines I believe in, but there are limitations not so much in the law creating these as in the public and utility attitude toward us, and I speak of commissioners in general on a national basis, which limitations have militated somewhat against our most effective work as commissions.

I would not leave you with the opinion that I feel we should abolish commissions and resort again to court and legislature control of details of utility regulations—far from it. What I do wish to leave with you is that commissions as such must be raised in the estimation of both the utility men and of the public; they must be given, by general consent, the status of a real administrative commission, for the regulation of utilities, not for their management, but for their regulation, so that there will be attracted to a commission men of the highest caliber, courage, training, ability and knowledge, whose regulatory decisions will be accepted on account of their inherent constructive merit.

*Progress Made Since the Report of the Federal Electric Railway Commission**

By Charles E. Elmquist
Formerly Chairman
Federal Electric Railway Commission

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Charles E. Elmquist

Work of the Commission Has Been Fruitful of General Improvement in the Electric Railway Situation—Favorable Public an Absolute Essential to Financial Success of Railways

A MORE friendly attitude concerning fares, paving requirements, new construction and curtailment of service became manifest after the Federal Electric Railways Commission hearing and report. The general public was convinced that an electric railway could not meet the appalling increase in the cost of operation without receiving more money for its services, and that the inflexible nickel fare and term contract were injurious to the industry and positively harmful to the public. Relief was given to more needy companies, and the emergency was safely passed. The industry now shows substantial, and I hope permanent, improvement.

The commission was instructed to "study and report upon the entire problem in order that the state and municipal authorities and others concerned may have the benefit of full information and of any conclusions and recommendations that may be presented." This injunction was obeyed and our report contained twenty-two findings and recommendations. Among these, and certainly the most important, is:

> The electric railway is an essential public utility and should have the sympathetic understanding and co-operation of the public if it is to continue to perform a useful public service.

This is not open to debate. The uncontradicted evidence as well as the experience of seventy-five years testify that the electric railway is the safest and most economical and useful and convenient means of transportation now available for moving the maximum number of people through the streets of our cities, and that no vehicle has been found to take its place.

Its essential feature being universally recognized, it remained for the industry to ascertain how to secure the sympathetic understanding and co-operation of the public. This was largely accomplished through publicity carried on by your committee of one hundred. Our findings and conclusions were used very effectively, and I think it can be truthfully said that the problems of the industry are better understood by municipal and state officers and the public than they ever have been in the past. There is now a frank recognition by the public that the electric railway is entitled to reasonable dividends upon capital honestly and prudently invested in properties which are efficiently and economically managed. This involves the admission that revenues can only come from services performed and that the charge for that service must be flexible enough to meet changes in operating and economic conditions, and that as a matter of fact, a fare of 4, 5, 6, 7, 8 or 10 cents may be just and reasonable according to the circumstances of each particular case.

My former associates were invited to express their opinion upon the outstanding results of the investigation conducted by our commission. Their answers are worth quoting in full:

Philip H. Gadsden says:

> Outstanding results from electric railway report are more intimate knowledge on the part of the public of the problems of the railways and the keenest sympathy with their difficulties brought about by the policy of frank and full publicity recommended by the commission. Except in one or two exceptional instances public attitude toward

*Abstract of an address before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

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private operation has been strengthened by commission's report. The railway situation generally is very much better in every way than at the time of our investigation. The most gratifying phase of the situation is that there is a rapidly growing appreciation on the part of railway men themselves of the findings of the commission and an increasing effort to put them into practical application.

C. W. Beall says:

The hearings and report of the Federal Electric Railways Commission had the very good effect of continuously impressing the public and authorities and press with the direful plight and unfair conditions surrounding street railways at that time. Undoubtedly this had considerable effect in succeeding years in helping street railway companies to get higher rates and more reasonable conditions of operation. Undoubtedly the hearings and report had a beneficial effect upon refunding of old issues and sale of new issues for construction. They were very helpful in securing increased rates of fare and more favorable conditions for many street railway properties, without which they would not have been able to refund or raise new money. The street railway situation in general is very much better now than in 1919 and 1920 as most companies have received increased rates of fare and better terms from the public authorities. . . . The greatest trouble is that in a number of cities the public and authorities are still trying to have both jitneys or buses and street railways.

Louis B. Wehle says:

The Federal Electric Railways Commission report seems in the emergency to have facilitated friendly adjustments with the public about fares and the burden of street maintenance, but perhaps because financially relieved since 1919 by higher fares, the industry has not been impelled to follow the commission's chief suggestions that it face constructively its problems of overcapitalization and that it adopt a sound long range policy of valuation to insure earnings of its junior securities against periods of price depression. This still stands as the commission's challenge to the real financial staesmanship in the industry.

Reference will be made to the finding of the commission, which deals with the subject of credit. It reads:

The electric railways industry as it now exists is without financial credit and is not properly performing its public functions.

That is not true at present. The general improvement in the industry has largely restored public confidence and well-managed companies now experience slight difficulty in securing capital for refundments or for new construction. Approximately $350,000,000 of new money has been expended for additions and betterments since 1919. Although this is far below actual requirements, it should be borne in mind that in 1920 the cost of labor and materials were so high as to practically prohibit construction, and that in 1921 the bankers were exerting themselves to curtail loans, and of course the railways had not begun to earn enough in 1919 and 1920 to permit of large expenditures for new construction.

Other findings to be discussed in this paper involve rates and valuation, and since they concern one general topic they should be read together. The findings read:

Unless the usefulness of the electric railways is to be sacrificed public control must be flexible enough to enable them to secure sufficient revenues to pay the entire cost of service rendered, including the necessary cost of both capital and labor.

There can be no satisfactory solution of the electric railway problem which does not include the fair valuation of the property employed in the public service, and where that is done the companies should voluntarily reduce any execessive capitalization to the basis of such value.

Since the adoption of this report the 5-cent fare has become practically extinct, except in the city of New York, and contract fares are now regarded as objects of curiosity. Substantial progress has been made in placing the industry on a sound and healthy basis. Service-at-cost franchises are being used in fifteen cities, and the question of its adoption is under consideration in Milwaukee, Akron and Winnipeg. Indeterminate franchises are recognized by law in six states and the District of Columbia, the states being Wisconsin Indiana, Minnesota, Massachusetts, Louisiana and Michigan. In the following states the power of regulation has been transferred to public service commissions, to wit: Arkansas, Louisiana, Minnesota, South Carolina and Tennessee, and in Alabama powers of the commission were greatly extended.

Approximately 600 miles of new track has been built and about 1,534 miles abandoned, showing a net loss of 934 miles, but in connection with this statement it is to be observed that about 1,500 miles of bus routes are now operated by electric railways. This new departure in auxiliary railway service has developed since 1919 and represents the substitution of more economical service for the tracks that have been abandoned. This practice is in harmony with the portion of our report which reads:

That street railway service and jitney service cannot permanently exist and pay their own way in competition with each other under any ordinary urban conditions seems to be well established by experience and by the conditions inherent in local transportation service, but the belief is general that the motor bus may properly be used to supplement the service rendered by the street cars.

The use and development of the motor vehicle surpasses the wildest imagination of its early promotors. An article in the October issue of the *Geographic Magazine* gives the number now in use as 13,000,000, or one to each seven persons in the United States, carrying about 32,000,000 people each day, and costing for purchase and maintenance about $7,000,000,000 annually. Claims are being made that the saturation point in the country is 18,000,000, and as the average life of a machine is six years it will be necessary to construct 3,000,000 annually for replacements, that being the present production of our factories. One would be inclined to say that the vast army of machines carries daily and annually far more people than the street and electric railways, but a simple calculation proves that the service is given to about the same number.

This competition is formidable and shows no signs of diminution. Direful predictions of financial catastrophe seem to leave no impression upon the public mind and the riding habit goes merrily on, and most likely it will continue with unabated frenzy until some unusual economic upheaval brings to us once again an era of thrift and economy when a dollar saved will be regarded as more valuable than a dollar spent for gas. I own a car, but I walk part way to the office and take a street car the rest of the way, and always ride home in one. I confess my utter inability to understand the mental slant on the fellow who drives to his place of business and loses a lot of time and patience in locating a parking place on a busy street in front of a valuable property which he expects his car to occupy all day long. Parking space has reached the point of saturation in most of our cities, and this holds out a gleam of hope for the street railways. Would it not (and this thought is casually expressed) be a good thing to start a campaign of education on the relative expense, time consumed, convenience and general utility of the street car as compared with the automobile, and endeavor to convince the car owner that it would be greatly to the interest of himself and the public to patronize the street car morning and night?

Testimony submitted at the hearing by witnesses from Cincinnati, Pittsburgh, Boston, St. Louis and other cities, also by regulating officials and certain representatives of the industry, all lead to the conviction that no satisfactory solution of the problem can be reached unless the value of the property is fixed, and that the capitalization should be reduced to the basis of the value. In one large city, for example, two strikes occurred in as many months, but wages could not be advanced without an increase in fares, and the community opposed higher rates because it was known that the company in an early day had issued one share of stock as a bonus to the purchaser of each bond. Bonus or "hope stock" did not bring a dollar into the treasury. These practices flourished in the early days of electrification of street railway properties, when the valuation of the physical properties for rate-making purposes was not given any consideration.

It is quite obvious that promotion stock has now found its way into the hands of innocent purchasers for value, who expect dividends although the capitalization may be greater than the fair value of the property, and that is precisely the one thing the community objects to.

A striking example occurred in the Minnesota Legislature two years ago. The street railway interests sought to transfer to the state the jurisdiction over rates, accounting and valuation. Municipalities objected and the bill was bitterly contested. The Minneapolis franchise would have expired by limitation in 1923 and it was felt that a new franchise would be blocked by the Socialist members of the Council, who wanted to force public ownership upon their terms. Arguing the question before the joint committee a prominent Socialist referred to the question of watered stock and gave figures showing varying values of the property, as follows:

A Socialist group	$11,000,000
A citizen's committee	15,000,000 to 19,000,000
Mr. Pillsbury, an engineer	24,000,000
City engineer	26,000,000
Company	35,000,000

Here was a spread of $24,000,000, 6 per cent of which is $1,414,000, and

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it would take 23,280,000 revenue passengers at a 6 cent fare to produce that money, and this figure omits any reference to the added cost of handling these passengers. It is obvious that some of these figures are wrong, and it is also evident that the public will not be satisfied that it is paying no more than a fair and remunerative rate until the value of the property has been fixed by some competent tribunal.

PUBLIC OPINION MUST BE FAVORABLE

The problem of the street railway is largely a psychological one, and influences will be at work against the public acceptance of increased fares so long as there is a belief that companies are overcapitalized and their values too high. No class of utilities is so wholly dependent upon the good will of their patrons as the street railways. People must have water, fuel and light, they must have food and raiment, but those who patronize the railway have the alternative of walking or of riding in buses or their automobiles. Therefore the railways occupy a different relation to the public than steam railroads or any other classes of utilities. It is not sufficient for them to win the judgment of the regulating commission and the courts; they must reach the bar of public opinion, and this is hard to reach and hold so long as wide differences exist in respect to value and excess capitalization.

The evidence overwhelmingly supports the conclusion that the proper solution of the street railway problem under private control depends upon the introduction of proper regulatory methods, followed by the correct valuation of the property and readjustment of capitalization when too high, and surrendering existing limited term franchises for indeterminate permits to be issued by the state. In determining the proper method of regulation consideration must be given to the industry as it now exists as well as to its normal and natural development. The companies operating within and between a large number of cities and villages cannot have as many different rates and standards of service, rules and regulations as there are municipalities served because that would intensify public sentiment against them, and also increase the cost of service. Obviously a central authority should be selected and given power to regulate rates, prescribe standards of service and accounting, determine the depreciation to be charged and probably control the expenditure of that fund, and also to prevent the issuance of securities in excess of the value of the property. Regard must be given to the strong home-rule sentiment that now exists throughout the country. People will not willingly give up the power to control utilities which so intimately affect their welfare.

Some states now have complete jurisdiction over utilities, and in numerous instances the cost of service franchises give very good satisfaction, but where legislation for the industry is necessary consideration might be given to a suggestion of this kind.

Give to the state control of those things which can be best done by the state, leaving to the municipalities the control of those things which most intimately affect their citizens. Among the powers to be given to the state is control of rates, valuation of the property, prescribing and supervising its accounting methods and controlling security issues. Municipalities should name the streets upon which the railways may operate, regulate routing and service and such matters as paving, sprinkling, the cleaning of streets and the extensions of new lines, but action should be subject to the right of appeal to the state commission in the first instance and then to the courts if dissatisfied with the order of the state tribunal.

I shall conclude this desultory discussion by quoting from the testimony of the Hon. Frederick J. MacLeod, chairman of the Public Service Commission of Massachusetts, found on page 1,438 of the printed record of our proceedings:

> Under proper public regulation dividends do not represent profits, but merely interest upon invested capital. To construct and maintain our street railway properties capital and labor are both required, and one is as essential as the other. It is just as impracticable to expect capital to be supplied gratuitously or at less than the going rate as to expect the men who operate the cars to work without pay or for less than a living wage. The man who invests his money in street railway stock is entitled to the prevailing interest rate for the use of his money equally with the man who makes his investment in the form of bonds. Indeed, in so far as the stockholder assumes the risk of having his principal impaired or entirely wiped out before the bonds are affected, he is entitled to something more than the bond interest rate. Public service companies, however, should be so managed and regulated that the risk to the investor and other speculative elements shall, so far as possible, be eliminated and the dividend return practically limited to the going interest rate. But if the possibility of speculative profit is removed it is essential that the investment be reasonably secure, or private capital will not enter the field. To sum the matter up, public service corporations do not afford a proper field for speculation or exploitation, but in order to enable them to furnish proper service and accommodations to the public their property values must be kept intact, and the payment of all costs of operation, including a reasonable interest rate upon legitimate investment, must be reasonably assured in order that needed capital may be obtained.

*Relations of Management and Employees**

By Dr. C. A. Lippincott
Studebaker Corporation
South Bend, Ind.

Dr. C. A. Lippincott

The Basis of These Relations Should Be Maintenance of Self-Reliance—Some Welfare Methods Do Not Do This—Maintenance of Self-Respect and Self-Reliance Is Most Important to Organization Personnel

MOST of the efforts made up to this time to bring management and employees into closer relation have been made along so-called lines of welfare work. Welfare work is an expression associated largely with charitable institutions. It has been a work of philanthropy rather than based upon actual business conditions and business necessity. This work has failed to succeed largely because it was contrary to two fundamental principles. In the first place, this work has not been ethically sound, and any relationship between employers and employees must be upon a sound moral and ethical basis before it has the possibility of success or continuance.

To begin with, welfare work invades the man's self-respect and no man can afford to accept gratuities of any sort or of any kind, however valuable they may be, for he pays too great a price for them. He pays the price of his self-respect, of his independence, of his self-reliance, of his manhood. The best thing that any of us have is our self-respect, our independence, our manhood.

I am opposed to it, too, not only because it breaks down moral fiber but because it destroys that individuality which we need in the citizenship of this great country. A nation which has too much done for its people inevitably becomes a weak nation, and in the hour of crisis will fail to function and fail to meet the supreme obligation.

There is another thing about these gratuities and this paternalistic form of government and that is they all tend toward socialism, toward communism, and certainly we are absolutely and utterly opposed to the development of socialism and communism in this coun-

*Abstract of address at annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

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try. We don't believe in it; we don't want it. Our individuality is our most precious possession and that is the thing we are interested in preserving.

I am opposed to these welfare plans because they are economically unsound as well as ethically unsound.

We deal with four things in industry: men, material, machinery and methods of management. I frequently ask groups of foremen which of these four things is the most important in getting out production. I have been surprised at times to have them mention one thing and another, instead of mentioning at once that man is most important of the four in getting out production.

We have spent millions of dollars in trying to get foolproof machinery and then we have gone out to try to find a fool to run it. It must be conceded that we have had a great deal of success along that line.

Now the first step in any approach of management to men must be on the basis of justice, on the basis of simple, plain justice. Nothing can take the place of that. That is the first consideration when we come to consider the distribution of the profits, if there be any, of the joint enterprise of management and men, of capital and the public.

What is a fair distribution of the profit? What is a fair wage to the man in your employ? No man can write a universal formula for justice under all conditions. That is a problem which must be worked out in the individual industry, but the fundamental basis of our first approach to the employees must be on the ground of doing absolute justice.

The next necessity in any approach to men in solving the problem of management and men and their industrial relations is the question of attitude toward the man, of consideration for the man. I do not think that, after all, the problem that gives you the greatest trouble with your men is the question of wages or of hours. The greatest problem with the men, as I have found in the last four or five years (and I have interviewed literally thousands of workmen) is not so much the question of wages, but it is a question of the attitude of the managers toward the man while he is in their employ.

Today we are just beginning to recognize that the foreman is the key man in industry, although he has always been the key man, for whatever the managers, the presidents or the directors of the railway may desire in their attitude toward the employee, they are actually represented by what the foreman does to that employee. He is the point of contact. The foreman in the past has been largely a driver of men. His idea was to make the man go whether or not he wanted to go. I want to say to you that men all over this country today are resenting that kind of a method, and they should resent it. They are men and we want them to be men —self-respecting men. The man who can be driven is not the highest type of employee, but the man who can be directed, the man who can be led, is the man whom we want in industry today. Before we can get him, we must educate the foreman to be a director of men and not a driver of men; to be able to command, by his superior mental and moral power, all of the energy, and particularly the allegiance and co-operation of the men who are in his charge.

I believe that the employers of the United States can solve this problem of human relations if they are willing to concentrate upon it. I want to say to you, and to emphasize it positively, that the first move along this line should be made by the employer. The employer prides himself upon being the mental and moral superior of his workmen. Certainly he ought to be. Probably in some instances he may be their mental superior, though you will find many men of keen minds among your employees. But in too many instances he is not their moral superior. His principles are not as good as those of some of the men who are working for him. Unless we can take higher ground than they take, unless we can recognize that there has been a great deal of injustice in the world, and that it is up to us first of all to right that injustice, we will not remedy the situation.

"Oh," you say, "the man will not appreciate it." Suppose he does not appreciate it; he has had a great deal of training the other way. It is going to take some time to train him to realize and believe that he is a partner in the business, that capital and the employer are interested in his welfare, that they are interested in giving him justice, that they are interested in giving him a square deal, that they are interested in seeing that he has an opportunity to live as well as to let live, to live for himself as well as to live for others in this world.

That is the attitude which employment must take today. First, the attitude of justice, and second, the attitude of kindness, of a desire to treat the man who is under you, in your care, and whose destiny is largely in your hands, with kindness and to be fair and square to him under all conditions.

*Does Rubber Endanger the Rails?**

By Alfred Reeves
General Manager
National Automobile Chamber of Commerce

Alfred Reeves

Co-ordination of Trolley and Bus in the Field of Mass Transportation Is Urged—More than 1,000 Buses Are Now Being Operated by Railways in Auxiliary Service

MY THOUGHT is to draw a picture of the future—a picture which, it seems to me, will have to be realized if the American public is to enjoy the transportation to which it is entitled, and purveyors of transportation receive the reward which should go to those who properly perform a service so vitally necessary as the street transportation of America's ever-increasing and ever-restless population.

It seems proper to mention that the automobile industry, and those who use its products are probably the biggest taxpayers in this country.

Last year we paid $114,000,000 to the federal government in excise taxes, while annually we pay not less than $215,000,000 to the state in registration fees, personal property taxes and gasoline taxes (the latter now effective in thirty-seven states) with $6,000,000 more in wheel and privilege taxes, or a total of $335,000,000, which will probably climb to a total of $400,000,000 in 1923.

John E. Walker, former tax adviser to the United States Treasurer, states that of the $9,000,000,000 total tax burden of county, state and nation in 1921, more than $700,000,000, or 8 per cent, came from taxes levied against transportation—motor, steam and electric.

Few will deny that the trolley supplies the best form for mass transportation. It is generally agreed that transportation in big cities can best be served by monopoly, provided that monopoly is not abused, not overcapitalized, and is properly regulated by state authorities.

Unfortunately, monopoly in transportation in the past has been abused and the public has resented it. The newspapers gained circulation and politicians have gained popularity by shouting about it.

Our industry appreciates the hardships of the electric lines. There has been legislation far beyond what seemed necessary. There has been taxation almost to the confiscation point. There have been rulings that were almost impossible to obey. During the past five

*Abstract of an address before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

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years, you have also been faced with a new form of transportation, which has in some cases added to your income by increasing the number of passengers traveling, but at other times has undoubtedly cut into your earnings to a substantial degree.

Low cost has not always been the answer, because the average American is ever ready to pay extra to save time and secure comforts. This is shown by the 10-cent fare paid by 55,000,000 people last year who patronized the Fifth Avenue bus service in New York. The public, I am sure, will gladly pay 8 or 10 cents for a special bus service even when the trolley fare is 5 cents, and it should be willing to pay extra where buses and trolleys are on a transfer basis.

The private passenger car, operated by its owner on the roads which he builds and pays to maintain, is with us now to the number of almost 11,500,000.

Combination of Trolley and Bus Advocated

Two questions present themselves:

1. If the buses had come first, how many of them could now be supplanted by trolley cars?

2. Does rubber endanger the rails?

The bus is a member of the transportation family, born of an emergency and certain to grow into a lusty youngster. It should be adopted as an ally of the trolley, which we shall always have, because the electric lines are still the best forms for use in handling mass transportation.

With the present congestion of traffic and cencentration of population, the trolleys cannot properly handle all street transportation. They cannot afford to build in sparsely-settled territories. Nor can the bus do it alone. Think how many would be required to supplant the trolleys which last year carried 15,000,000,000 passengers, which was 15,000,000 more than in 1921. A combination of trolley and bus seems to be the real answer.

In some instances it seems best for bus lines to be run independently, but in a broad sense it has appeared to us in the bus industry, that as experts the trolley people had a rare opportunity to enter the bus field and thus give the public complete transportation.

It is doubtful if the public will support bus lines conducted on a trolley basis. While not always possible to realize, the aim should be to give a bus seat to every passenger. This has been done successfully in New York, Detroit and Chicago, and we feel it can be done in other cities.

The public wants quick, safe, comfortable and economic transportation and cares not about the medium. Given the service, it will gladly pay a proper fare. The trolley company's interest in transportation lies in protecting its capital investment, securing new capital, caring for depreciation, returning proper dividends on securities, covering its general expenses, paying taxes and in meeting charges for paving between the tracks. The bus operator's requirements are about the same except as to the paving charges, but these are offset by registration fees, fuel taxes, and special impositions of one kind or another.

In certain fields of street transportation the trolley is supreme in efficiency and economy. In others the bus holds a similar position. This demands that the two forms be co-ordinated. The prime consideration, therefore, is to fix the fields of endeavor which each shall enjoy.

Many people have not appreciated that you trolley men have been taking the bus into your arms in order to round out a proper service for your communities. They express the fear that if you take over the buses, it will be for the sole purpose of bringing about their elimination. This is the one belief which the electric railway interests in this country must change if their entrance into this new field is to receive a proper welcome.

Service and not price is the real answer to transportation. The public is growing to believe that the trolley companies should manage the others, rather than irresponsible operators. But I fear they will patronize the so-called irresponsible operator if he succeeds in winning their favor by a sincere effort to give service at a low rate. By hesitating, trolley men have missed some golden opportunities, although it is not too late if they will enter the field in the proper spirit.

Most statements of electric railway men seem to hail with delight the inability of bus lines to score 100 per cent, when at short notice they have been installed in place of trolleys. I hear the difficulties of Bridgeport, Saginaw, Des Moines, and other cities; but, gentlemen, those operations were only growing pains and only partially indicated what can be done with buses. Most of these operations could not be considered conclusive measures of bus efficiency, because they were emergencies and lacked time for proper organization.

Rights of Those Now in Field Should Be Protected

May I emphasize another point?

We believe that the power of the trolleys to acquire, own and operate buses, should be exercised largely in new fields. It hardly seems equitable, except where there has been illegal or unjust competition, that they should be allowed to destroy bus transportation in the hands of others. In all cases where men have taken the risk in order to build up a bus transportation business, equity demands that they be permitted to retain that business if it is not adverse to public welfare, or that there be paid for the business a sum which is not measured by the sum of the second-hand value of the equipment, but the value of a going concern which pioneered a development that has proved of benefit to the public.

One could give a long list of happenings in this country of late that shows the tendency toward bus transportation. The most outstanding feature, of course, had to do with the operations in Newark during the recent trolley strike, where some 11,000,000 passengers were carried during August by the bus lines.

One of the largest bus operations by an electric railway is that at Milwaukee, Wis., where more than seventy-two buses are now in service. Wilkes-Barre, Pa., has bus service of from sixty to seventy-five units, handling approximately 4,000,000 passengers annually.

West Coast Has 100 Intercity Buses

The most noteworthy move by one company is the action of the Pacific Electric Railway and the Los Angeles Railway Corporation at Los Angeles and Pasadena, Cal.

After a survey of the operations of other electric lines and the independent bus transport service being given in all parts of the country, these two companies jointly have secured a long-term franchise for bus operation in these two cities and have placed an initial order for almost 100 buses of the twenty-five-passenger type, and their investment in equipment, garages, etc., will total approximately $1,000,000 immediately, with every prospect that this will be doubled before the end of this year.

At Baltimore the United Railways & Electric Company has been operating buses for several years, and has extended its service within the past year. At Newburgh, N. Y., and at Everett, Wash., the electric railway lines have abandoned their electric service and taken up bus operation instead. At Youngstown, Ohio, the Pennsylvania-Ohio Company now has an installation of buses totaling thirty-one, of which about one-half are of the de luxe type. Since inaugurating this service, about a year ago, the traffic on the lines, combined bus and electric service, between Warren and Youngstown, 15 miles, has increased 33⅓ per cent.

We are not yet sure of the proper types for the various kinds of bus service. Some bodies have been built entirely too wide and without respect for the rights of others on the highway.

We feel our industry is in accord with yours, so far as it relates to state supervision of common carriers. More than two years ago, we declared that control over motor vehicle common carriers, if deemed necessary, should be placed in existing state commissions and that as a prerequisite to operation the owner should be obliged to obtain a certificate of public convenience with the proviso that lines in actual operation shall prima facie be regarded as necessary.

Our declaration called for liability insurance, with special or extra fees utilized for highway maintenance, and advocating legislation to enable steam railroads and trolleys to own and operate the motor vehicle in conjunction with their regular line of business.

My faith in the good sense of American business men, together with your kindly reception of a representative of the automobile industry, leads me to believe that this meeting marks a new era in local transportation in this country.

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American Association Proceedings

Growth and Development of the Industry Are Shown by the Scope of the Papers and Discussions —Among the Broader Questions Considered Are Valuation, Taxes, Commission Regulation and Co-ordination of Transportation Facilities

THE opening session of the American Electric Railway Association was called to order at 10 o'clock on Tuesday morning by President C. D. Emmons, president United Railways & Electric Company, Baltimore. Before the president had proceeded far into his address the meeting room was well filled with an enthusiastic audience. President Emmons' address appears on another page in this issue.

In reporting for the executive committee, Executive Secretary J. W. Welsh said that this report consisted of a review of the several executive committee meetings during the year. This was received and will be included in the records. Mr. Welsh gave a brief review of his own report as follows:

Reports of Secretary and Treasurer

He stated that the association year, which comes to a close with this convention, has been one of growth and development in various activities. Possibly the most noteworthy work done has been that of the information bureau. A total of 11,812 requests have been answered during the year, an increase of approximately 16 per cent over last year, and greater than any previous year in the association's history. Of the member railway companies, 81 per cent are consistent users of this service. The need for it is self-evident, as it is a clearing house for information through which companies may secure at one central point information which would otherwise require communicating with a great many companies.

Mr. Welsh pointed out that it is now generally appreciated that the association maintains a complete, up-to-the-minute file on problems of major importance, such as wages, relations with labor, fares, commission regulation, financial statistics, etc. It may not be generally known, however, that a much wider range of subjects is constantly in review and under investigation by the association headquarters staff. As examples, he cited the statistical information relating to motor bus operation, now of great interest to every electric railway company. A notable report issued by the bureau covered a summary of public utility laws throughout the country. This is the only report available on this subject from any source made during the last ten years, and the need for it has been clearly indicated by the fact that copies have been requested not only generally throughout our industry but by public libraries and other national organizations and the public utility commissioners themselves.

The services of the advertising section have been taken advantage of by a much larger number of companies and particularly by the manufacturer members. This work is supported by the committee of one hundred, and a campaign for funds covering another two-year period was recently made and consummated in six months. Both electric railway and manufacturers are realizing the need of educating first their own employees in the problems of the industry so that they may pass the information on to railway patrons. An important activity in this direction which has been initiated during the year has been the awakening of the manufacturers to a realization of their opportunity in educational work among their own employees. The personal work of E. F. Wickwire, chairman of this committee, stands out as a real accomplishment, he said.

The secretary said that the association magazine *Aera*, has won recognition in the field of public utility periodicals, quite aside from its increasingly valued reception by electric railways. In this connection he reported that during the year an increase of 20 per cent in advertising rates became effective, and this, together with an increased use of the advertising pages by manufacturers, has resulted in a substantial increase in the magazine's revenue.

The secretary also referred in his report to the establishment of the Charles A. Coffin Foundation, which he said would serve as a stimulating influence in improving electric railway service and in broadcasting the achievements, to the end that the public generally will appreciate the efforts of electric railways toward modernizing their service and equipment.

The secretary referred to the work of the Engineering Association during the year and mentioned the complete revision of the Engineering Manual, which has been made. The work of the other associations was also touched upon, as was also that of the Washington office.

As an appendix the secretary's report contained a complete list of the membership, together with a tabulation of committees and number of meetings held by each, and a summary of the changes in membership.

Barron G. Collier, New York, reported as treasurer on the financial status of the association as of July 31, 1923, the date of the last official audit, saying that in the printed proceedings of the convention the audit of Nov. 1 will be included to bring the figures up to date. Mr. Collier said that the total revenue of the association for the first nine months of the present year were $224,180 and total operating expenses $120,813. This leaves a net income of $103,367. Deductions of $10,000 for the welded rail joint committee and $4,117 for the joint fuel committee were made from this, leaving a net surplus of $89,249. The association books as of July 31 also carry a fund of $21,542 belonging to the welded rail joint committee. This money was raised entirely by contributions to the committee by the association and others interested in its and is being handled for the committee by the association.

Mr. Collier pointed out that the surplus indicated in the above figures will be materially reduced by the end of the association's fiscal year.

At this point President Emmons appointed as members of the resolutions committee A. W. Brady, J. G. Barry and H. W. Blake.

Finance and Policy

J. H. Pardee, New York, read the report of the committee on finance, of which R. P. Stevens and J. G. Barry are also members. Mr. Pardee briefly reviewed how the committee has kept close supervision of the expenditures of the association during the year and advised with the executive secretary on all matters having to do with the handling of the association finances. He said that while the association expenditures are greater than for last year, this is to be accounted for largely through the increased activities of the association, as set forth in the report of the executive secretary. All accounts of the association have been audited quarterly by a firm of certified public accountants. Mr. Pardee said that in the opinion of the committee the financial affairs of the association are conducted efficiently and in accord with modern business methods. The committee is satisfied that the association is fully protected in all of its financial transactions. From present indications the receipts for the current year will be approximately the same as for last year, while it is expected that the total of all expenditures and contributions will approximate 25 per cent higher.

Britton I. Budd, Chicago, presented the report of the committee on policy. He said that two matters calling for action by the committee had come up during the past year. One was the proposed organization of a medical and surgical section of the association, through which physicians and surgeons employed by electric railways might exchange experiences for the benefit of the industry. After careful consideration, the committee disapproved of the suggestion. The committee felt that

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opportunity for exchange of ideas could be afforded through the creation of a joint committee of physicians and surgeons affiliated with the Transportation & Traffic Association and the Claims Association. This recommendation is being considered by the executive committees of the affiliated associations.

The other matter had to do with the participation of the American Electric Railway Association with other utility associations, the railroads and communication companies, in the formation of a co-operative committee to study inductive co-ordination. The committee on policies recommended that all associations participate in this study.

The committee gave consideration to the formulation of a brief statement of principles, which might be used on letterheads and in other ways. The 1914 code of principles, while excellent, is so lengthly that little practical use of it is made. The committee reported progress on this item.

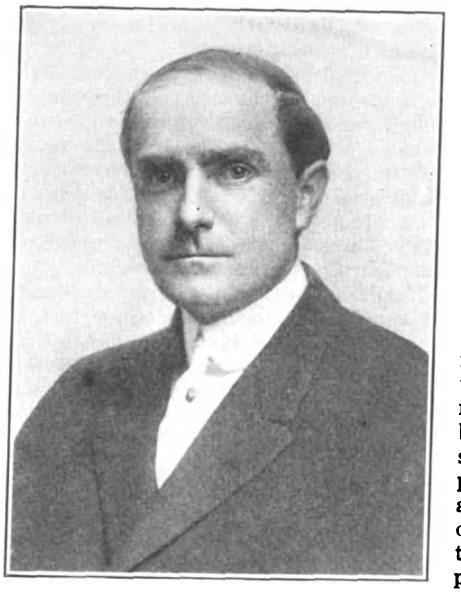
The committee noted with gratification that the courts and public regulatory bodies are adopting the principle enunciated at the last convention of this association, namely, that public transportation is a natural monopoly and that the established transportation companies are entitled to public protection from competition; that is, duplicative of service, destructive of stability and detrimental to the public interests. This principle has not yet been generally adopted, but decisions in Illinois, New Jersey, Maine, Maryland, Connecticut and other states show that public realization of the essential character of electric railway service is becoming keener and the commissions and courts are reflecting this public sentiment and pointing out that when the public regulates and controls a utility it is under obligation to protect it from impairment. The committee recommended that the association reaffirm this principle and continue to assist member companies and the public with all available information regarding points at issue.

The committee said also that the association might well reaffirm its policy on public ownership. While some notable experiments have been made in this phase of socialism, the results so far obtained strengthen the conviction that the public can be better served under private ownership and operation. Our energies should be directed toward giving the public the best service possible, which is the most effective way to combat the agitation for public ownership and operation. Where public ownership and operation have been tried, the public has learned that it is not possible to get something for nothing, that the rate of fare must depend on the cost of providing the service. The committee recommended that the association continue its efforts to educate the public on this question, as the association believes the doctrine of public ownership is in conflict with the principles upon which our government is founded.

C. L. Henry, Indianapolis, as chairman, presented the report of the committee on national relations, which follows in abstract:

National Relations

As the attention of both houses of Congress was taken up almost entirely by matters of more public concern, but little transpired before any of the committees of either house that was of special interest to our industry or that called for any special attention on the part of the committee.



Britton I. Budd
President-Elect A.E.R.A.

From the present outlook, judging by the discussions all over the country, through the newspapers, in public addresses and otherwise, the coming session of Congress, which will meet in December, will consider many matters of very grave importance to our industr, as it represents a part of the great transportation industry of the country which will call for close attention to the end that the electric railways may not suffer by any legislation that may be enacted.

As heretofore in such cases, the discussions will center around the steam railroad systems of the country and whatever legislation is considered or enacted will primarily be directed toward the problems involving the steam railroads. However, as many of our companies are interstate carriers and, as such, subject to the jurisdiction of the Interstate Commerce Commission, and now subject to many of the provisions of the transportation act of 1920, which will in all probability be amended in many respects, unless careful attention is given to the matter, the electric railways in the country will be embarrassed in legislative provisions from which they should be entirely exempted.

The legislative battles will, in our opinion, be centered around the transportation act of 1920. From many of the provisions of this act electric railways are either entirely or in a measure exempted and we feel that in not a single instance should there be any change where such exemptions are written.

The Interstate Commerce Commission in its report for 1922 has recommended "that section 20-a of the interstate commerce act be amended to include within its provisions electric railway companies engaged in the general transportation of freight." This section is the one giving to the Interstate Commerce Commission control of the issuance of stocks, bonds, etc., of interstate railways and the Congress exempted electric railways from the provisions of the section.

On account of the various questions arising in such matters, the committee is very strongly of the opinion that the jurisdiction over the issuance of stocks, bonds and other securities by electric railways, should be left in the hands of state commissions instead of being placed under the control of the Interstate Commerce Commission.

Since the last annual meeting of the association the attention of the committee has been required by various matters in various forms before the Interstate Commerce Commission. It was represented at the original hearing held by the Interstate Commerce Commission to discuss the provisions of the proposed interchangeable mileage act and filed with the commission a brief on the subject setting forth the attitude of the electric railways toward the proposed legislation. The final order of the commission exempted generally electric railways, but issued a supplemental order including several electric railways which had requested to be included in the commission's original order. Before anything was done in the way of carrying out the provisions of the commission's order in the premises, the whole matter was held up by an injunction of the court and has not even yet been tried out.

In December, 1922, the committee was represented again before the Interstate Commerce Commission on the "application of the Western Pacific Railroad for authority to acquire control of the line of the Sacramento Northern Railroad," etc. This case was of importance to electric railways generally as it involved the question of whether or not the Sacramento Northern Railroad would be "operated as a part of a general steam railroad system of transportation" in the event the Western Pacific Railroad acquired control thereof. The committee supported the contention of the Sacramento Northern Railroad that it should not be properly construed as being operated as a part of a general steam railroad system of transportation.

In January the chairman of the committee, along with Mr. Welsh, secretary of the association, appeared on invitation of the commission before the Federal Coal Fact-Finding Commission and had a long conference with the commission, during which all the features of the coal situation, so far as they related in any way to our industry, were fully discussed. Of course, the com-

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mission did not make any statements which would indicate what it intended to do, but it did—all of the members—exhibit the most interested and friendly feeling toward our industry.

During the annual meeting of the association at Chicago last October the chairman of the committee was authorized to appoint a sub-committee of five to have full charge of all matters relating to the disposition of questions arising under section 15-a of the interstate commerce act, of which sub-committee the chairman of this committee was to be chairman. The chairman of this committee thereupon appointed the following persons on such sub-committee: C. D. Cass, A. W. Brady, B. C. Cobb, W. V. Hill and Britton I. Budd.

Soon after at a meeting of the sub-committee it was agreed with the Chicago, North Shore & Milwaukee Railroad that that company should prepare for presentation to the Interstate Commerce Commission a brief maintaining that the company was not embraced in the provisions of section 15-a of the interstate commerce act. As soon as this brief was prepared it was submitted to the members of the sub-committee and approved by them in every respect. At the time it was filed with the Interstate Commerce Commission the sub-committee also filed with the commission a short brief asking to join with the Chicago, North Shore & Milwaukee Railroad in the question presented by the brief, asking also, as did the railroad company, for an oral hearing on the question. Matters remained without action for some time, when the Chicago, North Shore & Milwaukee Railroad was notified by the commission that until further order it need not take any further steps in the matter. This was understood to be equivalent to a finding by the commission that the contentions of the Chicago, North Shore & Milwaukee Railroad were approved by the commission. Since that day nothing has been heard from the commission in any way regarding the status of the company under section 15-a.

As the chairman of the committee has by request of various companies been made their representative in Washington before the Interstate Commerce Commission, there have been since the last annual meeting of the association a great many communications addressed to these companies by him relating to matters before the commission, but there is nothing among them which calls for a general notice.

It should be borne in mind by all representatives of electric railway companies that the Washington office can be called upon by members of the association in all such matters and will gladly render every possible service.

The report was signed by W. R. Alberger, P. S. Arkwright, H. G. Bradlee, Arthur W. Brady, C. D. Cass, F. C. Chambers, B. C. Cobb, S. M. Curwen, J. H. Hanna, T. N. McCarter, John W. Shartel, H. B. Weatherwax and Charles L. Henry, chairman.

Reports were read of the committee of one hundred and joint committee of the national utility associations. Abstracts follow:

Committee of One Hundred

The committee reports that in accordance with a previous agreement entered into with you, it has during the past year financed the work of the advertising section of your association. Details of this work have been under the direct supervision of the association's committee on publicity, which will submit a separate report. The committee of one hundred's report will be confined strictly to the financial phases of the situation.

The fund which was raised in 1921 for carrying on the work of the advertising section was practically exhausted on Jan. 1 of the present year, so the committee of one hundred inaugurated a new campaign for funds. This campaign now is practically completed, and the amount raised assures the carrying on of the work of the advertising section at the present rate of expenditure until some time during the latter part of 1924.

One hundred and seventy of the 641 railway companies asked to contribute to this fund contributed, as did also seventy-six of the 245 manufacturer companies and ten of the sixteen associated companies. Out of a total of 902 organizations solicited, 259 contributed to the fund. The first appeal for funds was sent out on March 5, 1923, and the last contribution was received on Sept. 4, 1923.

Henry R. Hayes, secretary and treasurer of the committee of one hundred, has supervised the expenditure of moneys, and a complete record of funds expended has been received by the chairman and is on file at Mr. Hayes' office and also at the association headquarters, where it is available at all times to contributing members interested in the work.

The report was signed by Guy E. Tripp as chairman.

National Utility Associations

In the organization of this committee are represented three national utility associations, viz., the National Electric Light Association, the American Gas Association and American Electric Railway Association. Its activities are handled through the following sub-committees: Federal taxation, P. H. Gadsden, chairman; public utility fuel, J. W. Lieb, chairman; public utility financing, S. Z. Mitchell, chairman; public information, M. H. Aylesworth, chairman.

On the subject of federal taxation the committee has kept closely in touch with the proposed national legislation, particularly the movement to abolish tax-exempt securities. Early in the year a letter was sent to member companies calling their attention to the "Green resolution" for a constitutional amendment. Arrangements were made for mailing extracts from the Congressional Record containing letters from Secretary Mellon and an article by Professor Seligman to member companies. The membership were again advised when the Green resolution came before the Senate judiciary committee on Jan. 23. At the annual meeting of the Chamber of Commerce resolutions were presented on behalf of this association and the American Gas Association favoring the elimination of tax-exempt securities. As a result of this the United States Chamber of Commerce has referred the matter to its committee on taxation for special consideration. In general this committee has also had referred to it questions dealing with valuation and has a special committee engaged in the consideration of this subject.

The work of the joint fuel committee under Mr. Lieb has been completely covered in the printed reports covering the establishment of a Washington office during the coal emergency and the assistance which was rendered to all public utility companies in securing coal at that time.

The work of the committee on public utility information was carried on by co-operative action between the directors of publicity of the three national associations and by maintaining close contact with the state public utility information bureaus. The report was submitted by Randal Morgan.

J. N. Shannahan, national councillor United States Chamber of Commerce and president Newport News & Hampton Railway, Gas & Electric Company, praised the work of the national chamber and urged all to take an active interest in its work. The more railway men, he said, who attend its annual meeting as national councillors or delegates from their local chamber the better.

TRANSPORTATION NEEDS

P. H. Gadsden, United Gas Improvement Company, then gave an oral report of the study of transportation now being conducted by the United States Chamber of Commerce. He said that in January of this year, following a conference called in New York by President Barnes of the United States Chamber of Commerce to consider the subject of transportation, it was decided that the national chamber should make a study of all transportation agencies through five committees. These committees are, respectively, on (1) the relation of the railroads to government, (2) consolidation of railroads, (3) rates, (4) relation of the motor truck on highways to other forms of transportation, (5) water transportation. Of these committees, electric railway companies are interested particularly in committee 4. This committee, of which Mr. Gadsden is a member, soon found that the basis of the question being considered was regulation. The steam railroads and the electric railways were operating under regulations imposed by statute, and it was necessary to know what position the people of the United States wanted to take in regard to the regulation of the motor

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truck. Hence, a sub-committee on regulation was appointed, with Mr. Gadsden as chairman, and while the speaker could not give the conclusions reached by that committee, he was permitted to say that the representatives on that committee of the motor truck interests had shown a willingness to approach the subject of motor trucks when engaged as common carriers in a spirit of co-operation. The next step was to investigate the subject of taxation, not only from the standpoint of the amount of taxes assessed on the property values of each industry, but also the extent to which each of the carriers was being required to act as a tax collector. As regards this latter requirement, the speaker said that the electric railways led all the others. He also spoke of the very valuable assistance given to the committee.

The work done by all the various committees is now complete and their reports are in the hands of the president of the national chamber. The next logical step would be the appointment of a general committee by the chamber to consider these reports and prepare a report representing the mature judgment of the people of the United States.

Without attempting to forecast in any way what this report would be, the speaker felt that he could say that he believed it would be of great value to the industry in clarifying the proper position of the different transportation agencies. It would not be prepared with the idea of defending or supporting any particular interest, but absolutely with the purpose of determining which system or combination of systems was best for the people of the United States. From that standpoint the electric railways have nothing to fear.

At the conclusion of Mr. Gadsden's talk, reports were presented by the committees on trackless transportation, uniform motor vehicle regulatory laws and construction and maintenance of highways for motor vehicles. These reports follow in abstract:

Trackless Transportation

The experience of the industry during the past year has been to confirm the findings of the committee contained in its 1922 report.

The answers made to the questionnaires sent out this year by the committee of the Transportation and Traffic Association indicate that the adoption of bus service by electric railways has been of a character and for the reasons set forth in our 1922 committee report. This experience in general confirms the fact that bus operation is on the average more expensive per bus or seat-mile than electric car operation, but that the higher unit cost is justified where traffic is very light.

The committee's conclusion last year that "the possibilities of development of transportation with railless vehicles should interest the industry greatly" has been justified by the fact that in the intervening year (from June, 1922, to June, 1923) the number of electric railway companies to adopt buses for part of their service has increased from forty-four to ninety-five and the number of buses involved from 300 to 925.

The committee on bus operation of the Transportation and Traffic Association has prepared an excellent report this year, giving the results of a study of the extent, costs, reasons for and methods of bus operation by electric railway members of the American Electric Railway Association.

It is believed that the same social and economic forces which have already caused the adoption of auxiliary bus service by ninety-five electric railways in this country will continue to expand their use in the future and that the association should arrange for the coming year to continue the study of the operating, engineering and accounting details of bus service.

The constantly growing use of bus service by electric railway companies gives this association a direct and vital interest in the questions of special taxation and traffic regulations affecting motor vehicles in general. In this connection co-operative action with the automotive vehicle associations is desirable.

Another feature which should be of interest to the association is the provisions of state laws and the attitude of state commissioners as to the regulation of competition with electric railways or the operation of buses by electric railways.

In its last report the committee stated in substance that there was a field for the economic use of buses to supplement the electric railway service in the cities of this country, either by inaugurating bus service on lines of light traffic, where track reconstruction was the other alternative, or by using buses for extending service into new territory where the expected traffic was not great enough to warrant the investment in tracks for railway service.

The committee also concluded that for handling mass transportation the electric railway is the most reliable and economical method now known, but that on account of the availability of buses for the special conditions above stated, the electric railways should be alive to the possibilities of bus operation—both in order to handle all the transportation needs of their community and by so doing to prevent wasteful competition by others entering the field due to the electric railways failing to utilize buses where the need for them exists.

Experience has shown that the motor bus amalgamates well with street railway transportation. It decidedly helps in providing a unified service in which the various companies are trying to provide street transportation. The menace of the jitney, although still present, has grown less. Particularly has it become apparent during the past year that after the street railway has installed motor bus operation the public has come to realize how much more satisfactory is the service than that previously rendered by various irresponsible, poorly organized jitney companies.

This has been largely due to the adoption by the street railways of the best constructed and designed buses to be found on the market. They have been well maintained, cleaned, painted and run on schedules of frequent and evenly spaced headway from early in the morning until late at night. All this has been a welcome change in many communities.

The automotive industry has progressed in the past few years and is now developing passenger carrying vehicles of improved design. We are advised that the larger manufacturers of buses have appropriated large sums for the further improvement of bus design for passenger transportation service. There is a field in transportation in which these vehicles can furnish satisfactory service and traction officials should not allow an antagonism, aroused by jitney competition, to cause them to lose sight of the fact that it is their duty to supply transportation in the territory in which they are operating, and if extensions are required or present high costs of reconstruction necessitate the abandonment of any track, they should be quick to consider trackless transportation. The electric railways must keep pace with the development in the transportation field if they expect to continue to be the recognized distributing agency of the transportation commodity in their territory.

Failure on the part of traction companies to recognize and meet the above described situation will result as it has in the past in encouraging independent operators to enter the field and meet these service requirements. It is better for the traction companies and the public to realize fully that duplication of service is detrimental in that it results in a higher cost for transportation, making it desirable that the traction companies shall remain the transportation agency of the community, giving the public what it wants if the request is reasonable and the need apparent. Duplication of service is always ultimately paid for by the passenger and under proper regulation it is to the interest of the passengers that highway transportation shall be conducted as a unified whole.

From the results of experience in operating trackless transportation so far it must be appreciated that higher operating costs per seat-mile with buses justify a higher rate of fare in proportion, in compensation for any expedited service which may be possible by their operation.

Transportation is lacking in some places where lines have been abandoned on account of high costs of operation or of track reconstruction. The public formerly served by these lines feels that an injustice has been done the communities. Not only where lines have been abandoned but also in many local and country sections where highway transportation has never existed there is a growing demand for some service, and this demand is constantly increas-

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ing where communities are stretching out into new territory and going through a process of natural growth. As the recognized distributors of transportation, the traction companies should be prepared to supply this lack. It must be realized, however, that it is incumbent upon sparsely settled districts to assist by caring for deficits until the service becomes self-supporting. Never again must the transportation companies and the riding public, who eventually pay the bill, be imposed upon for the purpose of land development exploitation.

The committee has five members who have served at least two years and whose companies are in the business of operating motor buses. In fact, of the thirteen members, ten represent organizations that have inaugurated motor bus operation.

The members of the committee are convinced that the motor bus has come to stay. It is a business proposition, not a theory. In fact, the use of buses where feasible is an established policy with most of the members of this committee. Committee reports have been made in many associations of street railway men and in the automotive industry. Technical journals have compiled statistics of every description. Two conclusions seem to be reached by reading these data and these reports, and from the committee's experience:

1. The electric car running on rails is still the most essential, reliable and economical method of urban, suburban and interurban travel, considering the transportation problem as a whole and especially for mass transportation. This condition arises largely from the fact that the operation costs per passenger are higher for bus operation than with electric cars, and from the further fact that it is not possible to handle mass transportation with buses.

2. The motor bus is needed to feed and supplement our car lines, to open up new territory; in fact, to complete, round out and make whole passenger transportation on the highway.

As stated by this committee in the past, it is our duty, as public servants charged with the responsibility for conducting the highway transportation in our respective communities, to adopt every feasible unit or method for furnishing this service.

The report was signed by J. H. Alexander, R. E. Danforth, B. J. Fallon, George Keegan, T. J. McGill, H. A. Mullett, D. W. Pontius, G. T. Seely, Claus Spreckels, R. A. West, H. B. Potter, vice-chairman; C. W. Kellogg, vice-chairman, and H. B. Flowers, chairman.

Uniform Motor Vehicle Regulatory Laws

During the winter just past there have been in session forty-five State Legislatures, and legislation affecting the operation of motor vehicles for the transportation of passengers and freight on the public highways has been passed in twenty-two states, which is of varying degrees of importance. Some of the states, such as Iowa and Oklahoma, have passed general, full and complete regulatory laws affecting motor vehicle common carriers. Other states have merely amended certain sections of their present laws. In seventeen states a gasoline tax has been imposed upon all motor vehicles whether common carriers or not, making a total of thirty-six states now having such a tax. Ten states have increased their gasoline tax, the amount of the increase varying from 1 cent to 2 cents per gallon. The gasoline tax runs from 1 cent to 3 cents per gallon, the lower figure being the rate of taxation in the states of Arizona, Connecticut, Kentucky, Louisiana, Maine, Mississippi, New Mexico, North Dakota, Texas and Vermont and the higher figure the rate in Florida, Georgia, Oregon, South Carolina and Virginia. In seven states there was no attempt made to pass legislation affecting motor carriers. In six states legislation was attempted but failed. In the state of Wisconsin a bill has been drawn and reported favorably by the committee, which remains for the action of the Legislature.

There remain almost as many plans of taxation of motor vehicles and motor vehicle common carriers as there are state-taxing bodies. The complete plan of taxation per ton-mile of travel over and along public highways, as suggested by this committee in its report at the last annual meeting, was adopted in one state (Iowa), with the exception that the rate of taxation suggested was changed from 1 cent and 1½ cents to ⅛ cent and ¼ cent respectively. In one state (West Virginia) the taxation of motor vehicle common carriers is based on a prescribed sum per passenger seat-mile for passenger-carrying vehicles, such prescribed rate being higher for heavier motor vehicle units and lower for lighter units.

Plans of Taxation Chaotic

In general, however, the plans of taxation remain chaotic, unscientific and unremunerative. As a rule the taxes in all states are much lower probably than the cost of maintaining highways damaged by motor vehicle common carriers. Until this situation has been corrected the public will be subsidizing the operation of these new transportation units.

In all legislation of a general character passed during the last winter, the requirement of a certificate of convenience and necessity before a motor vehicle common carrier can operate has been enacted into the laws. It is manifestly conceded by all parties concerned that such requirement is fundamentally sound. Also, in all states passing general motor vehicle legislation within the past year, liability insurance bonds to protect the public against injuries and damages have been required. This insurance feature, therefore, in addition to the certificate of convenience and necessity feature has apparently been accepted as basicly necessary in any effective motor vehicle regulatory law. There has been some divergence of ideas in the application of these two fundamentals, the insurance required in some states being somewhat less than in others and the character of the insurance being somewhat different. Certificates of convenience and necessity, while required in all new general laws, are issued under very stringent conditions and regulations in some states, and under less close requirements in other states.

There are a few fundamental ideas that must be secured in any new laws in order that regulation may be effective. First, certificates of convenience and necessity, making it unlawful for any motor vehicle common carrier to operate or commence operation until some state authority has consented to the operation of a common carrier by motor vehicle. Second, sufficient power lodged in some department of the state to supervise and regulate the rates, service, accounts, and safety of operations of every motor vehicle common carrier. Third, adequate insurance to protect passengers and public from injuries and damages caused by the operation of motor carriers. Fourth, a compensatory tax which will produce such an amount as will repair the damage done to highways by motor vehicle common carriers. Until a better plan has been devised, it is the opinion of this committee that there should be urged upon the public the necessity of taxing motor vehicle common carriers on the basis of the amount of use of the highways. To secure complete compensation for the use of highways by motor vehicle common carriers, every state should be urged to study this question on the basis of reducing the information to the point of how much damage a ton mile of travel does in cents and fractions thereof to each type of highway commonly in use. When that has been determined by investigation, the rate of taxation per ton-mile of travel can be accurately fixed. Until it has been determined the principle involved in the application of the ton-mile tax should be urged and the rate set at a tentative figure that will be certain to be sufficient. This may be done without particular detriment, because such rate may be changed from time to time as the studies advance without it affecting the sound principle of the ton mile tax. It is vital to all concerned that the present public subsidy in the shape of uncompensated use of roads be withdrawn from motor vehicle common carriers. Every taxpayer is interested in this and every other form of transportation is also interested in it. When such public subsidy has been withdrawn the rates charged on this new form of transportation must necessarily be fixed at such a point as will compensate their use of highways, and when this is done the present unfair and indiscriminate competition will be substantially curtailed.

It is gratifying to note that the draft of uniform motor vehicle law as proposed by the committee at the last annual meeting has been more or less

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used in many states in framing new motor vehicle common carrier legislation. Many parts of such laws have been written quite largely from the tentative draft adopted by this association at its last annual meeting.

The report was signed by A. W. Brady, Ralph R. Bradley, David Daly, D. W. Pontius, B. E. Tilton, H. E. Chubbuck and C. D. Cass, chairman.

Construction and Maintenance of Highways for Motor Vehicles

The committee on cost of construction and maintenance of highways for motor vehicles was appointed in the year 1922, and sent to the electric railway company in each state located in or near the capital a questionnaire requesting certain data. The replies were not received in time for the committee to report at the 1922 convention; therefore, the committee was continued for the year 1923.

Replies to the questionnaire indicated that many states have not kept authentic records of the cost of construction or maintenance of their improved state highways and there was practically no record of costs in connection with county highways. The committee's information also indicated that many state highway departments which have not kept detailed cost records are starting to keep construction and maintenance costs which should be available in the future. Data on county highways probably will not be available for some years to come.

An examination of the tabulated data received by the committee shows that, with few exceptions, the costs of highway construction and maintenance have increased steadily from 1917 to 1921, due to the construction of concrete, stone-block or brick pavement types of road instead of macadam and to the recognized increase in cost of labor and materials of all kinds. Obviously, costs of highway construction and maintenance will vary widely in different states due to the differing climatic conditions and soils, types and widths of highways, varying costs of labor and materials and density and character of traffic.

In order to determine the annual cost to any state of its improved highways it is, of course, necessary to know the total amount of money invested in highways from which the interest, depreciation and other fixed charges thereon can be obtained. These charges, to which should be added the annual maintenance costs, will represent the total annual highway expense. The determination of the depreciation charges requires knowledge of the estimated life of each type of highway for the character and density of the vehicular traffic accommodated by it. Information of this character is not now available, although elaborate tests are being made by the U. S. Bureau of Public Roads, various state highway departments and educational institutions.

The committee presents in tabulated form the data received showing partial figures of the construction and maintenance costs per mile for twenty-seven states, together with the mileage for the years 1917-1921 inclusive. The report says that it is realized that this information is not complete and in some instances may be inaccurate, but it gives a fair idea of average construction and maintenance costs for the years indicated. Figures as to motor vehicle registration and revenues collected by the U. S. Bureau of Public Roads are also included.

The conclusions of the committee are: That there now is a noticeable absence of accurate data on highway costs; that there is need of definite action on the part of the several states to obtain accurate cost data on the various types of road in use, in order that an equitable plan of taxation may be devised to meet the expense incurred through the increasing use of highways by motor vehicles.

The report was signed by J. S. Bleecker, C. M. Cheney, W. F. Graves, Samuel W. Greenland, E. C. Johnson, E. P. Roundey, J. N. Shannahan, H. M. Steward, and W. J. Harvie, chairman.

Co-ordination of Electric Railway and Bus Transportation

President Emmons then announced that the rest of the session was to be devoted to a consideration of the subject of co-ordination of electric railway and bus transportation. Papers were read by Alfred Reeves, general manager Automobile Chamber of Commerce; L. S. Storrs, president Connecticut Company, New Haven, Conn., and D. W. Pontius, vice-president Pacific Electric Railway, Los Angeles, Cal. These addresses will be found elsewhere in this issue. The meeting then adjourned, after Secretary Welsh had announced that the association had received from the United States Department of Commerce copies of its recent "Survey of Business." Copies of this survey were available to the delegates at the convention.

Wednesday's Session, A.E.R.A.

PRESIDENT EMMONS called the second session of the American Association to order promptly at ten o'clock Wednesday morning. The first order of business was the report of committee on nominations, which was presented by J. H. Pardee, chairman. The association acted on the report, electing the following officers for the ensuing year.

President, Britton I. Budd, president Chicago, North Shore & Milwaukee Railroad and Chicago Elevated Railroads.

First vice-president, J. N. Shannahan, president Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.

Second vice-president, F. R. Coates, president Toledo, Ottawa Beach & Northern Railway, Toledo, Ohio.

Third vice-president, W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill.

Fourth vice-president, R. P. Stevens, president Republic Railway & Light Company, New York.

Treasurer, Barron Collier, president Barron G. Collier, Inc., New York.

The new members of the executive committee are: J. H. Hanna, vice-president Capitol Traction Company, Washington, D. C., and H. B. Flowers, president New Orleans Public Service, Inc., representing railways, and E. F. Wickwire, secretary Ohio Brass Company, Mansfield, Ohio, and Cornell S. Hawley, Consolidated Car Heating Company, Albany, New York, representing manufacturers.

J. P. Barnes, as chairman, presented the report of the committee on valuation. In view of the great importance of this report, it will be published in full in the JOURNAL next week.

The valuation report was discussed by H. M. Brinckerhoff, Prof. A. S. Richey and J. A. Emery. Mr. Brinckerhoff called attention especially to the reference of the committee report to the yardstick method of making valuations. He stated that the form of valuation report and the method of proof are of great importance. We have reached the point where valuation engineers have had sufficient experience so that they ought to have somewhat standardized methods. However, he stated, there is very great diversity of methods, both with engineers and with commissions. It should be possible to state the physical facts so that these would not have to be brought out in testimony in hearings.

With the knowledge we now have of costs, it ought to be possible quickly to prepare a rough estimate of value with sufficient degree of exactness to make it acceptable in formal proceedings. As bearing on this contention, he cited the fact that a building contractor will figure the exact cost of a few of the major items and estimate the rest on the basis of cubical content, and he succeeds in doing business on this basis. There is no need to go into such great detail with utility valuation work. He stated we ought to be able to get engineers to agree on many factors and thus make it possible to get an estimate easily, which would be near enough for practical purposes. This ought to be driven home to both engineers and lawyers.

Mr. Emery called attention to the fact that the committee's report was unanimously agreed to by all of the members and commented that at the beginning of their work this was hardly thought to be possible. The principal controversy nowadays is between the reproduction and the prudent investment methods of valuation. Since the opinion of Justice Brandeis in the Southwestern Bell Telephone decision of the United States Supreme Court, a

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good deal has been made of the investment method. Mr. Emery pointed out that this would mean that if a company had invested $3,000,000 before the war in a piece of property and $7,000,000 since then, it would have a total valuation of $10,000,000. But he pointed out that this could obviously not be taken as a measure of the valuation, for the amounts of labor and material involved in the $3,000,000 piece of work might be greater than that in the $10,000,000 piece. His point was that the $3,000,000 and the $7,000,000 items are altogether different and cannot be added. If an effort is made to translate the present and pre-war values of the dollar to equivalent basis, then one is back practically to the problem of determining reproduction costs.

On the matter of depreciation charge, Mr. Emery stated that there has been a tendency in late years to assume that this was for the purpose of wiping out investment. He stated that this was entirely at variance with recent opinion of the United States Supreme Court. If a piece of property wears out the company is entitled to get that back in terms of present-day value. He acknowledged that there were serious accounting difficulties in this.

On motion, the convention adopted the report of the valuation committee.

W. R. Maltbie presented the report of the committee on special taxes by making a very able review of it. The report follows in abstract:

Special Taxes

In view of the fact that so many burdens carried by public utilities, and particularly by the electric railways, have been disguised under other names, it is necessary for any intelligent discussion of the subject that we have a definition of "tax." For the purposes of the present report we are regarding as a tax any charge imposed or service exacted which operates to the benefit of the community as a whole or to any part thereof, excepting such charges or services as react to the benefit of the users of the street railways in the ratio of their respective use.

With this definition of taxation in mind the committee prepared a questionnaire, and forwarded it to all of the member companies with the hope of determining definitely the full variety of tax burdens, and to some extent the total tax burden, carried by the industry. Replies were received from 113 companies and the following tabulation made.

Excess Profits Taxes—Excess profits taxes are, of course, no longer imposed, but the fact that in a number of cases the excess profits taxes imposed for the year 1917 and subsequent years have not yet been adjusted, and the further fact that the government still has a considerable period of time within which to review the returns for the later years of the operation of the excess profits tax law, fully justify, your committee believes, a discussion of the question at this time.

The street railway industry passed, in many if not most of our larger cities, through a period of consolidation. At that period security issues were not under the control of public service commissions, and accounting standards for the industry had not yet been unified and were to some extent undeveloped.

The minor companies owned in many cases valuable intangible rights and these, together with the anticipated increased revenue resulting from the economy and efficiency of consolidated operation, were capitalized by the promoters of the consolidation, in accordance with the then current business practice.

But an internal revenue department field agent, examining in 1920 or 1922 an income tax return for the year 1917, 1918, or 1919, can find nothing in his rules and instructions to cover such a situation and therefore is apt to slash millions of dollars out of the invested capital claimed by the company, change its surplus into a deficit, and finally present it with a bill for taxes on excess income.

Some of the cases have been adjusted and the companies relieved by the presentation of evidence establishing the value of intangibles and thus restoring to invested capital all or a part of the amount wiped out by the field agents of the internal revenue department. In other cases the companies have decreased or set aside the levy for excess profits tax by showing that they were entitled to increase for the years in question the modest provisions made for depreciation, although the result (since under commission regulation comparatively few companies carry any appreciable surplus over from year to year) must necessarily be to seriously reduce the surplus or even to create, at least for income tax purposes, a deficit.

It has been suggested by some of the companies that it might be possible to handle this situation on the basis set down by Sec. 210 of the act of Oct. 3, 1917, whereby the deduction to be made can be determined by a comparison with standard concerns in the same line of business. Some work was done by our predecessor committee with the idea of assisting in such a movement, but the difficulty of finding representative companies whose returns had been already examined and pronounced satisfactory by the government, coupled with the difficulty of applying such a standard on account of the unstandardized character of operating conditions, led the committee to abandon this mode

SUMMARY OF TAXES PAID BY 104 ELECTRIC RAILWAYS

Direct Taxes		
Federal corporate stock tax (seventy-five companies reported)		$274,820
Federal income tax and state income tax:		
Federal income tax (sixty-seven companies)	$3,486,016	
State income tax (eighteen companies)	596,631	
Federal and state income tax (one company)	6,648	
Total (seventy-three companies reported)		4,089,295
Real and personal property taxes:		
Real property tax (sixty-five companies)	$2,734,928	
Personal property tax (thirty companies)	3,720,443	
Real and personal property taxes (thirty-three companies)	5,669,446	
Total (ninety-nine companies reported)		12,124,817
Franchise tax (fifty-one companies)		1,822,434
Real and personal property and franchise taxes (three companies)		330,752
Gross receipts tax (fifty-one companies)	$3,101,276	
Franchise tax and gross receipts (three companies)	87,318	
Total (fifty-four companies reported)		3,188,594
Net receipts tax (two companies)		1,796,568
Licenses:		
Car licenses (twenty-six companies)	$431,032	
Pole licenses (nine companies)	3,365	
Wire licenses (two companies)	2,260	
Track licenses (seven companies)	7,213	
Car and pole licenses (one company)	717	
Car, pole and wire licenses (two companies)	11,143	
Pole and wire licenses (one company)	1,033	
Car advertising licenses (one company)	125	
Total (thirty-five companies reported)		456,888
Miscellaneous taxes (forty-six companies)		826,128
Total direct taxes		$24,910,296

Imposts		
Paving construction and paving repair and maintenance:		
Paving construction (sixty companies)	$2,372,143	
Paving repair and maintenance (sixty-four companies)	2,466,045	
Paving construction and paving repair and maintenance (three companies)	580,355	
Total (eighty-four companies reported)		$5,418,543
Street cleaning and street sprinkling:		
Street cleaning (ten companies)	$660,944	
Street sprinkling (twenty-three companies)	70,422	
Street cleaning and street sprinkling (two companies)	40,644	
Total (thirty-four companies reported)		772,010
Snow removal (thirty-one companies)		325,870
Bridge construction (ten companies)		262,009
Bridge repair and maintenance (thirty-four companies)		216,692
Traffic policemen (six companies)		115,937
Support of public service commission or other body or officer (twenty-five companies)		172,291
Street lighting (thirteen companies)		47,286
Free transportation of police, firemen, mail carriers and municipal employees:		
Police (seventeen companies)	$523,866	
Firemen (thirteen companies)	242,313	
Police and firemen (thirteen companies)	472,119	
Mail carriers (two companies)	473,306	
Municipal employees (five companies)	62,272	
Total (thirty-one companies reported)		$1,773,876

In addition to the above, forty-seven companies reported that they give free transportation to police, firemen, mail carriers or municipal employees but no record of the amount is available.

Miscellaneous imposts (six companies)	$289,744
Total imposts	9,394,258
Total taxes	34,304,554
Total operating revenues	358,530,280
Direct taxes as percentage of operating revenue, 6.9 per cent.	
Total taxes as percentage of operating revenue, 9.6 per cent.	

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of attack; and, so far as we know, it has not been satisfactorily followed by any company in the industry.

Depreciation

The difficulties which the companies are finding today since the repeal of the excess profits tax, arise chiefly out of a ruling of the department on the question of depreciation.

The government has always been willing in the administration of the income tax to allow as a deduction from income a reasonable sum based upon the estimated life of the unit of property in question. In the case of a corporation the department is disposed to insist that this depreciation cannot be allowed unless it is charged off against capital or set up upon the books as a reserve.

The rulings of the income tax division and the income tax law itself have been changed in this regard a number of times.

The present situation may be summarized as follows:

1. The present law and the act of 1918 make no requirement that the depreciation claimed shall be charged off.

2. The treasury regulations require that all depreciation claimed should be charged off, but that where it has not been charged off the books may be reopened and the proper allowance claimed.

3. Where on account of the payment of dividends in previous years there is no available surplus against which the proper credit to a depreciation reserve can be debited the allowance can still be claimed by writing it off against principal or capital. In such case the ordinary dividends in the years when proper depreciation was not claimed would seem to become a liquidation dividend in whole or in part and therefore under the revised ruling (Regulations 62, 1922 edition, Paragraph 1546) not to be subject to tax in the hands of the stockholders.

4. Banks, as a special class of corporations subject to federal or state control in their accounting, may carry supplemental books of account showing depreciation charged off without entering this charge upon the books required by state and federal authorities.

Conflict Between State and Federal Depreciation Regulation—In this matter of depreciation the electric railway industry, in common with other public utilities, finds itself in a situation somewhat similar to that of the banks. For income tax purposes the federal government allows a certain deduction of depreciation as an operating expense, the particular rates being subject to the approval of the treasury department. These rates are fixed or are supposed to be fixed on a straight line basis adjusted so as to accumulate by the end of the useful life of the various classes of apparatus the total difference between original cost and scrap value. A private corporation consequently, without fear of criticism, public or private, may adjust its rates so as to earn the full amount of this depreciation plus a reasonable return, distribute the reasonable return to its stockholders, and hold the full amount of the depreciation, without payment of any income tax thereon, as a reserve to be invested in expansion of the plant or elsewhere to benefit the stockholders.

The public utility, on the other hand, usually finds its appropriations to a depreciation reserve limited by action of the public service commission under which it operates and further finds its earnings limited to a fair return over and above the commission-fixed allowance for depreciation. If by chance the depreciation allowed by the commission is equal to that allowed by the income tax department of the federal government, the dual control introduces no difficulty, but if, as sometimes happens, the depreciation allowance set up by the commission is less than that allowed by the federal government, the utility must either accept the depreciation allowance as limited by the commission and therefore pay to the federal government an income tax upon earnings which would be tax free with a private corporation, or else make up the difference between the commission depreciation and the income tax department depreciation out of its net earnings applicable to fair return, and in the latter event either decrease the return to its stockholders below the fair return allowed by the commission or else treat a part of this fair return as a liquidating dividend resulting in depletion of capital and impairment of credit. It would seem desirable, therefore, that the industry should attempt to secure a special ruling similar to the bank ruling above noted.

Income Tax Bureau's Attitude

The situation outlined above, common to all public utilities, is further complicated in the case of the electric railways by the attitude of the income tax department toward depreciation of way and structures. If a company has been in existence for a number of years and has a large quantity of diversified trackage, it is probable that the lapse of time has brought about such an equalization of replacement charges that the tracks and right-of-way structures are maintained in status quo by a practically uniform annual expenditure on maintenance and replacements. It is therefore unimportant from the accounting and financial point of view whether (1) a part of this necessary annual sum is appropriated first to a depreciation reserve and then charged out of the depreciation reserve for major replacements, or (2) the entire sum is charged directly to maintenance without the intervention of a depreciation reserve account.

The Interstate Commerce Commission therefore in making up a standard system of accounts for electric railways (which system has been adopted by many if not most of the state commissions) has left it optional with the companies whether they will carry a depreciation reserve for way and structures or will maintain them in full operating efficiency by direct charges to maintenance for such replacements as may be necessary.

In the steam road case arising under the act of 1909 the court ruled that the depreciation of the roadbed and of the structures connected therewith must be treated as a whole. The jury under these instructions found no depreciation, and the decision thus reached by the lower court was upheld by the Court of Appeals. The expense of keeping the road in repair and of making replacements had, of course, been claimed and allowed as maintenance.

Basing its action apparently upon this decision, the income tax department is refusing to allow to electric railways any depreciation on way and structures, thus practically forcing the industry to adopt the second of the alternatives allowed it by the Interstate Commerce Commission.

In all cases where the diversity of the items which enter into the account, the magnitude of the plant, and its age have in combination produced an equalization of renewal charges from year to year this ruling works no hardship, but in all other cases it is apt to result in a distinct financial injury to the utility.

It is the feeling of the committee, therefore, that the association should attempt to secure a revision of the ruling of the income tax division so as to leave to individual electric railway companies the option allowed them by the Interstate Commerce Commission.

State and Local Taxation

Besides federal taxation as discussed above the street railway industry makes contributions to the state, to the county, in the case of interurban or suburban lines, and to the local municipality or other taxing district. The burdens imposed under this head may be divided into three broad classes:

1. The usual tax on real estate and personal property, paid in common with all other citizens of the state, whether individuals or corporations. In this class would also be included state income taxes. This first class represents the same type of burden as that imposed upon general corporations or individuals.

2. Special types of taxes not applied to the general corporation but either to utilities as a class or to the street railway as a special type of utility. In this class may be included taxes upon so-called intangibles, and upon franchises or easements.

3. A long list of special burdens imposed upon the transportation industry and not imposed either upon private citizens, general corporations or other utilities. These special burdens for the most part consist in the requirement that the utility shall render free service either to certain groups of citizens or employees or shall perform individually at its own expense certain pieces of public work. They are taxes in that they are expenditures which would otherwise be paid for out of the public purse and are therefore,

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to the extent of their cost, just as distinctly a tax burden as a definite rate imposed upon real estate.

No special consideration need be directed to taxes of the first class.

It is hard to lay down any general theory of taxation based upon equitable considerations which will justify taxes of the second class. There is certainly no basis for imposing upon the public utility a greater tax burden than is borne by the average normal corporation. The second class of taxes, therefore, must be justified, if at all, upon either practical considerations or as a historical survival from times when they had a practical economic basis.

But it should be noted that in cases where some such historical or practical justification may be adduced it is the justification of a gross receipts tax as a substitute for the flat property tax to which an ordinary corporation is subjected, and in no sense a justification of a gross receipts tax super-added to a flat property tax, except possibly in those cases where the gross receipts tax is contractual in its character and partakes of the nature of a payment for the franchise.

The justification of franchise or easement taxes demands also the assumption of conditions which existed at one time in the history of the industry but exist no longer. Given a street railway, for example, which enjoyed a legal monopoly of mass transportation at a fixed rate under which it was able to make large profits upon its invested capital, it was not illogical for the public to reason that these large profits were possible only because of certain exclusive rights in the public street, that these exclusive rights, protected by law, became valuable property which was in itself profit-producing to the owners of the utility, and that therefore it was not inequitable that they should pay a tax thereon.

But, given a complete change of the theory of operation by which the profit-producing character of the exclusive right is destroyed and the profit limited to only a fair return upon the property owned exclusive of the franchise rights, the justification for the franchise tax is destroyed and instead of being a levy upon the stockholders in proportion to the value of property owned by them it becomes merely an indirect burden placed upon the users of the utility for the advantage of the general public.

Burdens Imposed by Public

Taxation of the third class, consisting of various service burdens laid upon the utilities for the benefit of the general public, sub-divides at once into two sub-classes according as the tax in question was or was not justified.

The nature of this classification will be perhaps clearer if we will consider first the distinction between a true operating or construction charge and a public burden. If, for example, it is desired to extend a street railway system over a street already improved with a high-grade, modern pavement, the cost of cutting through this pavement and restoring the street to its original condition is a construction cost properly chargeable against the users of the street car service. Moreover, if from time to time it becomes necessary to open the pavement at certain points, the cost of such opening, together with the cost of restoring the pavement to its original condition, is a true operating charge made solely as an incident of operation and properly chargeable to the users of the utility.

If, however, on the other hand, the street car line precedes the pavement, operating over an ordinary road which the municipality decides to improve with a modern pavement; or if the pavement finally wears out under ordinary traffic conditions and it becomes necessary to repave, such repavement or such new pavement cannot properly be charged as either a construction or an operation expense. If the presence of the track increases the construction or maintenance cost of the pavement, the excess may properly be charged to the railway. If more than this is charged, it becomes merely a burden upon the users of the utility service for the benefit of the general community.

Returning to our two sub-classes of the third type of public burden we would note that the first and most important item in the first sub-class, namely, the class of those which were historically justified at the time of their first imposition, is the matter of paving construction and repair. In the horse car days the transportation companies found paving essential and were, in turn, one of the heaviest users or consumers of paving surface. It was therefore, to this extent at least, logical to require the companies to construct and to maintain the paving within the track space.

But even in these early days the other side of the situation seems to have been entirely overlooked. While it was true that the street railway traffic did wear out pavement and should therefore be charged with renewal costs as an operating expense, it is also true that other vehicular traffic, attracted to the rail as an iron tramway, assisted in the wearing out of the railway rail, acted as an interference with railway traffic, and contributed perhaps even more than the railways themselves to the wear of the pavement within the track space. It would seem therefore logical that the street railways should have claimed out of the general tax levy a credit for public service rendered as an offset against the admittedly logical charge for pavement outworn.

Today there is no longer any logical basis for any pavement cost whatever, except that purely incidental to and resulting from the operation of the cars over the tracks. The street car rider is paying a portion of the expense of providing a smooth pathway for the pleasure rider, the commercial truck, and even the jitney competitor.

The second sub-class consists of those public burdens which were never logically justified by any relation to operating cost. There is no logical reason, for instance, why the users of the street car system should pay for the transportation of the public police.

All of the public burdens of this second sub-class originally found their justification, so far as they could be justified, in purely practical considerations. The railways were operating under fixed rates of fare determined by charter or by act of the legislature. They were believed by the public to be extremely profitable businesses, and any additional burdens which could be loaded upon them, either with or without their consent, represented a transfer from the pockets of the stockholders to the public coffers and by so much decreased the general tax rate and the burden upon the general public. In other words, these burdens were a tribute paid by the operators of the transportation system as the price of non-interference by the public with a situation or business which it was believed would, even then, remain profitable.

Regulation Has Changed Situation

With the development of commission regulation, however, the entire situation changed. The business no longer operated upon a fixed charter or legislative rate but under a rate subject to constant modification by a commission operating on the theory of allowing only a fair return on fair value and allowing this fair return in addition to all operating costs, including both direct and indirect taxes.

In consequence of this changed theory of operation there was an immediate transfer of the public burden from the shoulders of the stockholders of the property to the shoulders of the users of the utility service. The more perfect and automatic commission regulation becomes, and the more frequent the rate adjustments, the more complete the transfer of the burden, until today in many states the street railway, instead of being a genuine taxpayer, has become merely an instrument by which a considerable percentage of the burden of public administration and public protection is, under the disguise of a charge for service, collected for the benefit of the people as a whole from the users of utility service, and even from them not in proportion to their need for public administration and public protection but in proportion to their use of the facilities furnished.

The inequity of this condition which, be it noted, does not operate to the injury of the street railway stockholder, has been still further heightened by the development of transportation other than the electric railway.

It is the opinion of your committee, therefore, that all taxation or public burden in addition to the taxes imposed upon other corporations, imposed upon a transportation system under public utility regulation, is inequitable to the users of the service; and that it is also injurious to the street railway system in that it introduces an unnecessary cost into the operation of the road and by so much increases the difficulty of

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developing proper public relations. We recommend, therefore, that our member companies give full publicity to the existing situation with regard to public burdens and co-operate with the users of their service in an attempt to have the public burden properly distributed over the general public.

Public utilities as a class should be able to make out a strong case for preferential treatment at the hands of the taxing authorities. Commission regulation sets a maximum rate of return slightly above the legal rate of interest. Practical economic considerations at the present time are holding the net return of many of the street railway companies at an even lower figure. The riding public, therefore, who are the real users of the street car investment, would seem entitled to claim the same low tax rate as, for example, the security holders or the bankers.

On the other hand, public utilities as a class and the street railways in particular play an absolutely essential part in the development of community wealth. They would seem, therefore, entitled to claim as favorable treatment as a manufacturer or merchant, particularly in view of the fact that the merchant or manufacturer, taxed upon his invested capital and turning over his invested capital from three to five times per year, is compelled to increase his sales price by only one-fifth to one-third of the tax percentage, while the utility, requiring by the nature of its business from three to five years to make a single turnover of its invested capital, must increase its sales price to its ultimate consumer by from three to five times the tax percentage.

Sooner or later the public itself will object to public utility taxation in excess of that imposed upon other corporations of no greater importance to community growth. If public utility regulation by commissions becomes thoroughly effective; if the owners of the property represented by the stock and bondholders, are limited to a fair return as compensation for the accumulated wealth devoted to the public service; and if the tax imposed has no effect whatever upon reducing or increasing the income which these owners receive; the next step in logical development is for the users of the service to refuse to bear an excess share of the public burden because the nature of their business or their habits of life compel them to make use of the utility.

There is another reason for the discussion of this problem, apart from the interests of the street car companies and the interests of its patrons. One of the most serious problems of the day is that of municipal, state, and federal extravagance. The check upon public extravagance is to be found only in a demand on the part of the public for economy, and one of the first and most important steps in the development of this public demand is the elimination of indirect taxation. The tabulation shown in this report indicates that approximately 10 per cent of the gross receipts of the street car companies of the United States is devoted to some form of public burden. The average fare at the present time is 6.92 cents or, in other words, an average of nearly two-thirds of a cent out of every street car fare collected in the United States is an indirect tax upon the street car users for the benefit of the general public.

The average workman riding to and from his work three hundred days in the year pays in this one item an indirect tax of approximately $4. If this indirect tax and other numerous indirect taxes which he pays could be bundled together with the relatively small direct tax which he is called upon to meet, labeled, and known to him as a tax, we would find a pressure for public economy making itself evident at the polls in unmistakable fashion.

While no such radical action on public utility taxation is to be immediately anticipated, your committee is convinced that the present nation-wide study of the whole tax problem must lead to important changes, and that our member companies should adopt a uniform attitude and aid in the early development and adoption of an equitable and intelligent scheme of public utility taxation.

The report was signed by Edwin Gruhl, A. G. Neal, A. M. Robertson, H. B. Sawyer, Paul Shoup, and W. H. Maltbie, chairman.

President Emmons gave credit to Mr. Maltbie for having secured the return of several hundred thousand dollars paid in taxes by the Baltimore company, and stated that railway companies in trouble should know that there is a way to get relief.

F. W. Doolittle presented a very able paper on "Essential Operating Costs." This appears elsewhere in this issue.

Mr. Dalrymple Gives Talk

James Dalrymple, manager Glasgow Corporation Tramways, who attended the convention all the week, gave a brief talk before the American Association Wednesday morning. He was reminded, he said, that when he first visited the United States some twenty years ago, he was looked upon with suspicion because of the municipal operation of the Glasgow Tramways. He added that the question of municipalization was then very much to the front in this country.

It is now thirty years since Glasgow began the operation of its railways. The occasion for that was the expiration of the company's franchise. The city tried over a long period of time, he said, to come to some reasonable arrangement with the company, but the company then operating was so short-sighted and so arrogant that the citizens finally gave up hope of reaching any reasonable settlement and had to take the property over and operate it. If the street railway in Glasgow had been operated then as the railways of this country are now being operated, he said, he doubted if it would have been taken over by the city, at least at that time.

The operation in Glasgow was successful almost from the start, and it was this that gave great impetus to the spread of municipal ownership in Great Britain, where about 100 railways are now municipally operated.

Mr. Dalrymple said that municipally operated companies there had had their ups and downs and had had to fight for their existence. He said that we are discussing the same subjects here as they are in Glasgow, both as to revenue and operating expenses. The railways there had to increase their fares in practically every instance. The statutes formerly limited most of the railways to a 2-cent a mile maximum rate. Many of them which were operating for less money have had to raise to the maximum and many others which were operating at the maximum had to go as much as 100 per cent over the 2-cent rate. Very few fares have been reduced. There has been a large increase in the cost of wages and materials. Materials are two to three times above the pre-war cost there, and wages are about 100 per cent higher.

Mr. Dalrymple commented that since he was here last, ten years ago, he has noted a remarkable improvement in all of the companies visited on his present trip. He said that the railways were in very much better condition than ten years ago. He observed that the railways here are considering their obligations to the citizens in the United States more than ever before.

As to the principle of municipal ownership, he said that they had a feeling in Great Britain that if the citizens of a city say they want to run the street railways themselves, they ought to be allowed to do so. If any city decides that this is the right principle to follow, then it must pay to the company, of course, full value for what is taken over.

Charles E. Elmquist, formerly chairman of the Federal Electric Railways Commission, presented a paper in which he reviewed some aspects of the commission's work in the light of the experience of the last four years and made some suggestions for the benefit of the railway industry. Mr. Elmquist's paper appears elsewhere in this issue. His paper was prefaced by some most interesting discussion of the political situation in Minnesota, as a result of which he left his audience with the feeling that in spite of recent elections, the integrity of the people of Minnesota is not in danger and that conditions there are fundamentally sound.

A Commissioner's Forum

Following the address by Mr. Elmquist, the convention had the pleasure of listening to addresses by five public utility commissioners: Dwight N. Lewis, member Iowa Board of Railroad Commissioners and president of the National Association of Railway and Utilities Commissioners; Henry C. Attwill, chairman Massachusetts Department of Public Utilities; Charles C. Marshall, member the Public Utilities Commission of

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Ohio; Lewis E. Gettle, chairman Wisconsin Railroad Commission, and William Milnes Maloy, chairman Public Service Commission of Maryland. These men discussed both the specific situations in regulation in their several states as well as general regulation problems. Abstracts of their remarks are presented in a symposium elsewhere in this issue.

Thursday's Sessions, A.E.R.A.

THE final session of the American Association was called to order by President Emmons on Thursday morning. C. L. Henry, Indianapolis, presented a proposed revision to the constitution and by-laws, providing as follows:

Proposed Addition to Article VI (d) to follow at the close of this Article.

If a meeting is held without a quorum present, the action taken at such meeting will be deemed legal and binding, the same as if a quorum were present, if the minutes of such a meeting are approved at the next subsequent meeting at which a quorum is present.

On motion the meeting adopted the amendment.

F. R. Coates presented the report of the committee on publicity, an abstract of which follows.

Committee on Publicity

A report of your committee on publicity of necessity must overlap somewhat on the work of the special manufacturers' committee on co-operation, the committee of one hundred and the accident prevention committee. This is because the work of all of these committees and that of the advertising section, through which all our publicity and advertising work clears, are very closely co-ordinated.

Epitomized, the work of the advertising section touches the advertising and publicity fields of electric railway and manufacturer companies, all daily and weekly newspapers in the United States, and the state committees on public utility information. All told, the section is co-operating with about 1,000 publicity and advertising men throughout the country who aid in the gathering and dissemination of good-will material.

One of the most important functions of the advertising section is to make available to newspapers, magazines and other publications facts about the electric railway industry. The committee's efforts have been to render a genuine news service to the newspapers and magazines, and proof that it has accomplished this endeavor is found in the fact that all statements and stories that it has released have been used generously by the large press associations serving the daily newspapers, the weekly newspapers and magazines. It never has offered for release a single statement which has been refused publication on the ground that it was colored or biased, or rejected on the charge that it was for propaganda.

News material has been released very largely during the last year through two main channels, the national press associations for the daily newspapers, and the state committees on public utility information for the weekly newspapers. Direct mailing to newspapers, except when news material of only local significance has been offered, is not followed for the dual reason that if a statement has news merit, it will be handed to the larger papers by the national press associations, and the state committees will take care of the smaller papers. Editors are overburdened with news releases and the committee seeks to aid them by avoiding direct mailing.

Special emphasis is laid by the committee on the fact that electric railways have two things of interest to newspapers—news material which has facts of general interest to the public, and advertising material, which may have news interest, but primarily belongs in the paid space sections of the papers. There is no reason in your committee's opinion why any newspaper should publish material belonging in paid space in its news columns, and the committee not only exercises great care to keep such material out of its news releases, but also urges individual companies to follow the same course.

At different times during the year larger newspapers of the country have carried news releases supplied by your committee dealing with: Growth of the electric railway industry in the last thirty years. Financial problems of electric railways. Public relations. Reviews of all major phases of the 1922 electric railway situation by the president of the association. The industry's need for more men. Electric railway financing. Trackless transportation. Need for uniform motor vehicle laws. Maintenance and construction of highways. Interest of the car rider in electric railways. Failure of the 5-cent fare in Seattle and of buses in Saginaw, the weaknesses of municipal operation and various other news stories. Your committee believes that all of the news statements previously mentioned were of a constructive character, calculated to aid in maintaining good local transportation for the benefit of the public generally.

The committee wishes to say that one of the first things that every state committee should do—and most of them do—is to urge paid advertising upon utility managements. Advertising does pay, and utilities should pay for everything that is properly classed as advertising. If you think you can go into a state committee and get free advertising into the newspapers which should go in as display, you had better stay out. It can't be done, and no fair-minded utility man should ask it—unless, of course, he is willing to give free street car service, electric lights, heat, water and telephone to papers just as he asks them to give away their space for something which is not news.

The advertising section has co-operated with the special committee on manufacturers' co-operation to a greater extent during the last year than ever before. Under the general direction of Chairman Wickwire the section has not only supplied material to the manufacturers for use in their good-will work, but also has helped conduct an intensive organization campaign for them. At the beginning of the present fiscal year only a few manufacturers were doing any good-will work for electric railways or had gone on record as being willing to do it but now approximately one hundred companies are enlisted in the cause.

Under a special working agreement between the Association and the committee of one hundred, part of the time of Fred C. J. Dell, director of exhibits, is allotted to this work.

The committee on publicity can think of no effort that would be more helpful to its endeavors as a continuation of the work of the manufacturers' committee as it has been carried on during the past year.

Bulletins and Posters

Once a month the advertising section, under the direction of your committee, issues a bulletin called *Truth*, which contains current information regarding movements in the electric railway field, consisting of brief news stories, editorial comments, etc.

This bulletin, which is prepared by the director, in a non-technical style, is particularly valuable to state committees on public utility information and electric railway companies and manufacturer companies having house organs.

In fact, much of the electric railway material, not of a strictly local character, which is found in clip sheets of the state committees on public utility information and the forty or more electric railway company publications which are printed in the United States is taken from *Truth*.

Truth not only circulates among these committees and companies, but also is sent to various organizations which use it as a reference or place it on their bulletin boards to be read by employees and others. The total monthly circulation of this bulletin is about 3,000.

At the suggestion of the committee on publicity, the director of the advertising section has been co-operating with the accident prevention committee in the preparation of poster and advertising material designed to decrease accidents.

The services of the advertising section to electric railway companies fall into two general divisions. The first

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is rendering a regular bulletin poster and suggested advertising material service to companies as a part of the routine and the other is to render special advisory service in local situations.

The committee has been pleased to note during the last year a growing tendency on the part of companies to avail themselves of this special advisory service. Scores of special requests have been made to the director of the advertising section for his advice and suggestion, and many companies, particularly, the holding companies, have sent their publicity men to New York to confer with the director on special problems, such as motor competition, paving taxes and merchandising transportation. Various companies, contemplating the organization of publicity departments, also have conferred with the director for the purpose of ascertaining the requirements of such a department in the way of personnel, finances, and so forth.

By virtue of being in close contact with all the publicity departments of the electric railways of the country, the director is in a position to give suggestions on almost any phase of a publicity or advertising problem. He can and will quickly give information as to what are the best methods of organization and of conducting a public relations department.

The services of the director also are available for companies having big problems of sufficient importance to warrant the director making a trip to the property. Whenever possible his personal services on the ground will be made available for limited periods.

The report includes a list of companies which are using company publications in their publicity work.

RECOMMENDATIONS

The committee believes that its activities should be continued along the general lines heretofore followed and every executive in the industry should lend his hearty support to the section's work, not only by having his advertising men co-operate with the section, but by following its work himself and offering suggestions and advice. The committee believes that the greatest weakness in the public relations machinery of the electric railway industry today is the failure of executives to present their stories personally to the public. There should be more speaking done at state and national gatherings by men whc are familiar with electric railway problems. The committee strongly urges that particular attention be paid to developing this feature of its work during the coming year.

The committee has under way the development of increased service, in the way of posters, suggested newspaper ads and articles for interurban roads, and it strongly urges that this work take precedence over everything else at the beginning of the new year. The committee believes that the taxation problem particularly on city lines is one of the biggest before electric railways, and it suggests that the efforts of the advertising section early in the year be directed toward the preparation of posters and other material designed to place the outstanding tax burden facts before the public. The industry is suffering greatly from pleasure cars giving lifts to prospective customers of electric lines and some advertising material dealing with this situation might well be prepared.

The committee strongly recommends closer co-ordination between the members of the manufacturers' committee and the committee on publicity of the association. If they will strike at the same phases of our problems simultaneously, much lost motion will be done away with and better results obtained.

The report was signed by P. S. Arkwright, J. F. Collins, P. H. Gadsden, L. E. Gould, F. T. Griffith, A. A. Hale, G. A. Richardson, L. S. Storrs, Elton S. Wilde, F. R. Coates, chairman, and Barron Collier, vice-chairman.

John T. Staub, Baltimore, presented the report of the committee on insurance, which follows in abstract.

Insurance

This committee has had several meetings during the course of the year and is compiling data from a questionnaire sent out on the subject of fire insurance. At this writing the data are not available for this report. The committee therefor has deferred any recommendations on this subject until it has obtained from member companies a full and complete report on which to base its conclusions. It has thought best, however, to suggest in this report certain recommendations which will ultimately assist in securing both a better rate and greater fire protection, as follows.

Fire Insurance—1. Inspection System—A system of inspection to be established and maintained, covering all locations and property of the company. This system of inspection to include the following:

(a) Regular monthly reports from the chief employee at each location.

(b) Inspections by a competent man from the head office to check the reports of local chief employees, report any additional information of value in fire prevention or rate reduction and review the fire-fighting organizations.

(c) Inspections and reports by insurance inspectors furnished by the insurance brokers or by insurance bureaus with the object of checking the work under (a) and (b), keeping standards up to the times and giving the insured the benefit of advice as to the latest practices.

2. Fire-Fighting Equipment — With any needful advice from insurance experts each location to be provided with the proper fire-fighting equipment.

3. Fire-Fighting Organization — At each location where practicable, fire-fighting brigade to be formed, instructed and drilled under competent advice.

4. Signaling System — Also, under competent advice, suitable local or central station signaling system, or both, to be installed at proper locations.

5. Analysis of Insurance Cost — For each location, that is, for each risk having its separate insurance rate make-up, a sheet to be made up showing make-up of insurance rate, annual insurance cost and estimated cost of elementary certain charges, and a book of such sheets, covering all the locations of the insured, to be submitted to the management of the determination of the practicability of removing or reducing the various hazards and charges.

6. Adoption and Enforcement of Rule as to Building Changes and Construction—The rule to be adopted and enforced that any plans for changes in buildings or for new building construction are to be submitted to proper experts on rates and risks.

7. Blanket Insurance—As a general rule blanket insurance to be obtained where available.

8. Valuations — That complete detailed valuations be made of property at each location, based upon carefully determined unit values, and upon carefully determined depreciation rates for the various items of property.

The following recommendations have also been made:

If pits are not standard, particular stress should be made on keeping them clean.

If stairs are incombustible, they should be properly cut off.

Tracks should run clear from building without break or transfer table, and should have bumpers so that there would be a clear space of not less than three feet between bumpers and wall of building, and not less than five feet between tracks and side walls.

All rails should be bonded.

Cut-off and trolley switches should be installed covering each section with a circuit breaker.

Proper attention should be given as to leaving trolleys in contact when cars are not in service, while stored in barn.

Metal lockers should be installed.

Hose should always be attached to standpipes and be tested out every thirty days.

The committee believes that the property adopting the recommendations and fully complying with them will secure greater protection and ultimately obtain a better rate.

Fidelity Insurance—Replies have been received from nineteen member companies to a communication sent to a selected list, requesting information over a period of ten years relative to the amount of such insurance carried, premiums paid, losses and number of employees. From a compilation of the information contained it will be noted that over the ten-year period the average ratio of losses to premium is only 18.1 per cent. It will also be noted that of the nineteen companies reporting only seven of them bond platform men. The lowest rate obtained for fidelity insur-

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ance by the companies reporting is 15 cents per $100 obtained by the Springfield Street Railway, Massachusetts. All the other companies are paying a rate of 20 cents or higher. While these figures would seem to indicate that even a rate of 20 cents is too high for the risk involved, the costs of carrying the insurance are also exceedingly high. It is felt, however, that the committee should point out that the rate of 20 cents per $100 is standard for this class of insurance and that they should be able to obtain such rate.

The following is a summary of information compiled from answers:

Number of companies replying..	19
Period	1913-1922
Aggregate platform men	$18,958,400
Aggregate other employees	$36,396,890
Total	$55,355,290
Total premium	$140,119.65
Total losses	$25,391.69
Average cost per $100	$0.253
Ratio losses to premium, per cent	18.1

The sub-committee is inclined to recommend that the practice of bonding platform men be discontinued owing to the difficulty in proving claims, and for the further reason that the experience of the companies seems to be that it would pay them to be self-insurers.

Standardization of Insurance Forms—The attention of the insurance committee has been directed to the liability on the part of a traction line receiving merchandise to be forwarded, which merchandise before it reaches its destination passes over the tracks of other companies; also liability in the case of shipments of merchandise that may be interstate. As the matter stands at present many interurban companies might suffer a severe loss, believing that they are fully protected.

The insurance committee has, therefore, thought it advisable to suggest that the member companies doing business in the Middle West states, as well as those engaged in interstate business, examine their policies and if there is any uncertainty as to the liability thereunder, they amend their forms by adding to the rolling stock item the following words:

". . . all while in the barns or yards or on the tracks of the assured or of others, wherever they may be in the United States and/or Canada."

Should the traction company be carrying common carrier liability insurance, the wording on its form should be made to read as follows:

"$..... on contents of cars for which the assured have assumed liability under bills of lading or shipping receipts or other agreements wherever the car or cars may be in the United States and/or Canada."

The report was signed by Williston Fish, H. A. Nicholl, Edward M. Wilson, Granville H. Bourne, N. H. Daniels, John H. Moran, Paul E. Wilson, Charles B. Scott, C. E. Morgan and John T. Staub, chairman.

C. E. Morgan, Brooklyn, presented the report of the committee on organization of community sections. This follows in abstract.

Organization of Community Sections

The general plan suggested to the committee was to the effect that a community section would consist of individual members of the association living in the same community or within a certain radius, who would affiliate for a mutual study of their local problems and would hold periodic and frequent meetings for this purpose. Special attention to be given to avoid any possible conflict with existing company section membership or other state associations.

The proposed membership would be much broader than any existing company section of the A. E. R. A., providing for not only electric railway employees but also for others interested in the industry, such as engineers connected with commissions, manufacturers supply dealers, students, college professors, consulting engineers, etc.

The committee feels that much good can be accomplished by the formation of such community sections, furnishing, as it does, an opportunity for those interested in the industry to get together at frequent intervals to discuss their common problems. It would give an excellent opportunity to bring together engineers and operating officials as well as the members of regulatory bodies, manufacturers, supply dealers, and in fact all those interested, from whatever angle, in the electric railway transportation field.

After careful study the committee is of the unanimous opinion that such community sections would be extremely beneficial in many ways to the industry and that the association would materially profit by the added membership.

The committee reported its findings with recommendations to the executive committee of the A. E. R. A., along with the proposed changes in the constitution and by-laws. The general plan of establishing such community sections was approved.

The necessary changes to the constitution and by-laws of the American Electric Railway Association are appended to the report.

The report was signed by James P. Barnes, F. R. Coates, C. R. Ellicott, W. H. Sawyer, Martin Schreiber and C. E. Morgan, chairman.

Company Section and Individual Membership

Martin Schreiber, Camden, N. J., reported for the committee on company section and individual members which appears below in abstract. Mr. Schreiber expressed his indorsement of the idea of having community sections and stated that it opened an opportunity to increase the individual membership to 25,000 or more, which was the goal originally in mind when individual memberships were first established.

During the year one large company section has been added to the list of company sections, and none has dropped out.

The new section, No. 14, was organized by employees of the Chicago, North Shore & Milwaukee Railroad. At the time this report was written, the membership was 173.

The company section group comprises the largest group of members in the American Electric Railway Association. As this report is written, the membership of the combined company sections is approximately 1,800. They comprise the cream of the operating forces of the member companies that have established company sections. From these men the companies draw their future supervisory employees. In the opinion of the committee, all companies should assist in the organization of company sections, not only for the good of the men, but also for the good of the company.

The company section meetings afford an opportunity for the exchange of ideas, the development of social contact that makes for good feeling and greater efficiency and provide the men with information about their company that always is immensely valuable when the men are called on to meet criticism or complaints about service.

Year after year the committee on company sections has urged members of this association to organize sections, and believes that executives should take this advice to heart.

Reports from several of the sections, showing the scope of their activities, were appended. Work of two of the sections has been disrupted of late, so reports were not received from them.

The report was signed by C. P. Billings, F. G. Buffe, F. R. Coates, W. J. Flickinger, J. H. Mallon, W. G. Murrin, A. T. Perkins, Harry Reid and Martin Schreiber, chairman.

L. H. Palmer, Baltimore, presented the report of the committee on mail pay, which follows in abstract.

Mail Pay

The committee has carried on the work of preparing the presentation of the case for increased mail revenue before the Interstate Commerce Commission, and the hearing is set for Oct. 15. The reports that were requested of member companies in April, 1922, have been received in part up to August, 1923. On account of this long time the Post Office Department has requested a short delay in order to include these with the tabulation to be referred to before the commission.

The Post Office Department has cooperated in working out the details, and a large portion of the data will be in the form of an agreed joint exhibit, the facts of which are accepted by both sides. This co-operation of the Post Office Department has much simplified the case, and the committee can see no reason why an opinion should not be handed down by the commission at a relatively early date.

The committee regrets the delay in bringing this case to a hearing before

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the Interstate Commerce Commission. It is due almost entirely to the failure of member companies to furnish promptly the information called for. A number of companies, including several which had authorized the committee to represent them, failed to furnish any information whatever, and after waiting for a long time the Post Office Department finally consented to a hearing with the partial information that was on hand.

The committee states in conclusion that the calculations to date indicate that it can prove that the industry is entitled to a substantial increase in mail pay rates.

The committee report was signed by C. L. S. Tingley, G. K. Jeffries, Samuel Riddle, W. S. Rodger, R. A. Leussler, Gordon Campbell, H. B. Weatherwax, R. P. Stevens and L. H. Palmer, chairman.

W. H. Sawyer, East St. Louis, presented the report of the committee on memberships, company and associate, which follows in abstract.

Company and Associate Membership

Since Oct. 31, 1922, the following gain in membership of the association has been made.

Company	Oct. 31, 1922	Oct. 8, 1923	Gain
Railways	348	339	9*
Associates	15	18	3
Manufacturers	244	289	45
Total	607	646	39

*Loss.

As the total company membership of the association on Oct. 31, 1922, was 607, we show a gain in new companies of approximately 10 per cent.

During the year certain companies resigned their membership or were dropped from the rolls in accordance with the provisions of the constitution, these numbering altogether forty companies, so there has been a net gain during the year of twenty-one companies.

An appendix attached to the report shows a tabular comparison of the membership this year and last year, also a list of the new company members.

Permanent Campaign

It is the recommendation of the committee that the permanent campaign for new members inaugurated last year be continued in the future, and the committee is convinced that much work lies ahead of the new committee in extending the work. The service of the association has become a real necessity to the industry, is essential to its welfare and progress as well as to that of every electric railway company in the country, all of which should be members and support the organization which is the national representative of industry. It is believed that if these facts can be brought home in a definite way to non-member companies they will readily affiliate with the association.

The report was signed by H. H. Adams, W. R. Alberger, A. C. Blinn, Luke C. Bradley, F. D. Burpee, T. C. Cherry, Jilson J. Coleman, L. E. Gould, Edward M. Graham, A. L. Kempster, George R. Lyman, W. J. Lynch, J. C. McQuiston, H. H. Norris, R. T. Sullivan, E. M. Walker, E. P. Walker, E. A. West, E. F. Wickwire, J. H. Wilson and W. H. Sawyer, chairman.

After briefly reviewing this report, Mr. Sawyer addressed the meeting as follows:

Revisions of the printed report to bring it up to date show that we now have 339 railway member companies, eighteen associate companies and 289 manufacturing companies, or a total of 646 companies, which is thirty-nine companies more than we had a year ago.

In this campaign I have personally written practically every non-member railway company in the United States, and my own conclusion from the replies received is that a great number of the non-member companies are simply plain slackers, and if you don't like the word "slackers" I might compromise and call them "spongers." They know that the American Electric Railway Association saved this industry and is making this industry better and bigger every day and that their company is profiting thereby. They know that the American Electric Railway Association spends time and money collecting data which are of vital interest to every electric railway in the country—that is, most of them do, for out of all the replies received there were only two companies which even by inference implied that the association was not doing good, efficient, constructive work.

Some of the companies are small companies who feel that they cannot afford even $50 dues per year. Some of the companies are in receivers' hands, and feel that they must husband all their resources. Some of the companies are affiliated with other companies in such a way that all data and many other benefits of the association are accessible to them. Some companies do not even have a plausible excuse for being non-members.

There are, of course, non-member companies which we all agree have good reasons for not joining at the present time, but far too many of them put up a straw man excuse when the real reason is that they think they are saving money by not joining, and figure that although a national association is necessary and our association is doing good work, we will continue to do what should be done nationally and that they locally can wiggle along some way and pull through without the data, assistance and inspiration which come from efficient systematic co-operation. I have a feeling both of shame and of sorrow that there are still executives in the electric railway industry who do not realize that every one of us needs all the help and inspiration we can get—and there is no better, no more economical or efficient way to receive that needed help and inspiration than to join the American Electric Railway Association.

There is no possible question in my mind but that the individual companies of this association receive direct and measurable benefits worth far more than their dues. My hope is that the committee this year has stirred up this situation enough, so that next year's committee may be able to benefit by the work which has been done this year, and which, I am frank to say, is not reflected in an increase of only thirty-nine members.

So far as the railway members are concerned, I have in my letters said little about their duty to the industry, but have dwelt upon the fact that sticks out to me so pertinently, that no railway company can in the final analysis really afford not to receive the benefits of this Association.

Attitude of the Manufacturers

Now, as to the manufacturing companies, my feeling is just this—we need their support and they need us. You can call it by any name you wish, but so far as I am concerned—and I am speaking only for myself and not the committee—a manufacturer has no right to expect to make money by selling his product to electric railway companies unless he as a manufacturer will do his fair share toward supporting the industry and this association which makes possible his sales to electric railway companies and makes possible his profits. Other things being equal, I have no desire to see business over which I have control go to a manufacturing company which is not doing its share to support our industry. So far as I am concerned, it is poor business for us to give business, other things being equal, to non-member manufacturing companies. From my standpoint, it is not fair or just when a member company pays dues to our association, comes here with its exhibits, shows and explain to us what the situation is in regard to its product, for us then to go back home and buy from a competitor who cares not for anything except the profit he may receive from the order—from a competitor who does not desire to co-operate or assist or help, but simply wants to take, and take all without giving.

We here believe in the American Electric Railway Association, and further I believe it is the duty of practically every railway company, and every manufacturing company which profits from the electric railway industry, to join the association, a duty not alone to the industry but a duty to itself.

Next year's membership committee will work hard; it will not be derelict—such committees have not been and will not be derelict—but the new members that are added to this association must come from the inspiration given by the present member companies to those now outside of the fold. Each and every member of this association should, out of a desire to help himself and to help his fellow man, consider himself as a committee of one to see that all the interests of the American electric railway industry co-operate and achieve success together.

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W. H. Sawyer was again called to the platform, this time to give the report of the committee on co-operation with state and sectional associations. An abstract of Mr. Sawyer's remarks follows:

State and Sectional Associations

The first state committee on public utility information was organized in Illinois about five years ago, and it is due to the wonderful success achieved by this Illinois committee and the co-operation to others given by this committee that there are today more than a score of different committees operating in thirty-seven different states.

Primarily, the purpose of the committee is to give the facts about public utilities to the public through every available legitimate source. They disseminate information through newspapers, state public utility commissions, banking houses, public schools, and colleges, chambers of commerce, boards of trade, Kiwanis and Rotary Clubs, and similar organizations; all of them render on request special information service to individuals or societies.

Some of the committees have speakers' bureaus, and supply speakers for meetings, and all of the directors of committees maintain close personal relations with the leading editors of their respective territory. The contact between these committees and the advertising section of our own association is very close, and is within reason properly co-ordinated so that there is little or no overlapping in the efforts of the two organizations.

Practically every state committee on public utility information is healthy, functioning within reason properly, and without question doing a world of good. There are only some few of these committees which are not fully taking advantage of their opportunity, and are therefore not accomplishing the good which it would be so easy for them to do if they were given proper support by the public utility executives of their state.

My own personal experience has been that for every minute I have given to the Illinois committee on Public Utility Information, for every dollar which our company has contributed, I personally have been repaid many fold by the inspiration given me.

These committees have accomplished wonderful results, but it is not so wonderful after all when we stop and appreciate what a virgin field they had to operate in. We public utility men have been going along for a generation or so efficiently conducting our business but not taking the public into our confidence—not telling them what we had done, what we were doing, or what we were trying to do, and these committees started out to do just what some one should have been doing all the time. Better public relations is the most important question with which the public utility executive of today has to deal—the most important, barring none, for better public relations are necessary to any satisfactory solution of our problems.

Some of you have not been doing your full duty to yourself, to your company or to your industry, but in spite of that these committees have done most excellent work. The results are outstanding; we need no statistics to prove conclusively that these committees on public utility information are doing wonderful work; but they have yet an enormous task before them. We have only scratched the virgin soil and are in a position where we cannot now for one moment afford to lessen our efforts.

These committees have set a precedent and it is going to require greater effort to live up to the precedent already set and to continue the march of progress. To falter now would be disastrous, far better to have never started. Therefore, I beg of you, do not get the idea that just because these committees have done such good and wonderful work that any of us can afford to allow a slackening up. We must all put our shoulders to the wheel and give them more support than we ever gave them.

Edwin C. Faber, in the absence of the chairman, L. S. Storrs, presented the report of the committee on publications, which was most complimentary of the great improvement made in the magazine *Aera* during the past year.

E. F. Wickwire, secretary Ohio Brass Company, Mansfield Ohio, reported in his inimitable and humorous way on the work of the committee on co-operation of manufacturers. This follows in abstract.

Co-operation of Manufacturers

An article in *Aera* for August described the work of the committee up to the middle of July, so it will be necessary only to mention the high points of things done this year and to say a few words about developments since the article referred to has been printed.

We have continued the publication of *Truth*, which contains items about electric railways suitable for posting on bulletin boards, or to be used in house organs and local newspapers. We have issued a little sticker which goes on the letterheads and order blanks used by the purchasing departments of our manufacturing members. It is just an entering wedge, but we are going to evolve further means of enlisting the interest and support of the many concerns who furnish raw materials and supplies to our member companies. The sticker reads:

"You have a dollars and cents interest in the welfare of the electric railways because a large share of the material we buy from you becomes a part of products which are sold to traction companies. Therefore, help them to get fair fares—reasonable regulation—an even chance for success."

It will reach many thousands of companies which have not realized their "dollars and cents" interest in the electric railway industry, and it is bound to create a favorable impression in a field that we have scarcely touched heretofore. This is just another application of the good old motto that "the constant dripping of water wears away the hardest stone."

In August *Aera* an honor roll was printed which carried the names of about seventy manufacturers who were participating in the work. Following an intensive mail canvass of manufacturers, there are now more than a hundred co-operating companies on the roster. The same article outlined an idea for a poster campaign. This campaign has now been launched and shows signs of being the best result getter which this committee has been able to devise.

The opening broadside was fired on Sept. 20, when Poster No. 1 appeared all over the country in street cars, in waiting rooms and on factory bulletin boards. Never has such a response come in for any material which has been offered by the association. The original printing order was increased again and again, and many companies pledged their whole-hearted support. Not a dissenting note in any of them.

This poster was followed Oct. 1 by Poster No. 2, which depicted "600 pounds of conductors," and these men, multiplied several thousand times, threw their weight into the fight for the industry on that date. This poster idea is a practicable and forcible way of reaching the people, although to some it may seem almost too simple. But we must remember that we are trying to appeal to the intelligence of the masses. The good old adage about "aiming high" is all right, but in this case we had better "aim lower" if we want to hit the mark that we're trying for.

The committee feels that the overwhelming response to the poster series is a good indication that the psychology of the plan is sound and that it will go far toward accomplishing our purpose, if it is supported throughout the land—and it's up to every one of us to see that this is done.

This is a method of reasoning with the public, instead of arguing with them. We in the manufacturing business realize that usually if we win an argument with a railway man we lose the order. Let's profit by that little trait of human nature in the matter of our industry's relations with the public and not try to win our case by arguing.

We know that the electric railway has been hampered by adverse public opinion. Many men will actually inconvenience themselves if they think it will injure the electric railway. Some politicians and newspapers have been radical in their attitude toward the electric railway industry, and against everything that the industry has tried to do. Isn't this antagonistic attitude on the part of so many people largely due to a misunderstanding of our industry?

We have evidence which indicates

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that the average man carries around a mental picture of Mr. Electric Railway which inspires anything but friendliness. We asked an artist to paint his conception of Mr. Electric Railway. He produced a portrait of a pudgy individual with a fat tummy, a silk hat and dollar signs all over his anatomy. Do you wonder that people are unfriendly if they are carrying around some such mental picture as that of Mr. Electric Railway?

Contrast that conception with the same artist's idea of Mr. Bus Man. This time he sees a friendly, sociable fellow, who may live next door or upstairs or around the block, and a man who has overdue bills and troubles and babies, just like he has himself.

Why doesn't the public recognize that our industry is essentially an industry in overalls? Why don't the people realize that the group of men which receives the largest slice of the money collected by traction companies is made up of the armies of workmen, who build and maintain the track, rolling stock and lines, who make the juice and run the cars—plus the legion of factory employees who make materials for the electric railway industry. Let's get the picture of the friendly man with overalls into the minds of the people and we will find a much different feeling on the streets and at the polls. We believe that it is possible to get that idea across if we combine our efforts in this movement and make them continuous. The public is busy these days and it's hard to make a lasting impression.

It is the nation-wide scope of this campaign that is going to get the results we are after—the adoption of the same tactics that are successfully used to sell tires, chewing gum and cigarettes. Your committee wants to emphasize the idea that the use of these posters must not only be widespread, but it must be sustained.

Favorable statistics will follow favorable public opinion as surely as the tail pursues the dog. The experiences of such cities as Des Moines, Iowa, and Saginaw, Mich., are convincing people that the electric car is an essential form of transportation in a wideawake city and that buses may have their place, but it is not in the place of the trolley car. Improved facilities of the interurbans, particularly in the direction of increased speed, safety and comfort, will not only enable them successfully to compete with the steam roads but gradually to eliminate inferior bus competition. There is more ahead of the electric car today than a safety fender.

Enough progress has been made by the committee to show that the work is valuable and that it warrants a place as a definite part of association activities and a larger organization to carry on the movement. In fact, the surface has scarcely been scratched. Just imagine the results which can be obtained when the full strength of the industry is mobilized and subject to call for instant action. Think of the effect of having the ranks of the railways and the manufacturers organized into a legion which would present a solid front, lined up to fight against unfavorable legislation. The committee hopes to accomplish these things. We have been organized less than two years now, but feel that a real start has been made toward our objective.

The report was signed by R. E. Adreon, George O. A. Barnes, W. D. Blatz, C. R. Ellicott, E. C. Faber, J. C. McQuiston, E. B. Meissner, George R. Rowland, P. L. Thompson, E. P. Waller and E. F. Wickwire, chairman.

Edward Dana, Boston, briefly abstracted the report of the committee on education as follows:

Education

The outstanding feature of the year's work of the committee on education, as covered in its report, was the securing of definite co-operation on the part of a large number of member companies. This took the form of the appointment by seventy-six companies of representatives charged with the responsibility for studying local educational needs, co-operating with the committee on education and putting into operation such plans as prove practical. It was decided early in the year to confine attention to the following five lines of effort: (1) An explanation to executives of member companies of just what the committee aimed to do. (2) An appeal for the appointment of an official or a committee to take up local work earnestly in co-operation with the committee on education. (3) Provision for the delivery of the message of the committee on education to various sections of the association. (4) Getting into direct contact with the educational work being carried on in the industry now. (5) Consideration of the advisability of the association delegating one man to supervise and correlate the educational work of the committee.

For the convenience of member companies, the committee divided the educational problem into the following three component parts: (1) Educating present non-technically trained employees for supervisory positions. (2) Training trade apprentices. (3) Co-operating with technical schools to assure a supply of technically trained recruits.

As to practical things which can be done the following were listed: (a) Participation in co-operative courses with the universities and colleges. (b) Co-operation with high schools and trade schools in either day or night courses. (c) Co-operation between electric railways and large manufacturing industries, including exchange of employees. (d) Conducting classes on the university extension plan. (e) Arranging for periodic staff meetings and series of lectures and instructions on local properties. (f) Providing company section and other educational lectures and discussions on company properties. (g) Provision of shop and departmental apprentice courses. (h) Distribution of company and association literature of an educational nature. (i) Americanization work for the benefit of foreign-born employees. Substantial progress, the committee stated, is being made along these lines in several states.

The committee interested itself in securing the publication of articles relating to employee training and appended a bibliography to its report. Attention was also drawn to a suggested outline of two courses which have been prepared as a result of a conference held at the eighth annual engineering extension convention of the Pennsylvania State College during May, 1923, on the subject of educational courses for public utility employees. In view of the fact that there is an association of the institutions conducting extension courses, it should be possible for such courses as are now being tentatively developed at the Pennsylvania State College to be made available for railway employees in practically any state in the Union. The courses referred to comprise a general one, intended to teach employees the economic conditions under which their companies operate, and a trainmen's course, dealing with shop practice, maintenance, apparatus, testing, supervision, etc.

The committee expressed itself as optimistic over the progress which has been made to date and confident that the importance of educational work has now become appreciated, so that permanent results must come, slowly, to be sure, but in a substantial manner. All member companies, large and small, were urged to appoint representatives to work up educational programs, to analyze last year's report and actively to become associated through the educational committee with the carrying on of this work.

The report was signed by E. J. Blair, Thomas Conway, Jr., C. B. Fairchild, M. B. Lambert, M. McCants, H. H. Norris, A. F. Perkins, F. R. Phillips, T. P. Pulliam, J. V. Sullivan, W. Von Phul, H. E. Weeks, T. S. Wheelwright and Edward Dana, chairman.

Henry C. Spurr, editor *Public Utility Reports*, addressed the association on various aspects of the utility situation. An abstract of his paper appears elsewhere in this issue.

President Emmons, as chairman of the Charles A. Coffin Prize Committee, then read the committee's report announcing the award of the prize. The report, comments of the President and the response of the recipients appears in the front part of this issue.

Relation of Management to Employees

The last feature of the program of the American Association consisted of two addresses on the subject "Relation of Management to Employees." The first of these was by Dr. C. A. Lippincott of the Studebaker Corporation, South Bend, Ind., who has devoted a great deal of attention to employee re-

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lations and has shown real accomplishment in that respect with the 200,000 Studebaker employees. An abstract of his address is presented elsewhere in this issue. The second address was by Elisha Lee, vice-president Pennsylvania Railroad System. Mr. Lee gave a pointed discussion on the principles of management-employee relations on the Pennsylvania System and told of the progress there. His address is also presented in abstract elsewhere in this issue.

The committee on resolutions submitted a report expressing the thanks of the association to the public utility commissioners and other speakers, referring particularly to its pleasure "at the cordial support and co-operation expressed in the addresses by the representatives of the automotive interests" and hoping that this "is indicative of even closer relations in the future"; to the convention committees which prepared reports for the convention; to the committees in charge of the convention itself, including the exhibit director; to the exhibitors themselves for their wonderful record-breaking display; to the pier contractors and others in Atlantic City who had been especially helpful, and to the president and other officers of the association for their services during the year to the association "and through it to the entire railway industry." The report was signed by J G. Barry, H. W. Blake and A. W. Brady, chairman.

A committee consisting of General George H. Harries, chairman; Charles L. Henry and Robert I. Todd then escorted the new president and four vice-presidents to the platform, where they were presented to the association by the retiring president, C. D. Emmons. In accepting the gavel symbolic of his presidency President Budd said he did so with a full sense of the responsibility and at the same time with full hopes of seeing the association and the industry continue in improvement of service and success. With the record of courage and accomplishment, in the face of almost every imaginable difficulty, which the railways showed during the war, with the stable position they have now regained in spite of many handicaps, the industry may be sure, said President Budd, that there can be no future difficulty it will not conquer. The four vice-presidents also made short talks, pledging their best efforts to make the coming administration a success.

The convention then adjourned *sine die.*

Exhibits More Numerous than Ever Before

NOT only in quantity but also in quality the manufacturers' exhibits excelled those of previous years. There were 167 individual exhibits, occupying 75,556 sq.ft. of space on the Pier and 374 sq.ft. outside. An interesting feature was the amount of space occupied by various motor bus manufacturers. A touch of humor was added by the presence of original Toonerville Trolley, used in the making of moving pictures of the well-known cartoons of Fontaine Fox. In that connection it was noticeable that a number of exhibitors, who were prevented by the nature of their products from displaying them on the Pier, used moving pictures to show those interested the working of the apparatus. The manufacturers showed much originality in their displays and arranged the equipment in a very attractive manner. There was also a pleasing harmony in the decorations.

Committee on Welded Rail Joints Meets

THE morning of Wednesday, Oct. 10, was occupied by the committee on welded rail joints with a meeting held on the convention pier at Atlantic City. Fifty or more engineers were in attendance and the meeting was characterized by a spirit of practical earnestness. Dr. G. K. Burgess, director of the United States Bureau of Standards, presided, and W. W. Spraragen, secretary of the committee, assisted him.

After the reading of the minutes of the last meeting, Dr. Burgess called for reports of progress being made in the laboratories where joint tests are already under way. Encouraging reports were made on the tensile, bend, drop and impact tests. A number of joints have already been tested and an exhibit of several broken joints was made during the Atlantic City meeting.

Members of the committee were then called upon to report the results of their analyses of test data for different types of joints and valuable information was given on the following: Carbon arc, electric seam; metallic arc, electric seam; thermit; cast weld; electric bar and electric butt. This work is not far enough along as yet to warrant publication of details.

Dr. Burgess then addressed the meeting on a program of future research work. He showed that great results are expected from the committee's activities, in which the Bureau of Standards is actively co-operating.

A report on the impact testing machine was presented. This machine is now due at the United States Bureau of Standards, where a small building has been erected to accommodate it. Prof. H. L. Whittemore exhibited a proposed design for the foundation of this machine, which was approved. It consists of a massive block of cast iron mounted on coiled steel springs. The joint to be tested will rest on pillow blocks, to which they will be attached by some method not yet determined. The top of the machine is curved to the radius of a car wheel and the machine is designed to duplicate as far as possible the conditions of service. At the same time all uncontrollable variables have been removed.

W. W. Wysor reported on the rotary service testing machine, the design for which is now practically complete. Details of the foundation for this machine were discussed. Estimates have been received of the cost of constructing the machine, and presumably the work will go forward promptly.

The secretary explained to the committee the financial situation, mentioning the expenditures to date and the new appropriations which have been made. He touched upon the work of his office and also some details of the several tests.

Manufacturers Move to Participate in Association's Advertising Campaign

THE manufacturer members of the American Electric Railway Association held a short meeting at 2:30 p.m. on Thursday. There were twenty-four present. E. F. Wickwire explained the ideas behind the movement of the manufacturers to participate in the association's advertising campaign to sell the electric railways to the public, so to speak. He explained that the whole idea was to drive home the thought that the man on the street and the electric railway operator, whether he be the trainman, a man in the shop or an official, were brothers.

In displaying some of the association's posters Mr. Wickwire explained the thought behind them. The campaign was a straight bid for support. There was no propaganda behind it. Mr. Average Man should be educated to a frame of mind where he will be reasonable in his attitude.

The public often had little grievances. These should be offset by popular publicity.

Mr. Wickwire said that so far as the co-operating manufacturers were concerned it did not make any difference to the association who handled the matter, but that it was difficult to separate sales and publicity. In some cases the publicity man was in closer touch with the problem than was the salesman, while in other cases the reverse of this was true.

Mr. Wickwire further said that the new officers of the association would probably arrange to have a program for the manufacturers embodied in next year's meeting. These sessions would be open, with free discussion. The manufacturers have been away from the association idea for a long time now, but Mr. Wickwire did not think that it would be difficult for them to get back quickly to closer asociation among themselves. In the case of a campaign for publicity such as he had been discussing Mr. Wickwire said it would then be possible for the manufacturers who attend the meeting to carry back the message to their own publicity, advertising or sales forces.

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T. & T. Association Proceedings

Traffic Regulation, Merchandising Transportation, One-Man Cars and Bus Operation Are Among the Leading Topics—Accident Prevention Was the Topic of a Joint Session with the Claims Association

THE first session of the Transportation & Traffic Association was opened by the address of the president, Garrett T. Seely.

President Seely's Address

Careful study of what constitute the most pertinent transportation and traffic problems of the industry was given by your executive and subjects committees with the result that the subjects assigned to this year's committees are all of vital importance.

Traffic congestion in the business streets of all cities is becoming increasingly serious each year. The solution of the problem can be worked out only through the co-operation of state and city authorities with civic organizations and transportation agencies. The importance of relief from existing conditions, as well as the prevention of still more serious congestion, made manifest in the committee report that will come before you, warrants more detailed study of remedial measures by a committee in the coming year.

The problem of making the services of the street and interurban railways more attractive to our customers will be presented forcefully in the report of the committee on merchandising transportation. This report will contain much of interest to all of us, the committee developing its study along five main lines of thought.

The use of the weekly pass, or the form of quantity-ride selling, has been extended during the year in an effort by various companies to increase riding through a change from the old stereotyped cash and ticket fare. The importance of the committee's study of this phase of the problem of merchandising is reflected in the fact that where only one company used such a method in 1919, there are in 1923 thirty-five companies which either have it now in effect or have had it in effect.

An especially interesting phase of this same report is the chapter devoted to car design from the standpoint of merchandising transportation. The tendency in the design of cars, as gathered from replies to a questionnaire sent out by the committee, is toward more comfort for passengers, easier entrance and egress, more comfortable seating, better lighting and the like, lower floors with fewer steps, more attractive cars, both as to exteriors and interiors, and the elimination of signs, even sometimes of advertising.

Merchandising by advertising, utilizing employees for selling and other phases of the development of passenger,

Garrett T. Seely
Retiring President

freight and express business are ably considered. The value of the committee studies in the last several years of this phase of the transportation business is apparent, and this subject is one which may well warrant still further attention in the year that lies before us.

The use of the one-man car in city operation has become standardized. Its advantages are thoroughly recognized. There are many suburban and interurban routes as well that are adapted to one-man operation, and the field for this method is extending from year to year. Through scientific car design a type of car is developing which fulfills service requirements, is comfortable and attractive, and, through its light weight, lower platform expense and reduced power and maintenance costs, brings the total costs of furnishing attractive and adequate service down to, or within striking distance of, the irreducible minimum.

The past year has seen sufficient development of the use of buses by electric railway companies as auxiliary

J. K. Punderford
President-Elect

to their car service to yield for the first time for the study of your committee definite facts of costs and operating conditions. The report of this committee will merit your closest attention, developing carefully and concisely as it does the study of the classes of bus service operated, the reasons for the inauguration of the bus service, the type of equipment used, operating and maintenance methods, rates, transfer arrangements and accounting methods, as well as the operating results and the effect of operation on public relations.

This phase of transportation has attracted such wide attention from the public that it is one which must command the careful consideration of every transportation man in the coming year, undoubtedly being a subject that will well repay further earnest study by a committee of this association.

Finally, we have the ever-important subject of accident prevention, which will be presented in a report resulting from a joint study of the causes of accidents by committees of the Claims Association and this association. This study brings consideration of this all-important topic to a still higher plane in the continuation of the excellent committee work of former years.

Every one of these reports should be fully discussed from the floor of this convention. The committee work is the mainspring of association progress. Ours has been a rapidly developing industry and it is chiefly through the work of the committees that this development has been guided. It is highly desirable therefore that any of us who may be able from our experience to add to the sum of information brought out in these reports should do so. I sincerely hope that none will hesitate, or await urging, to "speak out in meeting" and make the discussion of these vital matters complete and instructive.

Ours is the essential business of furnishing urban and interurban transportation. This association represents the phase of that business that has for its particular field the rendering of service and the selling of service to the people of our various communities. We must sell that service to a sufficient number and in such manner as to fulfill our quasi-public nature and at the same time to make our service remunerative as a business.

Report of Secretary

Because it consisted only in an abstract of the minutes of its meetings the report of the executive committee was not read. In the report of the

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secretary, Mr. Welsh called attention to the fact that the committee personnel is widely distributed geographically, making each committee fairly representative of the industry. Although it is not possible on this account for some of the more distantly located members to attend meetings regularly, their assistance and co-operation was obtained through correspondence. He emphasized also the difficulty of obtaining answers from questionnaires, and asked for increased co-operation to get results by this means. The number of answers received during the past year was discouragingly small in proportion to the number of questionnaires sent out. A statement was made also of the gains and losses in the number of members of the association during the year and the need of building up the membership was emphasized.

On the committee on resolutions, the president appointed J. E. Wayne, vice-president and assistant general manager York Railways, York, Pa.; M. McCants, assistant general manager Market Street Railway, San Francisco; C. L. Van Auken, editor *Electric Traction*. The committee on nominations was composed of C. E. Morgan, vice-president and general manager Brooklyn City Railroad; L. H. Palmer, general manager United Railways & Electric Company, Baltimore, and James P. Barnes, president Louisville Railway, Louisville.

The report of the committee on traffic regulations was read by H. B. Flowers, president New Orleans Public Service.

Traffic Regulations

The committee on traffic regulations, at the one meeting held during the year, decided that the committee should reinvestigate traffic conditions throughout the country. The effect of parking especially should be noted, as well as steps taken by various municipalities to cope with it.

As the result of this study it has been found that congestion of traffic has increased everywhere. There is scarcely an incorporated village or hamlet that has not its traffic problem the same as the cities of the first class. In each case it is strictly a local problem, but the statement for each is the same, "How may we best utilize our streets, roads and highways to handle the constantly growing traffic which must use them?"

Street cars carry the bulk of passenger traffic. In fact, the average surface car line more than carries the population of the community which it serves daily. That fact should be recognized in all regulations affecting traffic in which street cars are a part.

We have passed through the time of the making of traffic regulations. Many of the rules necessary to the rapid and safe movement of traffic are now almost as universally applied, understood and obeyed as the rule of keeping to the right.

The many remedies for eliminating congestion have been or shortly will be of like universal application. Semaphores, safety zones, abolition of left-hand turns, loading platforms, traffic lanes, each and every traffic-handling device, together with the making uniform of rules in connection with their use, have helped eliminate accidents, insure a more rapid transportation and a greater public convenience, but neither singly nor together have they been able to prevent traffic congestion.

The communities served by the electric car are not fully served if the traffic congestion in these communities makes impossible the safe operation of a rapid service, and while it may be sufficient answer to criticisms of the service to say that it is the best possible under traffic conditions, the committee feels that the industry might well aid in the elimination of that congestion.

It might well have its part in the education of the public. It might place its facilities as a national industry for the gathering of technical advice and practical experience at the disposal of the various communities which its members serve.

As individuals and good citizens the operators of this utility avail themselves of their membership in the association to place at the disposal of their communities such information as the association might have bearing on that particular community's problem.

As an example of the necessity for keeping in contact with traffic conditions throughout the country, the committee cited two experiments now under way in Detroit which, if successful, will be of great interest to the industry and especially to transportation men.

In Detroit an ordinance has been enacted compelling a full or boulevard stop by all vehicles before entering or crossing some fifteen main thoroughfares. The second experiment is the making of scheduled stops in blocks of three, which is perhaps the largest elimination of stops on purely local service heretofore attempted.

The reporting to the industry of the conditions which led to these two experiments in terms of traffic and the results obtained might, in the opinion of the committee, be of the same value to the operators of street cars as the fixing of a new standard in something purely mechanical.

The report was signed by Paul E. Wilson, H. O. Butler, W. H. Maltbie, F. R. Cogswell, Frank P. Edinger and H. B. Flowers, chairman.

Following the presentation of this report, George B. Anderson, manager of transportation Los Angeles Railway, spoke of the importance of educating the public along the lines mentioned in the report of the committee. The two chief objects of traffic regulation should be to safeguard life and to expedite movement, and all provisions in traffic ordinances which aim at objects other than these must be regarded as useless encumbrances.

Mr. Anderson emphasized the point that the great mass of street car riders are unorganized and are therefore handicapped and at a disadvantage in securing the passage of such ordinances as are for their own interests. On the other hand, merchants, automobilists, and so forth are united in organizations of various sorts which are able to influence the passage of such ordinances as they desire. Railways should therefore pay particular attention to the education of the public to the end that they shall see that their own best interests are served by the inauguration of such traffic regulations as will benefit the railway.

Additional discussion of this subject was contributed by J. R. Bibbins, consulting engineer, Washington, D. C. He spoke of the rapid increase of population in our urban centers, and the even more rapid increase in the riding habit. Properly to handle the transportation problem in the face of these circumstances will require the most expert attention to traffic regulation.

Both Mr. Anderson and Mr. Bibbins brought out the point that the removal of street railway tracks is often advocated as one cure for the transportation situation. Mr. Anderson particularly emphasized the falsity of this idea by figures, which showed in Los Angeles that the automobile traffic on streets without railway tracks was only about 40 per cent greater than on those streets where tracks existed. The ultimate result that could be hoped for by the removal of the tracks, therefore, would be to increase the capacity somewhat less than 50 per cent. This would fall far short of being a real solution. Mr. Bibbins, too, said that this was not the answer, and suggested that the T. & T. Association was the logical means of bringing home to the public attention the falsity of such reasoning. With the facts before them people would be less ready to listen with any degree of patience to the appeal of the demagogue.

The report of the committee on merchandising transportation was presented by Samuel Riddle, vice-president Louisville Railway.

Merchandising Transportation

The report of the committee on merchandising transportation is divided into five general subjects: (1) Weekly passes, monthly nickel permits, commutation tickets; (2) merchandising by advertising; (3) utilizing employees for selling; (4) car development for merchandising; (5) developing passenger, freight and express business.

No space was used in the report to urge member companies to continue their efforts to merchandise transportation, as it was considered superfluous. The committee contented itself with studying what companies have actually tried out, and a summary of these studies was presented.

Weekly Passes, Monthly Permits, Commutation Tickets—The use of the weekly pass and the monthly permit was greatly extended during the year. Where one company tried these meth-

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ods in 1919, one in 1920 and four in 1921, more than a score put the pass or permit into use during 1922, and in the first four months of 1923 six other companies had inaugurated the use of one or the other. On May 7, 1923, according to a compilation made by the American Electric Railway Association, there were thirty-five companies which were then using, or had used, the weekly pass.

A table presented in the report shows that the introduction of the weekly pass, with but three exceptions among the companies furnishing information, has been followed by a reduction in the average fare per passenger. A point upon which the committee endeavored to obtain information was whether or not the use of the pass or permit had increased riding and the effect it had had on revenue. Exact figures were impossible to obtain, but the general experience seemed to be that it had stimulated riding to some extent. With one exception, all the companies had used newspaper advertising extensively at the time the concession was made, and most of them continued this form of advertising intermittently. The favorite method of distributing the pass is to have it sold by the conductors on the cars. Approximately half of the companies also sell the passes and permits at their offices.

Experience with Weekly Pass

Another pre-eminent advantage is that the pass and permit everywhere seem to have created a better sentiment toward the company making the experiment. In corroboration of this statement the following expressions of opinion received from member companies are quoted:

"The weekly pass speeds up operation, avoids arguments over fares, stimulates riding in non-rush hours, reduces work for trainmen and creates a friendlier feeling."

"The weekly pass has eliminated jitney competition and made the company more popular."

"The advantages for us have been good will and no request for a lower fare."

"We think we have received the good will and co-operation of the public by the reduction in fare made possible."

"The advantages are an increase in non-rush hour riding, an increase in the riding habit, and the fact that it does not necessitate additional service, creates good will and gets a dollar from a man who otherwise would pay less."

"In times past the persons who used our cars most frequently had the most complaints to make about our service. such patrons seeming to feel that their heavy outlay for fare gave them a better right to kick. The weekly pass has made this class of patrons our firm friends, and even a hostile mayor is not able to get a rise from the public in response to his denunciation of us."

Merchandising by Advertising—Merchandising transportation by the printed word is growing very rapidly in the electric railway industry. The number of companies advertising, in one form or other, is now, according to the report of the committee, approximately 300, whereas three years ago not one-tenth of this number were using advertising. More, however, should be advertising.

In studying the advertising that electric railway companies are now doing, it was found that there are four mediums being utilized to varying degrees. These are newspapers, display cards inside the cars and car-window posters, display cards or dash signs outside the cars, and weekly, semi-monthly or monthly publications in pamphlet form, to be placed in racks or holders inside the cars.

The use of display signs inside the cars has been found very effective in bringing to the attention of passengers matters of policy, measures of safety and details of operation practices. All this tends to create a psychological reaction in favor of the railway.

Many companies utilize window signs for good will advertising. This space is the most preferred of all positions, because it is possible, by printing the signs on both sides, to reach not only the car rider but persons outside the car who are walking or riding in other vehicles. This space is always available to companies, without cost, for it is never included in contracts with car-advertising companies.

The committee expressed the belief that no more valuable means of stimulating travel exists than by the use of properly worded and attractive dash signs. These may be utilized to give publicity to every legitimate form of amusement, public and church gatherings and special events.

Many electric railway companies are now providing weekly publications for car riders in "Take One" boxes. It is advisable for such publications to be in small pamphlet form, and they should carry an amusement directory of the theater attractions of the city. Experience indicates that they should not be filled with company propaganda.

Utilizing Employees for Selling—"The handling of the car by the motorman and the treatment of the passengers by the conductor play a most important part in so satisfying patrons as to develop future business." The truth of the foregoing statement is so well established that it requires no further exposition. The real crux of the problem, however, is the manner in which motormen and conductors can be trained to be efficient, courteous, neat and generally pleasing to the patrons with whom they have to deal. The biggest obstacle to be overcome is the fact that the ordinary platform worker does not himself know what his company's problems are. One southern railway has done much to gain the good will of its public by means of the appointment of a committee of nine trainmen to study the merchandising of service. The committee suggests that many members of the association, by following in the footsteps of this southern railway, may improve the manner in which they are utilizing their employees for selling.

Considered purely from the angle of the effect that the platform man has on selling transportation, however, the committee believes that there are four qualities every good conductor should possess, and that there are three that every good motorman should have. These, it is believed, railways have a right to demand of their employees, and, what is more important, a chance of obtaining to varying degrees. These qualities for a conductor are good nature, personal neatness, general knowledge of the streets and buildings in his city and intensive knowledge of the part of the city through which his own line operates, and a good voice. For the motorman, the first two qualities are the same and the third is ability to start, operate and stop his car smoothly and easily.

The committee believes that the knowledge of what to do is not sufficient without the desire to do it, nor is the desire sufficient without the knowledge of what to do. The report outlines a list of eighteen possible cases where friction was likely to occur between the trainmen and the public, and suggests, in a general way, the best method of handling each case. Platform men should be impressed with the fact that the passenger is always right. Controversies arise in actual practice more frequently over transfers than over any other one thing. If the conductor and the passenger both are persistent, one of two things happens. The passenger either pays another fare or is put off the car. In either case, the company has not only made an enemy of the person affected but, because of some peculiarity in human nature, is certain to have alienated the sympathy of the majority of those who heard the controversy. It is better for the conductor to listen to the passenger courteously and then, even though the passenger is wrong, politely to drop the argument.

Car Design from the Standpoint of Merchandising Transportation — The report describes several pronounced tendencies in the design of new cars. There is a tendency to greater comfort, with easier entrance and egress, more comfortable seats of greater length and width, with a better type of upholstering, greater distance between seats, armrests, better lighting, low floor levels requiring few steps to the car floor, ramps rather than steps between platforms, better windows, with plate glass in some cases, and a free, open outlook from all sides, more pleasing interiors and exteriors, and the elimination of signs, often the elimination of advertising as well.

Another general tendency is toward lighter weight for economy. This, fortunately, fits in well with the tendency for comfort, as a low-level floor allows of a lighter truck and less swaying from side to side. The lighter truck also allows the use of lighter motors and simpler control. This all, in turn, makes possible faster acceleration and braking, which then makes possible the maintenance of scheduled speeds with lower, free-running speeds, a desirable situation from many standpoints.

Features of the most recent cars of a number of railways are described in some detail. The results of a number

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of questions sent out to member companies are also presented. One of the most interesting is the indication that the standard Birney safety car does not meet with great favor, unless modified in certain respects. The principal feature is that double doors are required and the cars should be made more substantial.

There is a tendency to eliminate mandatory or "rule" signs altogether. In such cases the personal conduct of the passengers is left up to their inherent decency. Smoking in the rear of the car during the part of the year when the windows are all open may take place in such instances.

Another point made is that center lighting is very satisfactory when shades of the proper design are provided. The glare is less and the reflection on the motorman's window is less on open vestibule cars.

Developing Passenger, Freight and Express Business—In general, the answers to the committee's questionnaire on this subject were not satisfactory. No attempt was made to set forth the methods used on urban railways to stimulate passenger business. Only the methods of the interurban line are mentioned. The replies indicate that time-table folders are considered the best form of publicity. Other forms used are descriptive and lithographic circulars, newspapers, car cards, billboards and posters.

The main features in building up passenger traffic are fast, reliable service, good, well-painted cars kept clean and sanitary, a good roadbed, courteous crews on trains and agents that can give reliable information and prompt service.

The report was signed by H. H. Brown, G. Sabin Brush, Frank L. Butler, R. F. Carbutt, John F. Collins, John A. Dewhurst, Samuel W. Greenland, M. McCants, A. W. McLimont, Richard Meriwether, E. B. Moore, F. D. Norviel, O. A. Smith, T. H. Tutwiler, C. L. Van Auken and Samuel Riddle, chairman.

Discussion

S. W. Greenland, vice-president and general manager Indiana Service Corporation, outlined the study which was made of the weekly pass. Walter W. Jackson, consulting engineer, and W. H. Boyce, general manager Beaver Valley Traction Company, discussed this phase of the report. Mr. Jackson analyzed some of the reasons why the weekly pass after being installed has been retained on some properties and discarded on others. Several fundamental requirements were listed as being necessary to a successful pass installation. The community must be of a size to allow the encouragement of non-necessity riding; a sufficiently frequent service must be provided to build up more general short riding; the program for the installation of weekly passes should also include an improvement in the service; the pass must not be too high in price and it must be effectively and continuously advertised.

Several examples were given of instances where the pass was installed and then abandoned, either because the property was so small or was in such condition that the pass could not save the situation. Failure to apply the proper kind of pass to meet a specific combination of conditions was also pointed out as a cause for the discontinuance of the weekly pass scheme on some properties.

Mr. Boyce discussed the results obtained with the pass on the Beaver Valley property and described the zone system in use. A progressive scheme of monthly "bargain" sales, in which the three-zone or "system" pass is sold at reduced rates, illustrates in a striking manner the application of general merchandising principles to the sale of transportation. A reduction in the price of the system pass from $2 to $1.50 doubled the sales of this pass in a very short time.

The work of the committee on merchandising by advertising was put before the association by Frank L. Butler, general operating manager, Georgia Railway & Power Company. The discussion of this phase of the subject emphasized the necessity for intelligently planned advertising. Contact with the public by frequent insertions was held to be important. The practice of having advertising copy prepared by the same department which handles complaints was recommended as a proper means of getting the correct viewpoint into the advertising copy. It was also held that copy written with a view to developing human interest stories maintains a proper contact with the public and gives the desired results. This same idea was brought out further in the discussion by the use of the expression, "The advertising should personalize the service."

In addition to reading excerpts from the portion of the report dealing with the utilization of employees for selling, M. McCants, general manager Market Street Railway, San Francisco, discussed the report. Mr. McCants took exception to the unqualified use of the slogan, "The Passenger Is Always Right." He maintained that this policy may frequently lead to the adoption of the easiest way out of a controversy rather than the best way from the standpoint of dividends, as well as good will. Standardization of verbal expressions to be used by platform men in avoiding passenger disputes was held by Mr. McCants to be of considerable help in connection with this difficult matter. He emphasized the fact that the interest of the men must be aroused.

The difficulty in detecting the personal characteristics of new employees in the employment office was mentioned, and it was explained that proper training and management, by helping to keep satisfied employees, go a long way toward maintaining the good natured contact with the public which is so essential to proper merchandising.

In connection with the report of the subcommittee on development of car design for proper merchandising, John W. Dewhurst, railway engineer of the public utilities management department, Day & Zimmerman, Inc., gave a brief abstract and added several comments on additional phases of the subject. He emphasized the importance of the elimination of noise in making the car ride more comfortable. H. H. Adams, superintendent of shop and equipment Chicago Surface Lines, stated that car design for proper merchandising involves an extremely broad and interesting subject. He discussed the importance of low steps and liberal platforms in facilitating passenger movement, and also described briefly the new automatic door which has been applied to one-man cars in Chicago. L. H. Palmer, general manager United Railways & Electric Company, Baltimore concurred in Mr. Adams' remarks and also indicated that proper lighting and heating are essential to the maintenance of passenger comfort.

W. G. Stuck, superintendent of equipment Kentucky Traction & Terminal Company, read a discussion on this phase of the report and also emphasized the importance of proper heating and lighting in making satisfied passengers. Comfortable seats, pleasing paint and finish, and proper arrangement for the movement of passengers, were additional factors that were discussed.

Many comments were made on the subject of building up freight and express business which was abstracted briefly by F. D. Norviel, general passenger and freight agent United Traction Company of Indiana. Mr. Norveil said that the key to building up freight business is proper service, and that although solicitation and advertising are necessary to accomplish this purpose, they must be backed up by real service to the shipper.

Schedule Should Fit Traffic

E. H. Maggard, vice-president and general manager Petaluma & Santa Rosa Railroad, read a prepared discussion of this subject. He felt that service, personal solicitation and a good local agent are the three most important factors to be considered. In addition, the freight schedule must fit the different classes of merchandise offered for shipment. The adoption of appropriate slogans in advertising both through paid mediums and by signs on the cars and buildings of the property were held to be of considerable help in building up business. Proper terminals and facilities for handling bulky freight must be provided. Six years of experience in the application of these principles was given as the reason for the growth in freight business from 60,000 tons annually to 210,000 tons annually on the property.

This subject was further discussed by Victor S. Curtis, secretary and general traffic agent the Connecticut Company, and C. H. Hardesty, general traffic agent Monongahela Power & Railway Company, who described various practices which had been used on their respective properties for building up both passenger and freight business. Mr. Hardesty reported favorable results from the sale of party tickets at reduced rates for groups of ten or more passengers. T. J. Jay, freight traffic

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manager Pacific Electric Railway, described the results obtained from the establishment of joint freight rates with connecting steam lines. A growth in freight business from $1,000,000 annually in 1913 to $6,000,000 in 1923 was attributed largely to the effect of this arrangement in inducing industries to locate upon the line of the electric railway property.

Tuesday's Sessions T. & T.

The Tuesday afternoon session of the committee on transportation and traffic commenced with the report of the nominating committee, in which the following names were proposed:

President, J. K. Punderford, vice-president the Connnecticut Company.

First vice-president, T. C. Cherry, president Auburn & Syracuse Electric Railroad.

Second vice-president, G. H. Clifford, vice-president Northern Texas Traction Company.

Third vice-president, J. V. Sullivan, assistant to the president Chicago Surface Lines.

Executive committee, Edward Dana, general superintendent Boston Elevated Railway; W. H. Boyce, general manager Beaver Valley Traction Company; E. M. Walker, president Schenectady Railway, and Samuel Riddle, vice-president Louisville Railway.

The nominations were then closed and the secretary cast a unanimous ballot for those named.

The report of the committee on one-man car operation was presented by J. P. Pope, general manager Kentucky Traction & Terminal Company.

One-Man Car Operation

In its report the committee states that its scope, as originally drafted, was to apply to suburban and interurban transportation only, but that since city and suburban transportation are so closely allied, wider latitude should be given to cover all branches of the railway industry.

The committee states that, on the whole, the operation of one-man cars differs but little from that of two-man cars. But few minor changes in the rules are necessary, most of which are necessitated by local conditions. The one-man operator has to do his own switching, has to collect and register the fares and has to handle train orders by himself.

For speeding up transporation on interurban systems, the committee states that fare register registration is the quickest and most feasible method of operation; in city transportation automatic transfer machines should be considered carefully.

As to the economics of the one-man car, the committee states that the savings may be considered under four heads—platform expenses, track costs and maintenance, power costs and accident costs.

The saving in platform expense is evident, even allowing for increased compensation.

Track costs depend on the use of light-weight cars. No attempt has been made to compile information on track savings, as but few companies are operating such light-weight equipment in interurban service, and the operation has not been sufficiently extended to arrive at an analysis of the savings. Tie spacing can be increased materially. The light-cars will not crush the ties, thus increasing the life of the track structure. Less maintenance of the track will be needed, and the decrease in cost of this item should be very large if light-weight equipment is used exclusively.

Rebuilding of heavy two-man cars for one-man operation will result in no saving of power consumption, while with modern light-weight cars the saving will be very marked.

It is the opinion of the committee that the accidents occasioned with one-man cars are not in excess of, and probably are less than, those with two-man cars for the same mileage.

The committee states that the advantages of the one-man car are: Frequent service, maintaining reasonable rate of fare and safety. With regard to danger of railroad crossings, the belief is that greater safety results from having the responsibility of flagging railroad crossings placed upon the one-man operator, rather than having it divided.

It is recommended by the committee that a joint committee of the Transportation and Traffic and Engineering Associations be appointed to make a number of designs of a standard one-man car.

The report was signed by J. E. Duffy. W. E. Wood, A. Swartz, L. G. Van Ness, A. L. Reynolds, H. C. DeCamp, K. A. Simmon, N. W. Bolen, G. H. Clifford, T. C. Cherry and J. P. Pope, chairman.

In discussing this report, C. E. Morgan, vice-president and general manager Brooklyn City Railroad, spoke of the success of one-man operation in that city. It was found that the average trainman preferred to operate a car alone rather than to have an additional man to collect fares during the rush hour. On thirty-eight lines in Brooklyn where one-man cars are operated there has been necessary an addition to the running time in only two cases, although during the same period every two-man line has had to increase its running time. One-man cars operate on the same streets with cars of other types through the heaviest kind of traffic. Mr. Morgan disagreed with the report of the committee in so far as saving power is concerned and said that there was a very noticeable saving with converted one-man cars in Brooklyn.

J. B. Stewart, Jr., general superintendent Youngstown Municipal Railway, described the method by which large cars of various types have there been converted for one-man operation.

President Emmons of the American Association expressed his gratification at the great success of the convention and said that he thought it was in no small measure due to the interest displayed by the members of the various affiliated associations.

Continuing the discussion of one-man car operation, Mr. Riddle described an interesting method of numbering stations on his property. This was done for the sake of simplifying the arithmetical calculation necessary to compute the fare.

The report of the committee on bus operation was presented by W. J. Flickinger, assistant to the president of the Connecticut Company. Mr. Seely asked Mr. Punderford, sponsor for the committee, to preside during the presentation of the report. An abstract of the report follows:

Bus Operation

It is generally conceded that there is a place in the present transportation fabric where the motor bus can be used to advantage. Public authorities have gradually brought order out of the chaotic conditions which the competitive jitney introduced in the transportation field seven or eight years ago, and many communities have now accepted the motor bus as an auxiliary to existing transportation facilities. The electric railways are also becoming increasingly interested in its use in meeting the full requirements for transportation in the territory which they individually serve.

The report of the committee consists largely of a review of what is being accomplished by various member companies operating motor buses. Information is presented to show the class of service operated. This indicates that, of seventeen companies reporting, seven operate supplementary service, twelve feeder service and nine independent service. Looked at in another way, seven of the companies operate exclusively on city routes, four on suburban lines, two in interurban service, two in city and suburban service, one in city and interurban service and one in city, suburban and interurban service. The base operating schedule calls for 185 buses, while the peak requires 225 vehicles. On the average, each bus travels 134 miles per day, while the individual mileage reported varies from 70 to 216 miles.

An analysis of the reasons for inaugurating bus service indicates that all of the seventeen operating companies are quite closely following the principles laid down in the 1922 report of the committee. This means that if a railway company adopts the policy of providing all transportation needs in the territory served the possibilities of the bus as an aid to such policy cannot be overlooked. As for supplanting existing rail lines with bus routes, this

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is a problem of economies, but it will be found that when rail lines with low earning power are faced with heavy rehabilitation or paving charges the bus can be used as a means of continuing service with an expenditure for equipment much below the cost of plant renewals or paving. A summary of the replies given as to the reason for bus operation shows that eleven undertook operation in order to hold a monopoly of transportation in the territory served, two companies have supplanted their rail lines with bus routes because traffic has failed to meet investment charges, two companies are using buses to provide a shorter and quicker route, one company operates buses to keep out competitors and, one has used buses to avoid excessive rehabilitation charges.

Types of Equipment.—The type of motor bus equipment used indicates the twenty-five-passenger bus to be the most favored, with the fourteen- and eighteen-passenger vehicle following in the order named. The type of chassis most commonly operated appears to be the White Model 5, which nine companies report using. Five companies have Reo and Republic, while four report Mack. Other types are not used by more than one company. Pneumatic tires are reported in thirty-one cases, and in nine cases duals are used on the rear wheels, while cushion or semi-pneumatic tires are used in only ten instances. Weights of buses per seat calculated from the table given in the report indicates as follows:

Passenger Capacity	Weight of Bus (Lb.)	Average Weight per Seat (Lb.)
13	4,950	380
14	3,000–7,200	215–514
16	4,350–5,500	272–344
18	4,500–9,000	250–500
19	8,430	444
20	6,000–7,920	300–395
21	7,000	333
24	6,480	270
25	8,130–10,000	325–400
27	6,100	226

Step heights on one-step buses vary from 14 to 20 in. from the ground to the tread of the first step with a riser of from 8 to 14 in. to the floor level. In case of a double step the second riser is 9 to 9½ in.

The committee in discussing design of vehicles says: "If we are going to sell to the public the idea that street railway companies should be given the opportunity to furnish the entire transportation service, the importance of having the proper equipment to provide the greatest amount of safety, comfort and convenience cannot be too strongly emphasized. It is pleasing to note that street railway companies are discarding the truck chassis and adopting the improved types as rapidly as the builders are developing them."

In the further development of the chassis, simplicity and accessibility should be the chief aim of automotive engineers. It should be borne in mind that ordinary running repairs are made without removing the body and, therefore, easy removal and replacement of parts from underneath the chassis should be made possible. It is very desirable that time out of service be the minimum. A unit repair system will best meet this requirement.

Consideration must also be given to the peculiar requirements of a vehicle operated in passenger service such as low center of gravity, clutch and gear designs for frequent stopping and starting, adequate and economical power, and spring suspension to give maximum riding comfort under varying load conditions.

This report does not touch upon body development. Each company, it is believed, will work this out according to its own requirements. In general, there seems no reason why the electric car body designs cannot be used as a base from which to develop a body which will give public satisfaction from the standpoint of safety, comfort and convenience. There will, of course, always be cases which will require specific treatment based on the particular transportation problem to be solved.

Operating and Maintenance Methods.—Where buses are operated as feeders or in conjunction with the railway service in any manner, schedules should be so laid out and maintained as to correlate the service from both facilities. This result can be obtained with the best economy if the same supervisory organization is responsible for both.

However, where a route is operated independently of the street railway service, it may be found desirable to supervise it with a separate organization.

Most of the street railway companies operating buses are doing so on such a small scale as not to warrant the increase in overhead and maintenance costs necessary if the repairs were entirely divorced from the electric car work. The committee believes, however, that this practice ceases to yield maximum efficiency and economy the moment the number of units becomes large enough to keep a separate corps of mechanics, inspectors and cleaners busy during a full working day. Bus chassis maintenance requires an entirely different line of training than that of electric car maintenance and if an attempt is made to spread the supervision and maintenance over both types of equipment, the maintenance of both will be unsatisfactory.

The body maintenance presents an entirely different situation. Bus bodies are now very closely following the type of construction used in electric car bodies and this work can be more efficiently and economically done by augmenting the regular body maintenance force sufficiently to take care of the additional equipment.

Several of the companies which have gone quite extensively into bus operation have either laid plans for or constructed garage facilities separate from those of the railway shop.

Rates of Fare and Fare Collection.—A comprehensive table showing both the railway and bus fare and the methods of collection is appended to the report. The majority of the companies are maintaining the same rate of fare on both the bus and the trolley car. Another tabulation shows that the cost of transporting a passenger by bus is greater than by trolley car, and the reasonableness of a higher rate of fare on the bus, particularly where the volume of traffic is so low that the railway will not produce sufficient volume of traffic to meet the cost of operation, or where the bus provides a more expeditious service than the trolley car.

Basis of Charging Depreciation.—None of the companies, by reason of short experience, is in a position to give definite information relative to the life of bus equipment. All of the depreciation is set up on a tentative basis with the idea of revising it, after experience, to the basis of actual conditions. So long as depreciation is recognized as a part of the cost of operation, it will make small difference under present circumstances whether it is figured on a straight line or mileage basis.

The cost of the original tires on the bus should not be considered a part of the amount to be depreciated. Theoretically the amount reserved out of revenues during the period a bus is operated should equal the original cost of the bus (excluding the tires) less its salvage or turn-in value. In all cases, where the experience is limited and the art is in a comparatively early stage of evolution, the amounts currently charged against the revenues and reserved may be considerably at variance with the actually sustained depreciation, but more extended experience will tend to improve the methods of calculating these charges.

Consideration must also be given to obsolescence and inadequacy, as well as wear and tear, in calculating depreciation charges. Physical depreciation, or the wear and tear of the bus, depends substantially on the following nine factors:

(a) The design of the bus.
(b) The quality of workmanship and material used.
(c) The character of maintenance.
(d) The efficiency of the driver.
(e) The grade and proper use of fuel and lubricating oils.
(f) The loads carried.
(g) The rate of speed.
(h) The character of service performed.
(i) The road conditions.

Because of these variable factors, it is difficult to suggest a standard practice for charging depreciation occasioned by wear and tear.

The factor of obsolescence, another element of depreciation, but not occasioned by wear and tear, should also be a matter of consideration, especially where there is likelihood of an appreciable advance in an art. At best, this is a problematical element and with respect to the bus at this stage of its evolution, at least, operators must apply

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indefinite theories in their calculations if they attempt to estimate it.

There enters into this study, the practical consideration that many buses, if not all, which might be replaced in regular service by better developed units could be used in extra service as spares and in regular service on lines of smaller traffic demand; often the chassis and other parts of discarded buses lend themselves to further utility.

The factor of inadequacy, is also an element of depreciation. It is a burden which operates on the income in precisely the same way as obsolescence and is as difficult to measure. The factor of inadequacy in depreciation is substantially occasioned by the traffic demands. For example, a bus with a carrying capacity of twelve might take care of all or its share of the traffic today and later, because of increasing patronage, might have to be replaced with a bus with a carrying capacity of twenty-five.

Assuming that the replaced bus, or its parts, could not be further utilized the charges against income over and above the reservations made out of revenues for depreciation occasioned by wear and tear would reflect the factor of inadequacy. This burden may be kept within bounds or eliminated in at least two ways:

First—Buses found to be inadequate in regular service may be further utilized or their major parts utilized.

Second—In establishing bus service the size of the buses necessary to accommodate the varying traffic demand and traffic growth may be reasonably determined if careful consideration is given to the fact that the bus, because of the nature of its construction and the laws against overloading which are in force in many localities, is less elastic in capacity than the trolley car.

Because of these widely variable depreciation factors, each company must study its own situation and from future experience develop such method as will adequately provide for renewals or replacements as they become necessary.

Depreciation on garage building and equipment must also be taken into consideration. As these facilities do not vary considerably from those generally used in railway operations it is safe to assume the same rate of depreciation in both cases.

No standard practice for providing for accident liability is suggested. Of the seventeen companies giving information, six set aside from 3 to 6 per cent of their gross revenue. In other cases the requirements as prescribed by law, either state or municipal, are followed. Generally speaking, each bus carries $1,000 property damage and $5,000 and $10,000 liability insurance for any one injury or accident.

Attitude of Public—With one exception, the attitude on the part of the public favors bus operation by the street railway companies. This indicates, that the public is showing a preference for dependable service by a responsible, experienced transportation agency to that furnished by an agency whose interest in transportation ceases immediately when profits disappear.

It is also recognized that through supplementing the rail service with buses additional territory is being served which could never hope to receive service from individual bus operation without a guarantee of immediate profit.

A very influential New England newspaper goes right to the heart of the matter in an editorial which says in part:

"Certain kinds of public service are essentially monopolistic, and transportation is one of them. It is as unsound economically that there should be two gas companies, two electric light companies and two telephone companies as that there should be two street railway companies, or, which amounts to the same thing, one street railway company competing for the transportation business of the community with a number of bus lines serving precisely the same districts.

"The right solution is to give one company monopoly of transportation and then see to it that it fulfills all the obligations that go hand in hand with monopoly.

"The motor bus is a valuable agency of transportation, but it should be employed as an auxiliary to the system of transportation that constitutes the main source of reliance, instead of being a competitor of that system. As a flexible unit its primary purpose should be to serve territory not at present served by the street cars."

The tabulation of operating results presented represents a picture of what may be expected in the furture. Certain elements of cost are as yet indefinite. None of the companies has been operating buses much longer than a year, consequently, their maintenance costs have had an advantage from the fact that their equipment was new and did not require heavy expenditures for repairs and renewals. It is quite possible also that the change from the truck chassis to one designed for passenger transportation may result in a decrease in this item.

So far the bus has had the advantage over the electric car by reason of the fact that the roadbed has been provided and maintained out of the general tax fund, but as the question of commercial use of highways is at present being given serious consideration throughout the country, it is entirely probable that the item of taxes will sooner or later be materially affected through changes in methods of taxation.

The most important factor to bear in mind in comparing the cost of bus operation with that of electric car operation is that, by reason of the smaller seating capacity of the bus, the cost per passenger is considerably higher than for electric car operation. The average cost per bus-mile, including

OPERATING RESULTS PER BUS-MILE

Company	A	B	C	D	E	H	I	L	K	O[1]	O[2]	R	Weighted Average All Companies, Cents
	1-1-23 to 5-31-23	1-1-22 to 3-31-23	7-1-22 to 3-31-23	5-26-22 to 3-31-23	1-1-22 to 3-31-23	3-1-22 to 3-31-23	1-1-22 to 3-31-23	12-1-21 to 11-30-22	7-3-22 to 3-31-23	7-15-22 to 12-31-22	1-1-22 to 12-31-22	4-1-22 to 3-31-23	
	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	
Transportation revenue	26.50	21.18	28.67	13.42	25.99	25.25	19.23	6.11	20.84	29.79	17.41	26.28	21.18
Other revenue	.....	.....	.60	.04	.....	.02	.06	.....	.04	.86	.51	.....	.21
Total revenue	26.50	21.18	29.27	13.46	25.99	25.27	19.29	6.11	20.88	30.65	17.92	26.28	21.39
Maintenance (excluding depreciation and tires)	3.83	1.95	4.50	1.62	3.02	6.56	4.00	2.62	5.42	6.71	2.97	2.61	4.20
Tires	1.50	1.94	1.49	1.32	.85	2.48	2.43	1.87	1.65	2.50	1.51	.47	1.88
Depreciation	3.00	2.68	3.88	3.25	2.29	3.96	2.67	7.19	8.05	2.87	2.68	1.03	3.08
Wages of bus operators	7.68	5.65	6.49	6.09	7.03	6.91	6.05	6.43	5.64	4.55	3.82	6.04	5.74
Other conducting transportation expenses	4.83	3.26	10.19	5.84	7.18	7.67	5.06	4.60	7.01	3.33	3.29	7.21	5.95
Injuries and damages, insurance, other general expenses	3.25	2.52	3.44	.77	6.56	3.04	3.93	.57	.74	5.32	3.64	2.56	3.10
Total	24.09	18.00	29.99	18.89	26.93	30.62	24.14	23.28	23.51	25.28	17.91	19.92	23.95
Net operating revenue	2.41	3.18	*.72*	*5.43*	*.94*	*5.35*	*4.85*	*17.17*	*2.63*	5.37	.01	6.36	*2.56*
Taxes	.92	.25	2.10	.60	.15	.24	.92	.65	.05	.18	.40	.49	.65
Operating income	1.49	2.93	*2.82*	*6.03*	*1.09*	*5.59*	*5.77*	*17.82*	*2.68*	5.19	*.39*	5.87	*3.21*
Operating ratio	90	85	102	140	104	121	125	381	113	82	100	76	112
Bus-miles	35,124	70,371	443,602	226,798	80,596	653,249	1,126,189	108,017	479,303	144,605	806,354	234,107	4,373,191

Note: Deficits are shown in *italics*.

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taxes and estimated depreciation, based on the figures shown in the accompanying table is 24.6 cents. It is fair to assume the average seating capacity per bus to be twenty-five. On this basis, the cost per seat-mile of bus operation is 0.98 cents.

Data obtained from ten companies operating one-man trolley cars, exclusively, shows an average cost per car-mile of 25.7 cents, including depreciation and taxes. The carsof these companies have an average seating capacity of forty-two, resulting in a cost per seat-mile of 0.61 cents. On the basis of this comparison, the cost per seat-mile of bus operation is approximately 60 per cent greater than for the one-man electric car. These figures, however, do not include a return on the value of the property.

If this were computed on the basis of carrying capacity, the increase in bus cost per passenger would be greater by reason of the greater elasticity of the electric car. This is particularly true in localities where the number of passengers above the seating capacity of buses is fixed by law. An example of this is the state of Connecticut, where the law allows only two passengers above the seating capacity.

This not only means an additional investment which is idle the greater part of the time, but because of the smaller seating capacity of the bus, it will require at least three buses to furnish the same number of seats as two trolley cars.

The committee reports it is unable to furnish any historical data of value on trackless trolleys as experience by street railway companies is confined to four companies operating a total of seven buses and two in Canada operating a total of eight, none of which has been in service a sufficient length of time to furnish reliable data.

Another year, however, should be fairly productive of information, as the committee is informed that installations are contemplated at Richmond and Norfolk, Va.; at Philadelphia; at Rochester, and at Detroit.

The report was signed by R. R. Anderson, A. C. Blinn, W. H. Burke, A. H. Ferrandou, R. N. Graham, J. M. Ives, H. A. Mullett, L. H. Palmer, T. S. Wheelwright, J. K. Punderford, Edward Dana and W. J. Flickinger, chairman.

H. W. Alden, president of the Society of Automotive Engineers, read a written discussion of the report of the committee on bus operation, which is abstracted elsewhere in this issue.

V. E. Keenan, superintendent bus division, United Electric Railway, Providence, R. I., referred to the report as a fair and impartial treatment of a subject which has been the source of considerable controversy in recent years. The progress made by manufacturers of bus equipment in recognizing the limitations of the customary type of truck chassis for bus work augurs well for further development in bus design. The need for standardization and the use of interchangeable parts was referred to, and the advantages of co-operation between the Society of Automotive Engineers and the A.E.R.A. were emphasized. The desirability of improvements in bus design to decrease the rate of depreciation and give a longer life were also pointed out. Referring to the convention number of the ELECTRIC RAILWAY JOURNAL, Mr. Keenan agreed that close study of the results obtained in the manufacture of pleasure vehicles by the use of interchangeable parts can be profitably applied to bus design.

The steps taken by the Washington Railway & Electric Company in installing bus service as an auxiliary to its present electric railway system were reviewed briefly by President W. F. Ham. He stated that the bus can now be used in many situations where it is not profitable to build a new car line, or can be applied where it is not profitable to rebuild an old line. The advantages of the bus under certain conditions for furnishing service on extensions of existing railway lines were also mentioned by Mr. Ham. He said, however, that a transfer charge between bus and cars is very desirable.

A brief description was given by G. B. Anderson, transportation manager Los Angeles Railway, of the steps taken by his property in the establishment of bus lines to forestall competition by independent companies. He said that although a transfer privilege is in effect between buses and cars, a fare of 10 cents is charged if the passenger rides on a bus during any part of his journey.

L. H. Palmer, general manager United Railways & Electric Company, Baltimore, amplified the report relative to the operation of trackless trolleys on his property by stating that the operating costs for these vehicles were increasing rather than the reverse. He expressed the opinion that trolley bus design is far from perfected and that considerable development is necessary before it will become a practical transportation vehicle.

In concluding the discussion, Mr. Flickinger, chairman of the committee, maintained that comparison of operating costs as between buses and rail cars must be made on the basis of cost per seat, in order to give a true picture of the actual results that could reasonably be obtained.

Wednesday's Session T. & T.

The joint session of the Transportation & Traffic and Claims Associations was called to order promptly by President Seely of the former association. The report of the committee on accident prevention was presented by H. B. Potter, co-chairman. He pointed particularly to the answers to the questions regarding the most hazardous elements in the operation of cars.

Joint Committee on Accident Prevention

The study made by the committee on safety work last year was continued by a committee under the name of the committee on accident prevention, which analyzed accidents with reference to causes and the relative number in different areas on each property. It was determined that better concrete results would be obtained by the committees on accident prevention of the two associations carrying on the work jointly.

The duties of the committee have resolved themselves into two important studies: (1) Analyze accidents. (2) Ascertain the extent of the co-operation between electric railways and various public bodies.

The joint committee dropped the question of outlining the manner of conducting safety week campaigns for the reason that it is the feeling of the members that the safety week idea has been overdone in the past and that accident prevention has now resolved itself into an all-the-year-round endeavor. There is a great deal of data on this subject on file at the headquarters of the National Safety Council and the organization of the safety week has been fairly well standardized.

As a result of questionnaires sent out to member companies the joint committee has obtained some extremely interesting information. The committee feels that if the facts presented in this report will serve as an inspiration to the member companies for greater effort along the lines of accident prevention in the future, its work will have been well accomplished.

Analysis of Accidents of 113 Electric Railways — The committee received a response from 113 electric railway properties situated in thirty-nine states and the Dominion of Canada. These properties represent 27 per cent of the electric railway mileage, 25 per cent of the gross receipts and 31 per cent of the passengers carried. The figures obtained are, in the opinion of the committee, fairly indicative of the trend of accidents in the years 1920, 1921 and 1922.

The committee has ascertained from authorities in other lines of work that the year 1922 was a year of high accident rate in industry as a whole, whereas 1921 was a banner year from the accident standpoint.

The results of our investigation, generally speaking, show that the electric railways as a whole had a high accident rate for the year 1922 as compared with 1921 as far as accident frequency is concerned, but the total cost to the railways shows a great decrease, and, further, the miles operated in 1922 exceeded 1921, which in turn exceeded 1920, and passengers carried in 1922 exceeded 1921. These results should be

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extremely encouraging to the electric railway industry.

The following totals are obtained from the answers to twelve questions submitted to the 113 electric railways:

	1920	1921	1922
Total number of all accidents	220,950	204,034	214,563
Total number of employees injured	13,523	12,777	13,183
Total cost of claims, injuries, damages, including costs and payments connected with operation, claims and safety departments, welfare and workmen's compensation inclusive of legal, medical and private investigations	$9,009,381.75	$7,759,852.86	$7,472,731.19
Total accidents in which motor vehicles were involved	79,262	79,808	89,582
Total number of car collisions	10,831	7,216	7,367
Total number of fatalities, all causes	582	496	474
Gross income, all operations	$280,503,326.20	$281,774,993.45	$279,433,916.10
Number of car-miles operated	608,810,174	611,111,592	626,944,541
Average total number of employees in service, all departments	89,844	90,161	90,920
Number of passengers carried, free and transfer	4,783,667,505	4,558,735,675	4,594,457,155
Number of cars operated	16,075	16,011	16,265
Miles of track	11,576.11	11,887.17	11,889.41

The above results of accident prevention work are particularly interesting when carefully analyzed. For instance it is assumed that the total number of accidents given above are the total number of accident reports received which may or may not have involved cost to the company or real injury to the person or property. In the last analysis, the item which most clearly demonstrates the results of accident prevention is the third item above, showing the total cost. This total cost in 1922 was $1,350,000 less than in 1920, or approximately 16 per cent. In this connection the following figures are extremely interesting:

	1920	1921	1922
Cost of accidents per 10,000 car-miles operated	$148.00	$127.00	$119.00
Cost of accidents per 100,000 passengers carried	188.00	170.00	163.00
Cost of accidents, percentages of gross earnings	3.2%	2.76%	2.68%
Average cost per accident reported	$42.20	$38.00	$34.80
Number of accidents reported per 10,000 car-miles	3.39	3.32	3.42
Number of accidents reported per 100,000 passengers carried	2.20	2.04	2.14

Fatalities—Various public authorities and accident prevention organizations in the past have laid considerable stress on the results obtained by accident prevention in reducing the number of fatalities. The committee would call to your attention especially the results obtained by these electric railways in reducing the number of fatalities, which in 1920 were 540, to 471 in 1921 and 450 in 1922.

What Causes Accidents — The committee submits causes of car collisions, alighting and boarding accidents, persons struck by car, collisions with other vehicles, submitted by the 113 companies in answer to questions sent out by the committee.

The most hazardous element in the operation of cars was stated by various operators to be streets car-auto vehicular collisions; automobile traffic; street crossing on down grades on paved streets; monetary hazard; step accidents; violation of operating rules and slippery rails; traffic congestion; grade crossings; hills, snow, ice and cold weather; the human element; railroad crossings, fog and cows on track; narrow streets; slick rails.

Co-operation Between Electric Railways and Various Public Bodies, and What Has Been Done Toward Accident Prevention Through Special Methods Introduced by Member Companies — A sub-committee was appointed to obtain this information and it confined its questionnaire to three questions which, with replies received from the company membership of the association, are as follows:

Q. 1. Have you adopted special methods for the reduction of accidents on your property, by means of:

(a) Adoption of a code of safety rules? To this question forty-one members answered No, and forty-one answered Yes.

(b) By the appointment of a safety director? To this question, forty-nine answered No, and thirty-three Yes.

(c) By holding periodical safety meetings? To this, thirty-five answered No, forty-seven Yes.

(d) By the formation of a safety committee? To this, thirty-four answered No, forty-eight Yes.

Q. 2. In what manner, if any, has the chamber or commerce or other civic bodies in your city assisted in an organized way in helping you to carry on effective safety work in your community? Replies received from forty-five member companies indicated that local chambers of commerce or other civic bodies had furnished no special organized assistance while thirty-seven member companies reported that the chambers of commerce in their cities had in various ways assisted in an organized way in furthering the cause of accident prevention.

Q. 3. Is there in your city a local safety council, and if so, to what extent has it co-operated with the various departments in the effort to reduce accidents? Forty-nine member companies reported that in their cities there was no safety council; thirty-three companies reported that there is, and that the same is co-operating fully in accident prevention work.

The report was signed by F. W. Mulford, F. H. Warren, M. W. Bridges, Charles W. Chase, James Harmon, S. B. Irelan, A. W. Koehler, C. E. Morgan, R. M. Reade, Harry Restofski, E. M. Walker, Alba H. Warren, J. V. Sullivan, sponsor; W. H. Boyce, sponsor; H. O. Allison, co-chairman, and H. B. Potter, co-chairman.

President Seely congratulated the joint commission on the work it has done. He suggested that individual companies can take the cue from the report and collect material from their own records, subdividing it according to causes of accident.

The formal discussion was opened by W. G. Fitzpatrick, general claims attorney Detroit United Railway. He said that speaking from the standpoint of the claims man the situation is gratifying. There has been a considerable reduction in accidents on the basis of passengers carried and miles operated. He said that the claims men and the transportations man should and must collaborate and that they should have a sympathetic attitude toward each other. The operator of the cars must, however, become the dominant factor in the situation.

The principal thing is discipline, discipline and still more discipline, said Mr. Fitzpatrick. He felt, however, that compensation laws have a baneful influence, even if they do not directly cause accidents. He said that trainmen should be directly responsible to their superiors and not to some board or commission.

Barron Collier, who was asked to give a written discussion, was unable to be present. His discussion was read by Marcus Dow. According to Mr. Collier, perhaps no industry can do so much for the safety movement as the electric railways, for they have the energy, brains and resources with which to do constructive work. He pointed particularly to the accident record of Greater New York, stating that there were killed in the streets by vehicles last year 965 persons, approximately half of whom were children under sixteen years of age, and more than 6,000 persons were injured.

"I have little faith that the slogans which have been chanted will bring about results," said Mr. Collier, "but I do think that when we go to the root of accidents, the causes for them, as you have done in your report for this year, we have started along the right line to cut down casualties."

Mr. Dow supplemented these remarks by stating that saving the lives of children is a work dear to the heart of Barron Collier. The thing which makes everything in the world worth while is human life. It is bad enough that nearly a thousand lives were sacrificed in the year, but that half of them were children under sixteen years of age was the appalling fact.

President Muir of the Claims Association conducted the informal discussion. Successful safety work is impossible unless there is a spirit of co-operation between the transportation man and the claims man, said Mr. Muir. One can't be successful without the other. They must accept advice from counsel and from each other.

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J. H. Handlon, Market Street Railway, San Francisco, said the development of safety devices for cars and safety practices promulgated by public authorities, as well as statistical methods devised for recording and classifying accidents were acting to better the situation. He said that some of the things done decreased certain classes of accidents but increased others. Better methods of selecting platform men were advocated by him. Eccentricities of various men in selecting applicants were scored. Following this care should be taken in the selection of men and they should be watched from the day they are accepted all during the period of training. He believed that it seemed advisable to adopt a follow-up method and give the men a probationary period before they are given full charge on the cars.

Attention was called to certain matters of the report that do not deserve compliment by L. H. Palmer, United Railways & Electric Company, Baltimore. Statistics presented show that half of the companies are not co-operating with the National Safety Council. Many companies have not formed safety committees or appointed safety directors. He thinks that it is an outrage that the companies have not taken advantage of their opportunities in doing work of this sort.

H. O. Allison, co-chairman of the committee, referred to the conclusion of the report on accident prevention, which was ruled out by the committee on publication. Mr. Allison presented this as his own contribution to the discussion. He said that there is no such thing as an unavoidable accident. Poor equipment, bad roadbeds, etc., may culminate in accidents, and therefore should be taken care of in advance. In this way many accidents are prevented which might have occurred otherwise.

James P. Barnes, president Louisville Railway, expressed his dissent from the view of Mr. Fitzpatrick and stated that he thought it equally necessary for a railway to have a brass band as well as to get down to brass tacks. The fact that the employment of men on the Beaver Valley Traction lines is in the hands of the safety engineer was brought out by W. H. Boyce, general manager.

The report of the committee on co-operation with the National Safety Council was presented by L. H. Palmer, general manager United Railways & Electric Company, Baltimore

Co-operation with the National Safety Council

The committee on co-operation with the National Safety Council early in the association year, after correspondence with the headquarters office of the Safety Council, picked out fifty-eight of the most important railway companies that were not members of the council and wrote to them, explaining the benefits of membership and urging them to join. All of the companies were written at least twice, by one or the other of the committee, and in each instance reply was requested. Of this number thirty made no reply, fifteen declined to join, ten joined or had benefits of the council through allied companies and three have the matter under consideration.

The committee was much disappointed in the response to its letters and it appears that the only way in which effective results can be obtained in future is through personal contact of members of the council with those who are not.

The report was signed by W. H. Boyce, Wallace Muir, L. H. Palmer, chairman.

In discussing this paper Mr. Barnes told of the benefits lost to railway companies by their failure to join the National Safety Council.

A paper on "Maintenance of Men" was read by Dr. H. E. Fischer, chief surgeon Chicago Elevated Railways.

Following the presentation of the paper, Dr. Bascom, Illinois Traction System, stated that railways should encourage their employees to consult the company doctor for even minor ailments. He emphasized also the danger of employing men suffering from syphilis.

At the conclusion of the discussion, President Seely of the Transportation & Traffic Association thanked President Muir of the Claims Association for the co-operation of the latter body in joint meeting. Mr. Muir expressed his gratification at the successful character of the meeting. There was no report from the committee on resolutions and the meeting therefore proceeded with the installation of new officers.

The new president, J. K. Punderford, was escorted to the chair by Mr. Smith and accompanied by the other new officers and members of the executive committee. In a graceful speech, the retiring president expressed his wish for Mr. Punderford's success in the ensuing year. Mr. Punderford described briefly the extensive wire pulling that he had done in order to gain his new eminence and promised to perform the duties of the office to the best of his ability.

He presented the badge of past-president to Mr. Seely and stated that no better testimonial of the success of his service as president of the T & T Association could be asked for than the well attended and highly interesting meetings during the convention. In accepting the badge, Mr. Seely expressed his deep gratification. There being no further business the meeting adjourned.

Biographical Sketches of Newly Elected Officers

Britton I. Budd

A KEENER, abler leader than Britton I. Budd could not have been selected for the American Electric Railway Association. This statement was made in the CONVENTION DAILY issue of the ELECTRIC RAILWAY JOURNAL in announcing Mr. Budd's election. Nothing that could be said about Mr. Budd would state the case better. It does not alter the fact that Mr. Budd would be the last one to subscribe to this view of him. The statement was made not only because of the kind of thinking Mr. Budd has contributed in the counsels of the association, but also because of the splendid record of achievement he has made with the Chicago, North Shore & Milwaukee Railroad and the Chicago Elevated Railroads. In selling transportation and developing good will, Mr. Budd probably stands out as the leading figure in the industry. Furthermore, so many ideas of modern electric railroading are being worked out on his properties that one may learn at every turn some new and progressive method of doing the thing better or at lower cost.

MR. BUDD'S ALL-AROUND EXPERIENCE

A plain statement without frill of the accomplishments made under Mr. Budd's direction confirms the view that there are still many things that can be done to improve the electric railway outlook.

Mr. Budd makes a good president in another respect. He is both interurban and street railway man, and rapid transit, too. There is probably not another man in the industry who is all three. Moreover, he is also president of the Public Service Company of Northern Illinois, one of the Insull electric and gas companies.

Mr. Budd has been associated with the transportation business ever since he left school, at which time he took a situation in the surveying department of a steam railroad in Ohio. In 1893, during the World's Fair at Chicago, he was associated with the Intramural Railway. With the incorporation of the Metropolitan Elevated he saw Chicago's future transportation plans take real form, and when actual operation of that line was commenced in May, 1895, he obtained a position as clerk in the storehouse. With the Metropolitan his rise was rapid, for he soon became storekeeper, then purchasing agent and finally general manager. When Mr. Hetzler, president of the Metropolitan, left in 1910, Mr. Budd was elected president of the company.

In 1911 a consolidation of all the elevated lines in Chicago was brought about, and Mr. Budd was chosen president of the combined system. Besides being president of the Chicago Elevated Lines, he became president of the Chicago, North Shore & Milwaukee Railroad at the time of that line's reorganization in 1916, and more recently assumed the same position with the Chicago and Interurban Traction Company. He was

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elected president of the Public Service Company of Northern Illinois early this year.

Further evidence of the accomplishments of Mr. Budd is afforded by the award of the Coffin medal to the Chicago, North Shore & Milwaukee Railroad, headed by him. The work of that road is reviewed in the report of the Coffin committee, presented elsewhere in this issue.

All in all Mr. Budd's election bids fair to insure another year of great accomplishment for the association.

Harley A. Johnson

H A. JOHNSON, who was elected president of the Engineering Association, is an alumnus of Purdue University, class of 1905. By progressive steps, taken during the past eighteen years, he has risen to the position of assistant to the general manager Chicago Elevated Railroads. In his present position he assists the general manager in carrying out the details of operation and maintenance of the property.

While in college Mr. Johnson was president of the mechanical engineering society. He was active in all student matters, being elected to Tau Beta Pi after one year in college. He graduated with the highest mark in the mechanical engineering class and was the representative of the mechanical engineers on the commencement-day program.

During his days at Purdue, and immediately following, he was a special apprentice in the mechanical department of the C., B. & Q. Railroad intending to enter the steam railroad field as a life work. In this position he worked in the drafting room, as a locomotive fireman, in the testing laboratory, in the locomotive erecting shop and on locomotive road tests.

In 1905 he entered the service of the Metropolitan Elevated in Chicago as helper in the shops, and worked his way up through different departments, including those of maintenance of way and transportation. In 1907 he was made engineer of car equipment, and three years later master mechanic, having the duties of superintendent of equipment.

When in 1911 the elevated railways consolidated, Mr. Johnson was made master mechanic of all of them, his title being shortly changed to superintendent of shops and equipment. In this position he handled the design and followed the construction of the new steel cars purchased in 1914 and 1915. This was his most responsible job up to that time. In 1916 his duties were extended to include similar ones for the Chicago, North Shore & Milwaukee Railroad.

In 1918 Mr. Johnson was made organization engineer for the four elevated railroads, being promoted three years later to his present position. He has charge of the educational work on the elevated lines and is chairman of the expense and budget committee. This committee approves all items of budgets and special authorizations for work, both construction and operation. He helped to organize the local company section of the American Association and was president for the first two years. He was on the original committee that inaugurated safety work on the "L" system. He was detailed by Mr. Budd to investigate the subject of motor buses for the North Shore Railroad.

Mr. Johnson has been long active in committee work of the Engineering Association. He also interests himself in Chicago technical and other organizations. He is a member of the Western Railroad Club, the Western Society of Engineers, the American Institute of Electrical Engineers and the Illinois Electric Railways Association.

J. K. Punderford

THE newly elected president of the Transportation & Traffic Association, J. K. Punderford of New Haven, Conn., is general manager of the Connecticut Company, which operates 802 miles of track and owns nearly 1,500 motor cars and a number of buses. It operates a large majority of the electric railways in Connecticut and serves all of the large cities in the state. Mr. Punderford has been connected with this property or its predecessor in New Haven for thirty-one years.

The new president of the Transportation & Traffic Association is a native of New Haven and naturally went to Yale University. He took the combined electrical and mechanical engineering course then given and was graduated in 1892. His first job was an electric railway one, assisting in the erection of the power station of the West Haven Street Railway. In the autumn of 1892 he went to Schenectady to take the students' course in electrical engineering then being given in the Edison works, but returned to New Haven and became connected with the Fair Haven & Westville Street Railway, then the largest electric railway property in the city.

At first he was engaged in the track department, but later entered the operating department, and when the company acquired the other electric railways in New Haven and vicinity he was made general manager of the combined system. Later, when the New York, New Haven & Hartford Railroad purchased the property and the other electric railways in the state Mr. Punderford was retained as general manager of all of the combined properties which now comprise the Connecticut Company.

Although most of Mr. Punderford's active business career has been in the transportation side, he has never lost his interest in engineering, especially in trackwork, and has given quite a little of his time to this department.

Mr. Punderford has always taken an interest in association affairs and served last year as first vice-president of the Transportation & Traffic Association. He is also an ex-president of the Union League Club of New Haven and an ex-president of the Connecticut Society of Civil Engineers.

Information Bureaus Meet

AT THE invitation of W. H. Sawyer, president East St. Louis & Suburban Railway, representatives and officers of state and sectional associations and directors of the public utility information bureaus, gathered for a luncheon at the Marlborough-Blenheim Hotel on Tuesday. There has been such a rapid expansion in the number and work of these information bureaus it was believed much good could be accomplished by such an assemblage. Several officers and past officers of the association and representatives of some of the sectional organizations were present.

Those in attendance were as follows:

Representatives of public service information bureaus—J. S. S. Richardson, Philadelphia; H. M. Lytle, Chicago; Joseph B. Groce, Boston; Benjamin E. Ling, Cleveland; A. B. McCrum, Charleston, W. Va.; Frantz Herwig, Milwaukee; John N. Cadby, Madison, Wis.; J. W. Holcomb, Cleveland; and Frank Bellville, Louisville, Ky.

Sectional association representatives —W. V. Hill, manager California Electric Railway Association; L. E. Earlywine, secretary Central Electric Railway Association, and E. N. Willis, secretary Southwestern Public Service Association.

Among the officers of the association and delegates from member companies were: President C. D. Emmons; Vice-Presidents B. I. Budd and J. N. Shannahan; Past-Presidents P. H. Gadsden, J. J. Stanley and L. S. Storrs; Secretary J. J. Welsh; Treasurer Barron Collier; and E. C. Faber, J. H. Alexander, J. P. Barnes, C. D. Cass, W. P. Strandborg, Labert St. Clair and J. W. Colton.

The most extended address was by Mr. Lytle of Chicago, a pioneer in the movement. Others who spoke were Messrs. Budd, Collier, McCrum, Richardson, Groce, St. Clair, Strandborg, Willis, Hill, Ling and Cadby.

New Officers of the Accountants' Association

At the meeting of the American Electric Railway Accountants' Association on Oct. 11 the following were elected officers of the association:

President, E. M. White, treasurer Binghamton Railway, Binghamton, N. Y.

First vice-president, W. L. Davis, auditor Lehigh Valley Transit Company, Allentown, Pa.

Second vice-president, J. J. Duck, general auditor Chicago Surface Lines, Chicago, Ill.

Third vice-president, Walter Shroyer, secretary Union Traction Company of Indiana, Anderson, Ind.

Executive committee: L. E. Lippett, auditor Auburn & Syracuse Railway, Auburn, N. Y.; T. B. MacRae, general auditor Metropolitan West Side Elevated Railway, Chicago, Ill.; O. H. Bernd, secretary and auditor Des Moines City Railway, Des Moines, Iowa; E. H. Reed, auditor Brooklyn City Railroad, Brooklyn, N. Y.

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Engineering Association Proceedings

The Advance of National Standardization Was One of the Outstanding Features—Methods of Handling Materials and Supplies, and of Accounting, Are Given Consideration —Arrangements Are Completed for Revision of the Engineering Manual

THE first session of the Engineering Association was held Monday afternoon, Oct. 8, with President L. C. Datz presiding. President Datz's address, which outlines the achievements of the association, follows:

President's Address

In his presidential address to the Engineering Association, L. C. Datz reviewed the accomplishments of the various sub-committees and the work of the association during the year and made several suggestions as to its future course. He spoke of the work of the committee on methods of voting on standards, as well as that of the committee on revision of the Engineering Manual. He stressed the amount of work that has been done on this revision and mentioned the fact that the executive committee of the American Association had approved the request to print the new manual.

Mr. Datz described the report of the committee on heavy electric traction and spoke of a question as to the proper scope of its activities. Mention was made also of the report of the special committee on wheel and rail contours, the equipment committee and that on buildings and structures. Praise was given to the committee on wood preservation for its work during the year and also to that on air reservoir specifications. The report of the committee on purchases and stores was praised by Mr. Datz, as was that of the committee on way matters.

Electrical problems were covered in the reports of the special committee on automatic substations, that on power distribution and on power generation. Increasing activity of the Engineering Assocation was mentioned in connection with the drafting of a policy to establish a definite and simple procedure in matters relating to the American engineering standards committee. Continuing, Mr. Datz said:

A great deal of serious thought has been given in the past few years to various phases of the Engineering Association, its activities and methods and the effect its results have in the electric railway industry.

One of the most important questions is that pertaining to standards. Is the present method of appointing the standards committee and the way it functions conductive to obtaining effective results? To this I would say "Yes" conditionally, because a committee of fifteen men, nine of whom represent railway companies and six represent manufacturers, can be selected that will guard this phase of the work efficiently, if the committee be carefully chosen with regard to necessary experience to pass upon such matters intelligently.

L. C. Datz
Retiring President

In connection with our standards and the use of same by our companies, the revision of our Manual and the adoption of some of our standards as American standards by the A. E. S. C. will aid materially in accomplishing results. I am pleased to state that there seems to be a noted improvement in the use of association standard for 7-in. grooved girder rail. I know personally it has been laid in New Orleans, Memphis, Knoxville and Little Rock in goodly quantities in the last two years. However, there is room for a great deal of improvement, and with the constant endeavor of our association to make our standards represent the last word in the art, we should do everything necessary to bring the use of same about, in order to offset the criticism for non-use of association standards we have been hearing so much.

Then there has been a great deal said about too many associations working independently on allied subjects. We should have ever before us the elimination of wasted effort and expense incurred in duplication of work by various technical associations on subjects in which they are interested individually. A great deal of this duplication can be eliminated by joint effort of interested associations, and I am pleased to say that it is becoming the practice more and more for the various associations to co-operate along these lines. The American Engineering Standards Committee serves as a happy and efficient medium in a great many cases.

H. A. Johnson
President-Elect

INDIVIDUAL MEMBERSHIP

I would like to see this association take the proper steps to further the inclusion of a course of public utility engineering in curriculums of colleges of recognized standing.

I want to call the incoming administration's attention to an opportunity to strengthen the Engineering Association by increasing the number of individual members. I am thoroughly sold on this idea, and I have been an individual member of the Engineering Association since my days in the drafting room some years ago. I speak from experience when I say that there are advantages incidental thereto that no man in justice to himself and the company he serves can afford to forego. These benefits follow active participation in the work of the association, in proportion to the well-directed thought and time put into it. Personal contact with other men interested in the same problems broadens a man's viewpoint, which cannot help but reflect favorably in the kind of effort he puts forth in his company's interest.

Although the Engineering Association has by far the largest number of indiviual members of any of the affiliated associations, there are still quite a number of men who should be individual members of this association, and we can render them a real service by bringing to their attention the benefits to be had by joining this association and taking an active part in its work. The dues are $5 per year, extremely nominal, and are kept purposely so in order to make it possible for every man connected with the engineering end of the electrical railway industry, whether he be the chief engineer, mechanical, electrical or civil engineer, signal engineer, superintendent of equipment, of power, of railway or of overhead construction, master mechanic, inspector, foreman, draftsman, as well as purchasing agent, storekeeper, or assistant to any of these officers.

I would strongly recommend that a

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special committee to increase individual membership in the Engineering Association, to work in harmony with the American committee on membership, be appointed.

In conclusion, Mr. Datz mentioned the pleasure he had had in serving as the head of the Engineering Association and thanked the members for the assistance they had given him.

G. C. Hecker read the secretary's report prepared by J. W. Welsh, setting forth the various accomplishments of the association during the past year.

Secretary-Treasurer's Report

There were ten standing and six special committees during the year, the total personnel being 169, exclusive of the executive committee. Thirty-nine committee meetings were held, with a total attendance of 294 members.

Co-operative work on the part of the committees with other associations has resulted in the completion of several important specifications, including those for track construction, prepared in co-operation with the American Society for Municipal Improvements, and the specifications for the manufacture of open-hearth steel girder rails of plain, grooved and guard types.

The committee on power distribution has co-operated with the American Society for Testing Materials in harmonizing the specifications for round and grooved high-conductivity trolley wire. The committee on way matters is co-operating with the American Railway Engineering Association in studying the design of substitute ties and in formulating specifications for crossings of steam railroads and electric railway tracks.

The recommendations of the 1922 committee on way matters regarding a research program in connection with the work of the committee on welded rail joints resulted in an appropriation of $10,000 by the American Association and contributions amounting to $13,477 by a number of member companies. This will be used for the construction and operation of the necessary service testing machines and for other expense involved in developing the several types of welded rail joints now on the market.

There is now under way the formation of an American Committee on Inductive Co-ordination, which will be representative of all interests involved and which the association is developing in connection with the National Electric Light Association and the Bell Telephone System.

Relations with the American Engineering Standards Committee are becoming increasingly important each year. Six of the Manual sections have been approved as "American standard" and one as "tentative American standard." Other proposals of the association will be take up through sectional committees.

The committee on revision of the Engineering Manual has been active and it has been definitely decided to publish the Manual hereafter in the form of a bound volume to be reissued at intervals of from three to five years.

As to membership, the total number of individual members, Aug. 31, 1922, was 528. Since then twenty-five applicants have been admitted; twenty-seven members have resigned, and forty-seven delinquents have been dropped, making the net membership Sept. 15, 1923, 479.

The annual report of the executive committee was approved by title only, inasmuch as the report will be printed in full in the proceedings of the association.

Committee Appointments

H. H. Norris, C. R. Harte and R. C. Cram were appointed as the convention committee on resolutions.

In the absence of C. S. Kimball, chairman of the committee on methods of voting on standards, G. C. Hecker read the committee's report. This was simply a progress report which recommended that the subject be continued. The report was approved.

Engineering Manual

R. C. Cram presented a report of the committee on revision of the Engineering Manual, explaining why it was necessary to have a committee investigating this subject. The difficulties encountered in endeavoring to keep the old loose-leaf Manual together and the expense of keeping it up to date were factors which finally led to the adoption of a bound volume. An appropriation of $5.500 recommended by the committee for the purpose of revising the Manual has been approved by the executive committee of the American Association. H. H. Adams, in his motion to approve the committee's report, stated that he believed it was time to revise the Manual because of the unwieldy form of the old volume. The recommendation that the committee be continued was approved.

Heavy Electric Traction

The bibliography of heavy electric traction and electrification data has been checked and revised by Prof. R. B. Warner of Yale University. It has been suggested that a complete rearrangement of the list be made, classifying together all articles appearing in a given periodical during any one calendar year, and from this compiling the subject index. The work would thus comprise: (1) A group of articles in any one periodical; (2) a chronological grouping, and (3) a subject index. Subsequent additions may readily be made as desired without material addition to the cost of printing.

The committee recommends that a complete bibliography, rearranged as outlined, be compiled and printed next year and automatically revised from year to year.

With regard to branch line electrification the committee states that with few exceptions branch line electrifications were made several years ago and there has been no material development during recent years. The committee, therefore, has not made a comprehensive investigation of the situation, feeling that such information would not be of material value, particularly in view of the recent tendency to substitute self-propelled cars for steam service on branch lines.

The self-propelled car is undoubtedly of interest to those responsible for electric railroads as well as to the operators of steam road branch lines.

The committee on equipment of the A. E. R. E. A. in 1912 compiled an extremely comprehensive report covering the development of self-propelled cars. The cars developed at that time were of various types, such as gasoline, steam, compressed air, storage battery, etc. Subsequent to 1912 an interruption seems to have occurred in the development of self-propelled cars for branch line operation.

Recently, renewed interest in the self-propelled car has been manifested. A number of roads in this country and abroad have adopted, and are operating successfully, a type of gasoline-driven car considerably smaller than those which were most common in 1912.

During the past few years the development of heavy electric traction has been of necessity somewhat slow on account of lack of funds available for expansion. Many railroads, however, have actively considered the question of electrification as a solution for their individual problems, and several engineering investigations have been completed and plans made for electrification. These are described in some detail in the report.

The report was signed by A. H. Armstrong, R. Beeuwkes, J. M. Bosenbury, H. W. Cope, J. H. Davis, J. V. B. Duer, E. C. Johnson, Norman Litchfield, A. S. Richey, C. H. Quereau, L. S. Wells, H. A. Johnson, John C. Davidson, vice-chairman, and Sidney Withington, chairman.

Sidney Withington, New Haven Railroad, added to the report the following data regarding Baltimore & Ohio Railroad locomotives: The company has bought two new electric locomotives, weighing 120 tons each, for use in passenger and freight service. The gear ratio is 19: 83, and at 14½ m.p.h. the tractive effort is 19,400 lb. The maximum tractive effort is 72,000 lb., and the maximum safe speed is 35 m.p.h. The railroad is also rebuilding four old locomotives to bring their weight to 120 tons each. Cast-iron ballast is being installed in the cabs. The gear ratio is also being changed.

Mr. Withington emphasized the importance of the bibliography, pointing out that the new plan outlined in the report calls for continuity. The old bibliography contained many errors which have been corrected. On the subject of the self-propelled car he said that this is making rapid progress, and many railroads are feeling their way in solving traffic problems by using this type of car, sometimes temporarily. No standardization is possible at this time. The data given in the committee's table are not complete, but a complete list of railroads to which questionnaires were sent will be appended.

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H. A. Johnson, Chicago Elevated Railways, said that the question had been raised as to whether the committee on heavy electric traction has been functioning in accord with the wishes of the association. The original purpose of the committee was to keep the members informed regarding the progress of electric traction on steam railroads. It has been working principally along this line. A special committee was appointed by the executive committee to study this matter, and on behalf of this committee he recommended that the scope of the work be broadened to include heavy traction on urban and interurban railways.

C. R. Harte, the Connecticut Company, said that the association is vitally interested in the self-propelled car of the type that the steam railroads are using. Electric railways must concern themselves in the development of auxiliary vehicles. Of these the bus is difficult to maintain, whereas the self-propelled car is rugged.

The report of the committee was then accepted.

Wheel and Rail Contours

H. H. Adams, Chicago Surface Lines, abstracted the report of the special committee on wheel and rail contours. He stated that the last revision of wheel contours was made in 1907. At five conventions since then revisions have been proposed but not acted upon. In 1922, however, the association deemed the matter important enough to appoint this special committee. The result has been that a set of contours has been agreed upon. These are the same for chilled and steel wheels below the tread line. An abstract of the report follows:

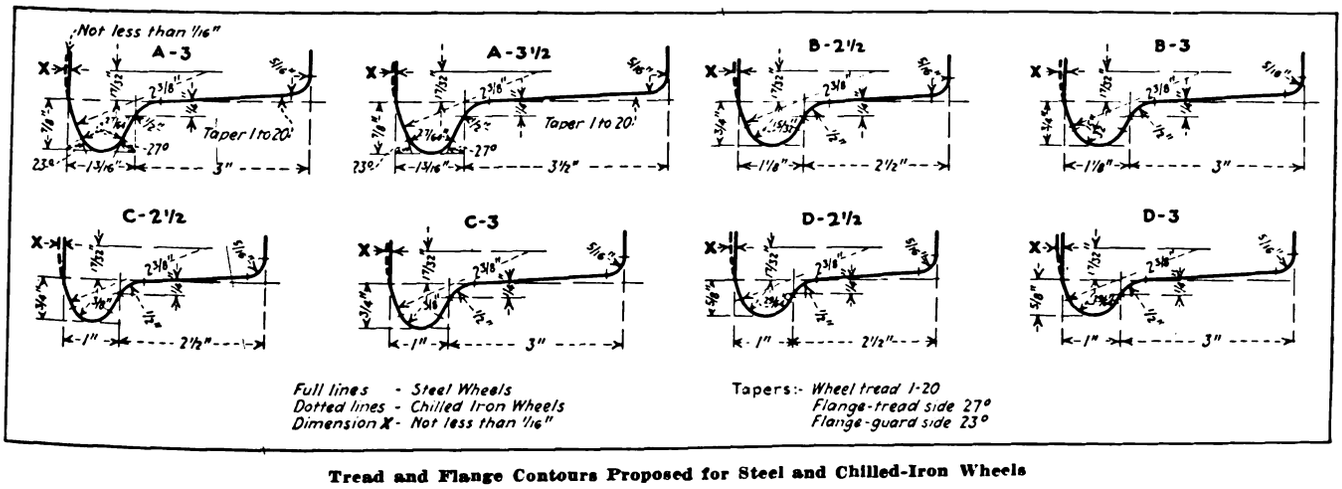
Abstract of Report

The committee submitted four contours of wheel flanges, each in combination with two widths of wheel treads and recommended that these be adopted as standard for both steel and chilled-iron wheels. An additional contour which is the same as that which is standard for the American Railway Association was also submitted for use where larger wheel flange and wheel tread are required.

The flange contours are alike for both steel wheels and chilled cast-iron wheels

STANDARD DIMENSIONS FOR A.E.R.E.A. PROPOSED STEEL WHEEL DESIGNS

Number of Wheels	Diameter D Inches	Flange Height a Inches	Flange Thickness b Inches	Throat Radius c Inches	Rim Width e Inches	Rim Thickness d Inches	Hub Diameter t Inches	Hub Length n Inches	Hub Projection Track Gage 4 ft. 8½ in.	Hub Projection Track Gage 5 ft. 2½ in.
Table No 1.—Flange Thickness 1 In., Tread and Flange Contour D 2½										
1	21	¾	1	½	3½	2	7	4½ or 5	3½	4½
2	22	¾	1	½	3½	2	7½	4½ or 5	3½	4½
3	24	¾	1	½	3½	2	7½	4½ or 5	3½	4½
4	26	¾	1	½	3½	2	8¼	4½ or 5	3½	4½
5	28	¾	1	½	3½	2	8¼	4½ or 5	3½	4½
6	31	¾	1	½	3½	2	8¼	4½ or 5	3½	4½
7	33	¾	1	½	3½	2½	8¼	4½ or 5	3½	4½
8	34	¾	1	½	3½	2½	8¼	4½ or 5	3½	4½
Note: Minimum rough bore 3¾ in.										
Table No. 2.—Flange Thickness 1 In., Tread and Flange Contour C 2½										
1	21	¾	1	½	3½	2	7	4½ or 5	3½	4½
2	22	¾	1	½	3½	2	7½	4½ or 5	3½	4½
3	24	¾	1	½	3½	2	7½	4½ or 5	3½	4½
4	26	¾	1	½	3½	2	8¼	4½ or 5	3½	4½
5	28	¾	1	½	3½	2	8¼	4½ or 5	3½	4½
6	31	¾	1	½	3½	2	8¼	4½ or 5	3½	4½
7	33	¾	1	½	3½	2½	8¼	4½ or 5	3½	4½
8	34	¾	1	½	3½	2½	8¼	4½ or 5	3½	4½
Note: Minimum rough bore 3¾ in.										
Table No. 3.—Flange Thickness 1 In., Tread and Flange Contour D 3										
1	24	¾	1	½	4	2	7½	4½ or 5	3½	4½
2	26	¾	1	½	4	2	8¼	4½ or 5	3½	4½
3	28	¾	1	½	4	2	8¼	4½ or 5	3½	4½
4	31	¾	1	½	4	2	8¼	4½ or 5	3½	4½
5	33	¾	1	½	4	2½	8¼	4½ or 5	3½	4½
6	34	¾	1	½	4	2½	8¼	4½ or 5	3½	4½
Note: Minimum rough bore 3¾ in.										
Table No. 4.—Flange Thickness 1 In., Tread and Flange Contour C 3										
1	24	¾	1	½	4	2	7½	4½ or 5	3½	4½
2	26	¾	1	½	4	2	8¼	4½ or 5	3½	4½
3	28	¾	1	½	4	2	8¼	4½ or 5	3½	4½
4	31	¾	1	½	4	2	8¼	4½ or 5	3½	4½
5	33	¾	1	½	4	2½	8¼	4½ or 5	3½	4½
6	34	¾	1	½	4	2½	8¼	4½ or 5	3½	4½
Note: Minimum rough bore 3¾ in.										
Table No. 5.—Flange Thickness 1⅛ In., Tread and Flange Contour B 2½										
1	26	¾	1⅛	½	3⅛	2	8¼	5	2 11/16 or 1 11/16	
2	28	¾	1⅛	½	3⅛	2½	8¼	5		
3	31	¾	1⅛	½	3⅛	2½	8¼	6		
4	33	¾	1⅛	½	3⅛	2½	9¼	6		
5	34	¾	1⅛	½	3⅛	2½	9¼	6		
6	36	¾	1⅛	½	3⅛	2½	9¼	6		
Note: Minimum rough bore 3¾ in.										
Table No 6.—Flange Thickness 1⅛ In., Tread and Flange Contour B 3										
1	26	¾	1⅛	½	4⅛	2	8¼	5	2 11/16 or 1 11/16	
2	28	¾	1⅛	½	4⅛	2½	8¼	5		
3	31	¾	1⅛	½	4⅛	2½	8¼	6		
4	33	¾	1⅛	½	4⅛	2½	9¼	6		
5	34	¾	1⅛	½	4⅛	2½	9¼	6		
6	36	¾	1⅛	½	4⅛	2½	9¼	6		
Note: Minimum bore 3¾ in.										
Table No. 7.—Flange Thickness 1 3/16 In., Tread and Flange Contour A 3										
1	33	¾	1 3/16	½	4 3/16	2½	9¼	6	2 11/16 or 1 11/16	
2	34	¾	1 3/16	½	4 3/16	2½	9¼	6		
3	36	¾	1 3/16	½	4 3/16	2½	9¼	6		
Note: Minimum rough bore 3¾ in.										
Table No. 8.—Flange Thickness 1 3/16 In., Tread and Flange Contour A 3½										
1	34	¾	1 3/16	½	4 11/16	2½	9¼	6	2 11/16 or 1 11/16	
2	36	¾	1 3/16	½	4 11/16	2½	9¼	6		
Note: Minimum rough bore 3¾ in.										



Tread and Flange Contours Proposed for Steel and Chilled-Iron Wheels

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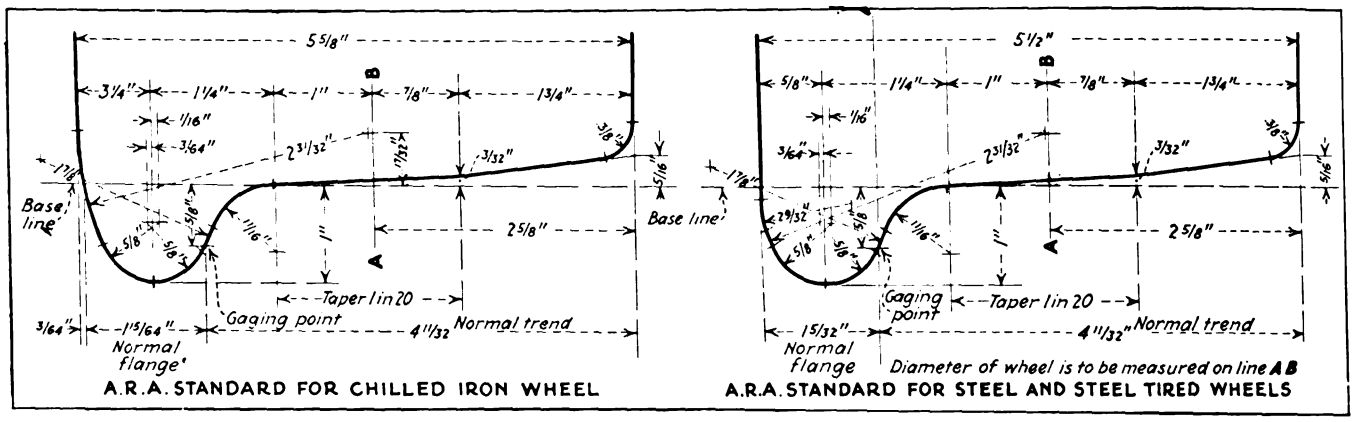

A.R.A. Standard Wheel Contours

below the level of the tread. On steel wheels the back of the wheels follows a straight vertical line above the tread level. On chilled-iron wheels the curve of the flange contour is continued above the tread level to produce a gradual thickening of the metal.

The recommendations of the committee were that the wheel contours submitted be adopted as standard and that wheel contours shown in the Engineering Manual under Et. 4a be superseded and withdrawn. Also that the table of dimensions for steel wheels submitted by the committee be adopted as standard to supersede the present standard dimensions as shown in the Engineering Manual Section Et. 7b, this table being a revision of the dimensions to suit the new proposed wheel contours.

In addition to the Manual sections referred to, the proposed standards effect section Et. 18a, wheel mounting and check gages adopted in 1919; Em 3a, limit of wear for association flange contours adopted in 1916; Ws 2a, rules for determining gage of track on curves adopted in 1911. The committee recommended that these sections be referred to committees of the association for revision next year.

The report was signed by C. A. Alden, V. Angerer, George L. Fowler, J. M. Larned, J. H. Lucas, A. D. McWhorter, A. J. Miller, J. F. Miller, J. M. Yount, J. H. Hanna, vice-chairman, and H. H. Adams, chairman. H. Fort Flowers, a member of the committee, did not concur in the report.

The committee's recommendations were then approved, but the report was referred to the next equipment committee for revision of the tables which accompany the contours, with instructions that they be expanded to permit any standard contour to be obtained with any standard wheel diameter.

Discussion centered on the necessity for the providing extra metal in chilled wheels above the tread line. Experts in wheel manufacture explained that the extra metal is needed in chilled wheels to strengthen the flange This is not required in the steel wheels and, moreover, they cannot be rolled to provide it. The American Railway Association endeavored to have this extra metal rolled but the attempt had to be abandoned.

Objection to the extra metal was raised on account of the possible wear on girder guard rails, but it was pointed out that in practice no wear is caused by the wheels above the tread line. In fact, the contour of the guard rail provides clearance for this extra metal. The curvature on T-rails serves the same purpose.

The special committee was then discharged with thanks for its excellent work.

W. W. Wysor, United Railways & Electric Company, raised a question as to the desirability of using narrow treads, and Mr. Adams explained that the committee recommends the use of wide treads wherever possible.

H. Fort Flowers, Differential Car Company, explained his reasons for putting in a minority report on this subject. He said that undoubtedly the committee had recommended wheel contours that were in accord with the wishes of the way committee of two years ago. Since then, however, new rail contours have been adopted in several cities, emphasizing the advantages of a compound fillet. New wheels and rails should fit.

It has been claimed that a wheel contour will conform to a rail contour after 600 miles of wear and that, therefore, the compound fillet is unnecessary. This conclusion leaves out of account the fact that in this rolling process metal is taken from the flange, and the life of the wheel may be decreased by as much as 3,000 miles. Mr. Flowers favored the continuation of the special committee so that this matter could have further consideration.

R. C. Cram, Brooklyn-Manhattan Transit Corporation, on behalf of the committee on revision of the Manual, asked that the equipment committee be instructed to revise the contour tables promptly, and it was understood that this will be done before the Manual is reissued.

Mr. Cram brought up the question of the advisability of adopting a new standard grooved girder guard rail for curves. He stated that now about 75 per cent of the rail production is of association standard rails. The matter was also discussed by C. H. Clark, H. Fort Flowers and C. A. Alden.

Tuesday's Sessions A.E.R.E.A.

The second session of the Engineering Association convened promptly at the appointed time Tuesday afternoon with president L. C. Datz in the chair. The report of the equipment committee for subjects Nos. 1, 2, 4 and 5 was presented by the chairman, F. H. Miller. The report on subject No. 3, which included a review of existing standards with recommended changes, was presented by C. W. Squier.

Equipment

This year's equipment committee reported on five subjects. The first of these was a study of gearing. Information in regard to helical gears was obtained from twenty-six replies to a questionnaire. This is the third year that information has been obtained in this manner, and since three years is just about the average life of a modern heat-treated pinion, information in regard to actual life could be arrived at only by estimation.

There is a marked difference of opinion, as reported, on the relative flange wear when spur or helical gearing is used; companies representing 47.5 per cent of the sets reported say that the flange wear is not greater with helical gearing than with spur gearing; 21.9 per cent say the wear is about the same, and 12.3 per cent say the difference is not noticeable.

With respect to the helical gearing running quieter than spur, companies representing 81.9 per cent of the sets reported say "yes" when new; 64.2 per cent of the sets reported say "yes" when half worn out, and 37.4 per cent of the sets reported have insufficient data to answer as to this when the gears are completely worn out.

Regarding the long and short addendum tooth, as applied to both the helical and the spur type of gearing, the leading manufacturers are agreed that it is an improved design. It is, of course, highly desirable that a standard form of tooth be adopted by all gear manufacturers. It was brought out that for long and short addendum gearing a

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limit-of-wear gage for gears and pinions would be desirable and would be a great aid to shopmen in determining just when to remove a gear or pinion without sacrifice of mileage or danger of the gearing failing while in service.

A careful study of web holes in gear blanks was made and the report included a table of the size and locotion of web holes in railway motor gear blanks as at present furnished by manufacturers. This should enable users to familiarize themselves with the present size and location of web holes, and the equipment committee recommended that this subject be studied by next year's committee with an idea of reducing the number of these.

The second subject reported on was various devices for trolley contact and their effect upon trolley wire. Information in regard to this subject was also obtained by means of a questionnaire, from which the following conclusions have been reached:

1. That trolley wheels of manufacturers' standard compositions give mileage equal to those using special composition.
2. That solid wheels are preferable to built-up type.
3. That standard "U" or "V" groove is most satisfactory under normal operating conditions.
4. That wheels lubricated with grease in hollow pin give greater mileage than wheels lubricated otherwise.

The number of companies using or testing the sliding contact indicates a growing demand for a better device than the trolley wheel, particularly for high-speed service.

Subject No. 3 was a review of existing standards and recommendations for changes. Specification Eb 4b, recommended specification for air brake hose, was changed in a few minor details to bring this into conformity with a similar specification of the American Railway Association. Specification Ec 1c, standard dimensions for height of bumpers and platforms, was withdrawn and the specification recommended by the 1922 committee of equipment was substituted. Through a misunderstanding in the last printing, both the old and the recommendations of the 1922 committee were included.

Et 3c, design of axles for electric railway motors, was corrected in line with previous recommendations. An enlarged diameter for the standard E-2 axle, which was previously omitted, was added. E-12 axle was renumbered as E-1a, so that the order of drawings would be in the same sequence as that contained in the table of dimensions. The diameter for the gear hub and motor bearing flange of E-7 axle was changed from 8 in. to 9 in. and that for the E-9 axle from 9½ in. to 10 in., in order to bring these into conformity with the stepping used for other axles. A paragraph stating tolerances, which was recommended by the 1922 committee, was added to each drawing.

Standard specification Et 9b for quenched and tempered carbon steel axles, shafts and similar forgings, and Et 11b, specification for annealed carbon steel axles, shafts and similar forgings, were changed in a few instances in order to bring these into conformity with similar specifications of the American Society for Testing Materials. Specifications for gears and pinions numbered Et 14b, Et 15b, Et 16b and Et 17b had the diameter and spacing for web holes withdrawn until definite recommendations regarding these could be recommended.

A careful review of the existing miscellaneous methods and practices referring to equipment was made, and the committee recommended that these be eliminated from the manual proper and that this subject be referred to succeeding committees for revision and republication in a separate pamphlet.

Spring Supports for Railway Motors Studied

Subject No. 4 included a study of spring supports for railway motors. Improved forms of spring supports were suggested and information given in regard to pressure and suspension which should be of particular use in design of future suspensions.

It was determined that it was desirable to have different types of spring supports for different sizes and weights of motors, but that it might be possible to eliminate some of the supporting methods now used, the motors were grouped into three classes, as follows:

(a) Motors up to 35 hp. for use on single-truck and lightweight double-truck cars, suspended by means of single spring suspension on the motor nose.

(b) Motors above 35 hp. and up to 75 hp. for double-truck service, equipped with suspension bar and double spring supports.

(c) Motors 75 hp. and over, for interurban and rapid transit service, having a rigid nose suspension.

Three types of improved motor suspension are submitted as examples of what might be done to improve conditions. The important matter of allowing for lateral material has been provided for, without distorting the springs. These suggested designs or modifications of them will no doubt cost slightly more than the present types of motor suspension, but should pay for themselves in reduced maintenance cost in a short while.

The committee thought that more accurate data as to the amount of permissible motion desirable and the downward and upward pressures obtained in service with different sized motors, due both to ordinary service and shocks, was desirable, and it recommended that this subject be continued by next year's committee.

Subject No. 5 included a study of standard dust guard designs as used by the American Railway Association. Designs were submitted for dust guards for five different sizes of journals, which the committee recommended for adoption as A.E.R.E.A. standards.

The report was signed by Walter S. Adams, Lewis J. Davis, Charles Gordon, J. L. Gould, Stuart Hazelwood, J. M. Hipple, A. J. Miller, M. O'Brien, E. D. Priest, E. S. Sawtelle, C. W. Squier, W. G. Stuck, A. Taurman, Daniel Durie, sponsor, Pierre V. C. See, vice-chairman, and F. H. Miller, chairman.

Recommendations of the standards committee were presented after each subject was ready for consideration. There was considerable discussion in regard to referring certain subjects as recommended by the standards committee back to the equipment committee in view of the urgent necessity of printing these in the Manual.

J. M. Hipple, Westinghouse Electric & Manufacturing Company, said that the allowance for bore of gears as recommended by the equipment committee would be a great convenience to both gear and truck manufacturers, and he felt that these should be approved. H. A. Johnson, Metropolitan West Side Elevated Railway, Chicago, in explaining the reason for the action taken by the standards committee, said that while undoubtedly the recommendations of the equipment committee would prove a great convenience to both truck and gear manufacturers, the standards committee felt that if tolerances for the bore of gears were approved, it would prevent the operating companies from specifying the pressure at which gears should be pressed on axles, which is desirable.

The report of the equipment committee was approved with the exception of parts recommended by the standards committee as being referred back for revision.

Co-operation Through Organization

A. D. McWhorter, Memphis Street Railway, then read a paper on "Organization and Accomplishments of Association of Electric Railway Men in Mechanical Departments of Southern Properties." It is abstracted elsewhere. The discussion brought out the fact that such co-operative work as was described has a stimulating effect on the men in the mechanical departments and is highly commendable. There was no adverse criticism of the plan.

President Emmons then came into the meeting to say a good word for the manufacturers and their exhibits. He urged the engineers to make the most of the opportunity afforded by the presence of so much equipment on the pier. Referring to the bus exhibits, he warned the engineers, in a humorous way, that they may have to revise their methods. They may have garages as well as shops to look after. What they must give is the transportation that the people want. The change to the bus is no more radical than occurred when horse railways were electrified.

N. E. Drexler, chairman of the committee on buildings and structures, presented the committee's report in abstract, taking up the four sections of the report in turn. Before taking action on the recommendations H. A. Johnson presented the recommendations of the

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standards committee on those of the buildings and structures committee. The recommendation of the committee that a portion of the report entitled prepayment and postpayment inclosures be published in the Manual as miscellaneous methods and practices was disapproved. However, the standards committee approved the recommendation that the drawings of culverts, trestles and bridges, together with fundamental data, be adopted as miscellaneous methods and practices and also approved the recommendation that various sections of the Manual referred to in the report of the committee on buildings and structures be revised to conform to standards of various national associations. The recommendations of the standards committee relative to those of the buildings and structures committee were approved. Favorable action was likewise taken on the original report of the committee on buildings and structures.

Buildings and Structures

The report of the committee is divided into four general subjects: (1) Review and bring up to date the study of electric railway terminals for both city and interurban service under the following classifications: Passenger, freight, combination, and prepayment and postpayment inclosures; (2) review and bring up to date the study of waiting stations (other than terminals) of moderate cost for interurban lines; (3) continue the study and report on the design of small bridges, culverts and trestles, with a view to presenting information for good current practice; (4) review of existing standards.

Electric Railway Terminals for City and Interurban Service—The committee considers this subject of such importance that it is submitting only general data in the form of a progress report. Among the general features which should be given careful consideration are convenience of handling passengers to and from cars or trains, attractiveness of architectural design, ample and convenient track arrangement, comfort of passengers and economical arrangement of space. In the interior arrangement consideration should be given to harmony, ventilation, sanitation and utility. The general trend today is to foster a spirit of public relations by furnishing comfortable, attractive terminals. It is recommended that the study of the subject be continued by the same committee next year.

Accompanying the report are plans of the Kenosha station of the Chicago, North Shore & Milwaukee Railroad, the interurban terminal building of the Dallas Railway, the interurban central station of the Kansas City Railway & Light Company and three plans of the Newark terminal of the Public Service Railway. The latter three have been described in issues of ELECTRIC RAILWAY JOURNAL.

In connection with the design of freight terminals, it was thought that a thorough study should be made to determine the proper location for the terminal with respect to the distribution of freight and accessibility for trucking. Provision should be made, either in the building or a possible extension thereto, to take care of future growth. The yard layout and general arrangement of track should be such as to permit of expeditiously handling cars to and from the freight house.

The building should be designed to be attractive in appearance and in keeping with other improvements on the property. It should also harmonize with surrounding improvements. The width of the freight building should not be too great, as this tends to increase the amount of handling and hand trucking. From the best information obtainable, it appears that a freight building with a platform on each side facilitates the handling of freight and is most generally recommended for this purpose. A long and rather narrow building is preferred. The recommendation of the committee is that the study of this subject also should be continued.

In a general way the remarks made in regard to passenger terminals and freight terminals apply also to combination terminals. This subject also is to be continued.

Considerable space is devoted to prepayment and postpayment inclosures. These are taken up under six headings: Change booth with automatic registering passimeter, fare booth with the registering passimeter released by the agent, change booth with registering coin box, ticket booth with cancellation box, automatic high registering turnstile, and the cashier system. These various types are discussed at length and many of them are illustrated. The committee recommends that the study of this subject be discontinued for at least a year, in order that existing types may have opportunity for further development.

Waiting Stations at Moderate Cost for Interurban Lines—The committee decided that these should be classified in three groups, open shelters, closed shelters and combination shelters.

The committee concludes that attractive waiting stations and resting places for patrons add greatly to the appearance of a property and that they do much to create public good will. They may be worth all they cost in money as well as worry. The recommendation is made that the study of this subject be discontinued.

Design of Small Bridges, Culverts and Trestles—The report of the committee goes deeply into this question, discussing pipe culverts, concrete box culverts, reinforced concrete culverts, concrete arch culverts, I-beam spans on concrete abutments, frame and pile trestles, etc. Many informative diagrams are included in the report. The discussion of the live load, dead load and impact is gone into thoroughly. The committee recommends that the typical drawings of culverts, trestles and bridges, together with the fundamental data covering their design contained in the report, be adopted as miscellaneous methods and practices, but the further study of the subject be discontinued.

Revision of Existing Standards and Recommendations—Most of this section of the report of the committee is devoted to a presentation of fire protection rules, instruction for the care and maintenance of automatic sprinkler systems, and the underwriters' rules relating to cars and carhouse wiring.

The report was signed by B. R. Brown, Charles W. Burke, J. D. Kent, James Link, L. L. Newman, J. M. Penick, S. J. Steiner, D. A. Scanlon, C. H. Clark, sponsor; John R. McKay, vice-chairman, and N. E. Drexler, chairman.

A very interesting report of the committee on wood preservation was presented by H. H. George, which was approved after the recommendations of the standards committee relative to the wood preservation committee report had been approved. The standards committee approved of the proposal of the wood preservation committee that the specification for brush treatment of wooden poles be adopted and also approved of the recommendation of the wood preservation committee that certain revisions be made in Manual section Wm 8b.

Wood Preservation

The special committee had no definite assignment, but the chairman divided its work into six subjects, covering specifications for various methods of treatment, the perforation process and a review of existing specifications. A voluminous report was presented, of which the following is a brief abstract:

Specifications for Open-Tank Treatment of Wood Poles—The committee's report includes photographs of the equipment used by several commercial open-tank pole-treating companies. The time available did not permit giving proper consideration to the subject of open-tank treating plants for the smaller pole-using companies. The committee, as a result of its studies, did not feel justified in recommending for adoption as a recommended specification and specification for open-tank pole treatment, but did include, for information only, specifications which are considered as standard in the industry for the open-tank treatment of Western red cedar and Eastern white cedar. They also included as information only specifications of the Western Cedar Pole Association for open-tank treatment of poles by the guaranteed penetration process. It is recommended that the ensuing committee be instructed to report on the question of open-tank pole-treating plants for small operating companies.

Specifications for Brush Treatment of Wood Poles—The committee submits for adoption as a recommended specification a specification for brush treatment of wood poles which covers the cases of treatment of poles subsequent as well as prior to installation. It also considered the advisability of per-

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mitting the use of a grade of creosote oil suitable for brush application as an alternative to carbolineum or oils of a similar type, and although confirming the opinion of the previous committee that the latter was the most suitable oil for brush work, it was recognized that carbolineum was not always obtainable at a reasonable cost and that the use of the next best oil would be better than not to use any preservative whatever. The committee therefore recommended that the ensuing committee be instructed to report on the desirability of preparing a specification for a suitable grade of creosote oil for brush work.

Specifications for Pressure Treatment of Wood Poles—The committee found that while general practice followed certain uniform methods, still there was considerable lack of accord on a number of details of the various pressure treating processes for wood poles and it therefore did not feel justified in taking the initiative in this field by suggesting definite specifications for adoption as recommended specifications. Drawing from its own experience, as well as data obtained from various commercial pole-treating companies and other existing specifications, the committee prepared, and submitted for information only, five specifications for pressure treatment of both green and seasoned poles, and recommended that further study of the subject be continued by next year's committee.

Specifications for Pressure Treatment of Cross-Arms—The committee, after careful consideration of this subject, felt that since a cross-arm could properly be classed as a dimensioned timber, the treatment of this material was already satisfactorily covered by the existing specifications of the association Wm 8b, and that no special specification was necessary. It therefore recommend that further consideration of this subject be discontinued.

Perforation Process for Timber Treatment—The committee incorporates in its report data bringing up to date the information as to developments in this method of treating timber and includes several photographs of machines now being used commercially in this country for this process. The committee felt that this method of treatment of timber had not become sufficiently standardized to justify making definite recommendations, except that further study of the subject be continued by the ensuing committee.

Review of Existing Specifications—The committee has carefully gone over the existing specifications of the association and has kept in close touch with the action of other technical organizations interested in the subject of wood preservation. As a result, it recommended the elimination of the clause covering specific gravity requirements from the existing recommended specifications Wm 8b for Grades 1, 2 and 3 creosote oil, creosote-coal-tar mixture, preservatives for paving block coal-tar oil, and preservatives for paving block distillate oil, and also the addition of a suitable footnote to each of these specifications to cover the question of specific gravity and the elimination of certain existing footnotes in order to make the specifications consistent with the changes now suggested. The committee also recommends certain renumbering of paragraphs in the specifications for the different grades of preservative oils.

Recommendation is also made to revise the specification for "float test" in the present recommended specifications for methods of sampling and analysis of creosote oil, as well as the complete revision of the section covering coke test in the same specification.

The committee also concurs in the recommendation that the ensuing committee be directed to consider a specification for a suitable grade of creosote oil for brush or open tank treatments as an alternative to carbolineum for use where the latter is not available.

Several papers were included as appendices, including "The Decay of Poles and the Fungi Which Cause It," prepared by C. J. Humphrey, pathologist Bureau of Plant Industry, U. S. Department of Agriculture, Madison, Wis.; "Attack on Chestnut Pole by Carpenter Ants," by Chairman Howard H. George of the committee; "Preservative Oil for Wood Floors," also by Mr. George. Through the courtesy of Earl Stimson, chief engineer of maintenance of the Baltimore & Ohio Railroad, the results of the 1923 inspection of the experimental installation of treated ties at Herring Run, Md., were published as an appendix, and through the courtesy of J. H. Waterman, superintendent of timber preservation of the Chicago, Burlington & Quincy Railroad, the results of the 1923 inspections of the experimental installations of treated ties at various points on his system also included.

The report was signed by M. J. Curtin, W. H. Fulweiler, E. F. Hartman, E. L. Morier, C. A. Smith, E. A. Hoffman, R. V. Achatz, advisory associate; R. C. Cram, sponsor; A. P. Way, vice-chairman, and H. H. George, chairman.

A written discussion on the subject prepared by Roger F. Hosford, read in Mr. Hosford's absence by Warren M. Craft, follows:

"I have been asked to discuss this report, particularly with respect to the parts dealing with brush and open-tank treatment. This report has been very carefully prepared and the committee is fully entitled to the greatest reward which you can give, which is to make use of its recommendations in your own individual practice. I feel that the two principal reasons for the failure of some brush-treating enterprises that have been based upon this experimental work of the forest service are: first, the use of insufficient quantities of preservatives, and, second, the application of the treatment to poles which had not been sufficiently prepared by seasoning to receive it. Green and partially seasoned poles will not permit of proper penetration by the preservative and also tend to open up the thinly treated layer obtained soon after they are set, since they are in no way stabilized with respect to the occurrence of checking. In the application of the brush treatment, another feature to be kept in mind is that of taking care to give the workman proper tools. For example, it is not easy to apply fluid with a brush at the level of the shoulder and avoid having some of the hot fluid reach the hand and the lower arm. A long-handled brush with a gooseneck attachment should be provided for the application of this preservative. With respect to the open-tank treatment section of the report, I have this year had occasion to work on the treatment of green chestnut, and when the time of treatment is made sufficiently long, results with respect to penetration and quantity of creosote absorbed can be obtained which are substantially equivalent to those obtained with poles which have undergone a considerable period of seasoning. The open-tank treatment does not remove all of the water from the outer layers of the butt. The successful treatment of grain poles does not imply that they can be successfully used everywhere. Climatic conditions have a vital effect upon the life of poles. The last point to which I wish to refer is the matter of "perforating" or "puncturing," the preparation for receiving open-tank treatment. This process in the past two years has become commercially available for assisting in the treatment of cedar poles. Through its assistance cedar in a particularly seasoned state, which will not take any appreciable quantity of creosote or show any appreciable depth of penetration unless it is held in an open tank for many hours in hot creosote, has been found to yield satisfactory results when held in hot preservative only the customary number of hours."

R. H. Dalgleish presented a report of the special committee on air reservoir specifications.

Specifications for Air Tanks

Several meetings of this committee were held during the year and a preliminary specification prepared. This was submitted to the equipment committee for criticism and recommendations. The committee has been in touch with the boiler code committee of the American Society of Mechanical Engineers, but has not submitted a specification to it, and feels that the specification should have the approval of the equipment committee before submitting it to the A.S.M.E. While the specification has some points on which this committee and the equipment committee do not agree, they are matters that we believe can be easily adjusted.

This committee is not prepared at this time to recommend the specification for the approval of this association, but recommends that the subject be carried over and assigned to a committee next year for completion.

The report was signed by L. J. Davis, J. A. Leeper and R. H. Dalgleish, chairman.

It was a progress report and in-

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dicated that several meetings had been held, during which a number of specifications for unheated pressure vessels had been considered. However, the committee is not ready at this time to submit a specification, recommending that the subject be continued throughout next year. It was brought out in the discussion that followed that the Bureau of Standards had made numerous tests on the various types of pressure vessels and that it would be well for the committee on this subject next year to investigate these tests. A sub-committee of the A. S. M. E. has the same matter under consideration and has been very friendly in co-operating with the association committee on this subject. The boiler code committee has assured this committee that no action will be taken without consulting it.

Wednesday's Session A.E.R.E.A.

The meeting of the Engineering Association on Wednesday afternoon was called to order by H. A. Johnson, vice-president of the association, and was turned over to W. G. Nicholson, president of the Accountants' Association, who presided during the submission of the report of the joint committee on engineering-accounting. In his opening remarks Mr. Nicholson expressed great satisfaction with joint meetings of this kind, which he said tend to foster co-operation between engineers and accountants and to encourage that harmony which is essential on each individual property.

The report of the joint committee was read by J. E. Heberle, assistant secretary Capital Traction Company, Washington, D. C., and follows:

Joint Committee on Engineering Accounting

This year the committee devoted its effort mainly to a consideration of the existing Interstate Commerce Commission classification of accounts for electric railways with the view of recommending certain fixed sub-divisions which will provide not only a better record system but will facilitate obtaining helpful cost analyses, and presented for consideration such a proposed treatment of the way and structures group of accounts. The committee recommended that its work be continued during the coming year. The number of sub divisional accounts recommended is shown by the statement in the list below.

The report is signed by the joint commitee: A. W. Grady, J. E. Heberle, Herbert Jackson, Charles H. Lahr, Edwin D. Dreyfus, Charles Rufus Harte, sponsor; Leon R. Brown, co-chairman, and George F. Dinneen, co-chairman.

Road and Equipment Accounts

Way and structures:

Engineering and superintendence (five sub-accounts).
Right-of-way (three sub-accounts).
Other land used in electric railway operations (no sub-accounts).
Grading (five sub-accounts).
Ballast (six sub-accounts).
Ties (two sub-accounts).
Rails, rail fastenings and joints (five sub-accounts).
Special work (four sub-accounts).
Underground construction (nine sub-accounts).
Track and roadway labor (ten sub-accounts).
Paving (ten sub-accounts).
Roadway machinery and tools (no sub-accounts).
Tunnels and subways (no sub-accounts).
Elevated structures and foundations (two sub-accounts).
Bridges, trestles and culverts (eight sub-accounts).
Crossings, fences and signs (four sub-accounts).
Signals and interlocking apparatus (three sub-accounts).
Telephone and telegraph lines (four sub-accounts).
Poles and fixtures (seven sub-accounts).
Underground conduits (four sub-accounts).
Distribution system (seven sub-accounts).
General office buildings (sixteen sub-accounts).
Shops and carhouses (sixteen sub-accounts).
Stations and miscellaneous buildings (sixteen sub-accounts).
Wharves and docks (no sub-accounts).
Park and resort property (three sub-accounts).
Cost of road purchased (no sub-accounts).
Reconstruction of road purchased (no sub-accounts).
Other expenditures, way and structures (no sub-accounts).

Operating Expense Accounts

Way and structures:

Superintendence of way and structures (thirteen sub-accounts, of which seven are for track and roadway and structures and six are for electric line).
Ballast (eight sub-accounts).
Ties (three sub-accounts).
Rails (three sub-accounts).
Rail fastenings and joints (five sub-accounts).
Special work (four sub-accounts).
Underground construction (eight sub-accounts).
Track and roadway labor (forty-two sub-accounts).
Miscellaneous track and roadway expenses (two sub-accounts).
Paving (nine sub-accounts).
Cleaning and sanding track (eight sub-accounts).
Removal of snow and ice (eight sub-accounts).
Tunnels and subways (five sub-accounts).
Elevated structures and foundations (seven sub-accounts).
Bridges, trestles and culverts (nine sub-accounts).
Crossings, fences and signs (four sub-accounts).
Signal and interlocking apparatus (five sub-accounts).
Telephone and telegraph lines (six sub-accounts).
Miscellaneous way expenses (no sub-accounts).
Poles and fixtures (twelve sub-accounts).
Underground conduits (three sub-accounts)
Distribution system (twenty-seven sub-accounts).
Miscellaneous electric line expenses (no sub-accounts).
Buildings, fixtures and grounds (twenty sub-accounts).
Depreciation of way and structures (twenty-five sub-accounts).
Other operations—Dr.
Other operations—Cr.
Equalization—way and structures.

In presenting this report Mr. Heberle indicated that the report was submitted as tentative for the purpose of inviting discussion of this important subject. Mr. Nicholson stated that accurate costs are of particular importance today due to the conditions which exist in the railway industry. M. W. Glover, general auditor West Penn Railways, stressed the advantages to be obtained from co-operation between engineers and accountants. He felt that the duty of handling all general accounts should be entirely in charge of the accountant, but subdivisions for obtaining cost data should be compiled in co-operation with the engineering department. He further expressed the fear that the committee report shows such minute subdivision as to make the accuracy of charges suffer due to the difficulty of training foremen to charge work to the proper accounts.

This same question was raised by C. H. Jones, electrical engineer, Chicago Elevated Railways, who maintained that subdivision of accounts should not be carried to the point where the foreman is required to spend a large amount of his time on clerical duties. T. B. MacRae, general auditor Chicago Elevated Railroads, illustrated the difference in the viewpoints of the accountant and the engineer by pointing out that the accountant thinks in figures, whereas the engineer desires a complete picture of a given situation. In order to maintain the desired contact between the two departments, this property has an engineering auditor who is in a position to compile cost information in the way which is most desirable for the purposes of the engineering department. Mr. MacRae questioned the use of the word "depreciation" in the committee's report and preferred the term "reserve" to indicate more accurately the function of this group of accounts.

The ruling of the United States Supreme Court which fixes the value of a property at the time the rates are made as the proper basis for rate making was given by C. R. Harte, construction engineer the Connecticut Company, as a primary reason in favor of accurately subdivided cost accounts. He stated that a knowledge of past costs is essential to the compilation of existing values for rate-making purposes. This value, he stated, can be set up only when cost figures of the property are also available in terms of man-hours and materials. In carrying out the work of cost keeping he felt that the engineer should co-operate in preparing the schedule of subdivisions and that the accountant should keep the records. Mr. Harte expressed satisfaction with the report of the committee as an initial step in the study of this problem and as a basis for further discussion and work.

Further discussion by H. H. George, engineer maintenance of way Public Service Railway; Herbert Jackson, supervisor underground lines Washington Railway & Electric Company, and Mr. Nicholson brought out the difficulty of properly making charges when accounts are too much subdivided, but emphasized the importance of carrying this subdivision as far as practicable. W. B. Yereance, consulting engineer, South Orange, N. J., commented on the report of the committee and pointed out that it fulfills the proper function of such a paper in that it outlines the general principles involved in the problems considered. The compilation of

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detailed accounts, he felt, was a matter largely governed by the local conditions existing on the individual properties. He agreed that the services of an engineer in the auditing department provides for the necessary co-operation between the two departments on a large property and advocated frequent council meetings as a means of obtaining similar co-operation on smaller properties. He stated that detailed cost figures on specific jobs should be furnished by the auditor, but that such reports should be prepared only as long as the information is of value and then should be discontinued.

Mr. Harte, Mr. Spencer, Mr. Nicholson and Mr. Heberle concluded the discussion by taking up the question of charges for new construction and the division of charges between capital and maintenance accounts. It was the general opinion that the engineering department should co-operate in this work by indicating as far as possible the proper classification for work performed and that there should be a mutual responsibility. The report was accepted by the association and it was agreed that the work of this committee should be continued.

The report of the committee on way matters was abstracted by W. F. Graves, chairman.

Way Matters

Seven subjects are discussed in the report including one outstanding subject, viz., the review of existing standards. Conclusions and recommendations are submitted on all of the subjects assigned.

Standardization of Frogs—This subject has been considered by the committee on way matters since 1910 and revisions made from time to time, as the study of the subject developed. It is felt that the required number of frogs can be considerably reduced, probably by a process of elimination, that the subject warrants further study, and that definite recommendations can be made in another year. After carefully considering and reviewing the previous work, this year's committee made recommendations as to several revisions which should be incorporated in the Manual.

Car Clearance Easements—This subject was thoroughly considered and reported on in 1922 and the present committee considers it can go no further in this study from its standpoint. The subject should be discontinued as a way subject, but steps should be taken by the executive committee to appoint way engineers on the committee on unification of car design.

Design of Substitute Ties—A progress report is submitted and the results of an investigation into the records of the United States Patent Office are given. Co-operation with the American Railway Engineering Association has been obtained by the appointment of a way engineer to represent the association on the tie committee of the American Railway Engineering Association, whereby benefit may be had from its extensive and thorough study of this subject. The subject of the design of substitute ties, particularly for use in paved streets, should be continued. A thorough investigation and study should be made of the substitute ties now available, the degree to which they have been used and the results of their use.

Design of Small Bridges, Trestles and Culverts—With a view to presenting information on good current practice, this subject was considered jointly with the committee on buildings and structures. The conclusions reached are stated in the report of the latter committee. It is the opinion that the subject cannot receive from two large committees the careful attention that it merits, and that it could be more satisfactorily handled by one committee. The subject of bridge, culvert and trestle design is one primarily concerning way engineers, these structures being generally designed and constructed by them. It is therefore recommended that the study of this subject be continued and that it be assigned to the ensuing committee on way matters. It is recommended that its further study by the committee on buildings and structures be discontinued.

Design of Track Construction for Paved Streets—A specification is submitted which is recommended for adoption. A similar recommendation is to be made by a concurrent committee of the American Society for Municipal Improvements, with which this committee co-operated. These specifications are very complete, covering the subjects of excavation, top soil and surface drainage, types of foundation, rails, rail joints, bonds, rail fastenings, ties, pavement base, rail filler and pavement. It is recommended that the further study of this subject be discontinued.

Welded Rail Joints—The welded rail joint committee of the American Bureau of Welding having been organized to pursue the scientific investigation of this subject in 1922, the subject was not assigned to the 1923 committee on way matters except to co-operate with the welded rail joint committee.

The most important work, that of securing funds for financing the work, was done after the report was prepared. The sum of $10,000, appropriated at the convention in Chicago, has been supplemented by contributions from individual railway companies and manufacturers, so that the total fund subscribed up to July 1, 1923, amounted to $23,477.

The first step in the actual testing of joints is the testing at various institutions of sample joints made up by certain railways in accordance with their own standards. The railway companies which will make up these joints have been selected so that samples will be secured representative of the four principal methods of welding, viz., cast-welded joints, thermit joints, seam-welded joints, Lorain bar weld and buttweld. Each company has been instructed to make twelve joints under actual service conditions, shipping six specimens to the Bureau of Standards, Washington, for tensile and repeated impact test, three specimens to Purdue University for cross-bending tests and three specimens to the University of Illinois for drop tests. A number of companies have made and forwarded these sample joints, but at the time the report was written no actual tests had been made.

The Emery machine at the Bureau of Standards will be used for tensile tests. It is not equipped with heads which will take the full rail section, and it has therefore been necessary in the past to plane away a portion of the head and base of the rail in order to insert it in the machine. This has resulted during a number of previous tests made by the bureau, in the breaking of the rail where it was weakened by the planing, thus precluding the completion of the test. In order to overcome this difficulty, the committee has designed and built special grips for the testing machine, which will permit testing the full section without cutting.

One of the most important tests considered by the committee is the repeated impact test. But the committee has been unable to find any form of testing machine entirely suitable for this work. However, considerable research has been done along this line by E. J. McIlraith, Chicago Surface Lines, and an ingenious method of determining the impacts caused by car wheels has been developed.

Special Test Track Developed

Final plans of the rotary machine, designed for testing joints in circular tracks under as nearly service conditions as possible, were adopted and an appropriation was made to cover the estimated cost. In addition to the tension, bending, impact and service tests contemplated, there will be a number of special tests, such as measuring impact by Smith's decelerometer, tests for hardness and abrasion, microscopic examination and chemical analysis of weld metals.

This is one of the most important subjects for way engineers at the present time and warrants a great deal of further study and investigation. This committee recommends that the subject be assigned to the ensuing committee for further report.

Review of Existing Standards—In view of the pending revision of the Engineering Manual, the committee made a thorough review of the way matter specifications. Numerous recommendations for additions, changes and withdrawals from the Manual were made.

The more important ones are that the executive committee appoint a special committee to co-operate with all other committees of the Engineering Association to recommend a specification for "symbols for recording surveys"; that the ensuing committee on way matters be instructed to submit a design and specification covering "standard design and specification for

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TABLE I—ANALYTICAL METHOD—TOTAL POWER SUPPLY AND DISTRIBUTION COST PER KILOWATT, ARRANGED AS TO DISTRICTS OF VARYING LOAD DENSITIES

		L.D. = 160		L.D. = 80		L.D. = 40		L.D. = 20		L.D. = 10		L.D. = 5	
Units	Power Supply Cost	Distribution Cost	Total	Distribution Cost	Total	Distribution Cost	Total	Distribution Cost	Total	Distribution Cost	Total	Distribution Cost	Total
1-1,000	$10.67	$1.05	$11.73	$1.49	$12.16	$2.11	$12.78	$2.98	$13.65	$4.22	$14.89	$5.96	$16.63
1-1,500	9.67	1.26	10.93	1.78	11.45	2.52	12.19	3.56	13.23	5.04	14.71	7.12	16.79
2-1,000	10.47	1.49	11.96	2.10	12.57	2.97	13.44	4.20	14.67	5.94	16.41	8.40	18.83
1-2,000	8.90	1.42	10.32	2.01	10.91	2.84	11.74	4.02	12.92	5.68	14.58	8.03	16.97
1-2,500	8.17	1.56	9.73	2.21	10.38	3.12	11.29	4.42	12.59	6.25	14.42	8.83	17.00
3-1,000	10.38	1.82	12.20	2.58	12.95	3.64	14.02	5.16	15.54	7.30	17.68	10.30	20.68
2-1,500	9.57	1.78	11.35	2.51	12.08	3.58	13.15	5.03	14.60	7.10	16.67	10.05	19.62
1-3,000	7.43	1.67	9.10	2.37	9.80	3.34	10.77	4.73	12.16	6.70	14.13	9.46	16.89
2-2,000	8.73	2.01	10.74	2.84	11.57	4.02	12.75	5.69	14.42	8.05	16.78	11.38	20.11
3-1,500	9.50	2.17	11.67	3.07	12.57	4.34	13.84	6.14	15.64	8.68	18.18	12.30	21.80
2-2,500	8.04	2.21	10.25	3.13	11.17	4.42	12.46	6.25	14.29	8.83	16.87	12.50	20.54
3-2,000	8.69	2.46	11.15	3.48	12.17	4.92	13.61	6.96	15.65	9.85	18.54	13.90	22.59
2-3,000	7.30	2.37	9.67	3.37	10.67	4.73	12.03	6.70	14.00	9.47	16.77	13.40	20.70
3-2,500	7.99	2.70	10.69	3.84	11.83	5.42	13.41	7.65	15.64	10.82	18.81	15.30	23.29
3-3,000	7.26	2.90	10.16	4.12	11.38	5.80	13.06	8.21	15.47	11.60	18.86	16.42	23.68

solid manganese steel electric over steam railroad crossing" and co-operate with the committee on tracks of the American Railway Association.

It was also thought that the sectional committee of the A.E.S.C. having in hand the design of plain girder rails for use in paved streets should broaden its scope to include the design of joint plates suitable for use with those rails, and that the size and number of holes, length of plates, etc., be standardized.

The ensuing committee on way matters should be instructed to submit a specification "rules for determining the gage of track on curves," having in mind the work of the special committee on wheel and rail head contours.

The report was signed by C. A. Alden, V. Angerer, S. Clay Baker, W. R. Dunham, E. B. Entwisle, G. C. Estill, R. B. Fisher, H. Fort Flowers, A. E. Harvey, J. H. Haylow, E. M. T. Ryder, A. T. Spencer, F. Tingley, J. B. Tinnon, W. W. Wysor, C. F. Gailor, secretary; H. H. George, vice-chairman; W. F. Graves, chairman, and R. C. Cram, sponsor.

In the discussion of this report Howard H. George, engineer maintenance of way Public Service Railway of New Jersey, explained the results of several meetings with the American Society for Municipal Improvements in deciding upon the specifications for street railway track construction. The specifications submitted with the report on way matters will be presented to the American Society for Municipal Improvements for action at its 1923 convention.

V. Angerer, vice-president William Wharton, Jr., & Company, Inc., explained the co-operation which the committee on way matters had with the way and track committees of the American Railway Association. W. W. Wysor, chief engineer United Railways & Electric Company, Baltimore, Md., gave an abstract of subject No. 5 of the report on way matters relating to the work of the committee on welded rail joints. He supplemented this by an outline of the work which had been accomplished by the committee on welded rail joints in co-operation with the American Bureau of Welding and gave information as to progress which had been made since the report of the committee on way matters had been printed.

The report of the committee on way matters was approved for all subjects except No. 6, and in this the recommendations of the standards committee were approved. A vote of appreciation was recorded for the excellent co-operation of member companies in making up track joints for tests.

The report of the committee on automatic substations was abstracted by Walter E. Bryan, chairman of the committee.

Automatic Substations

The committee assigments were: (A) To outline a method or methods for studying the economics of the subject, which will serve as a guide for the study of any particular situation. (B) On the basis of the above outline, study and work out a number of specific examples, comparing costs and merits of different power distribution layouts. (C) To determine, if possible, the economic limits to which track drops can be reduced.

In connection with assignment A, the committee also undertook a study of the trolley voltage most advisable for congested districts.

Economies of Substation Location

It has been rather general practice in previous studies to draw up comparisons between plans involving various sizes and grouping of units on what might be termed a practical or "cut-and-try," basis. The present committee felt that more satisfactory comparisons might be obtained by the use of an analytical method, based on an idealistic and uniform arrangement of the distribution feeders. There are situations, however, where such a method would not apply, and recourse must be had to the so-called practical method. The committee, therefore, submitted both methods.

First Method—The particular advantage of the analytical method lies in the fact that the results are based on a uniform system of distribution and the preliminary results, therefore, are more truly comparable than if the distribution feeders were designed at the start on the requirements of the individual lines. After the completion of the analytical study, detailed layouts would have to be made, which, however, would be confined to those substations set-ups which from the analytical study, showed the greatest economy.

The analytical method has its principal field of usefulness where a study is being made of a large urban system, or where the district under consideration has a fairly uniform load density. The results cannot be assumed to be conclusive, but may be materially modified by the supplementary detailed studies. The method readily lends itself, however, to a comparison of sizes and combinations of units extending over a wide range.

The measure of economy is taken as the summation of annual costs per kilowatt delivered at the car. These costs are subdivided under "Power Supply" and "Power Distribution." Values of distribution voltage, load per feeder, etc., are assumed, together with unit costs of construction and operation, as governed by local conditions. The study shown covers substations ranging from 1,000 kw. to 9,000 kw. in capacity, it being felt that stations larger than 9,000 kw. would undoubtedly be manually operated. Commercial sizes of converters from 1,000 kw. to 3,000 kw. are considered.

The committee prepared a set of tables as a part of its study, showing the various steps in the calculation for the range of capacities mentioned. Similar tables would have to be made up for any particular case. These tables include the assumed unit value and cost; annual cost for power supply and annual cost for distribution, based on standard meters.

Table I, reproduced herewith, sums up the cost of power supply and power distribution, arranged as to districts of varying load density. The cost of power supply is independent of load density, while it is evident that the cost of distribution will vary with the load density of the district served, varying inversely as the square root of the density.

Table II is a summation of the investment cost of the power supply and power distribution units. Similar to the distribution costs shown in Table I, distribution investment is inversely proportional to the square root of the load density. Hence, if the load density of any district is known, the approximate first cost of any contemplated arrangement may be obtained.

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TABLE II—ANALYTICAL METHOD—INVESTMENT COSTS PER KILOWATT

	Investment per Substation					Investment in Distribution L.D. = 143				Distribution Investment per Kilowatt Total Investment, per Kilowatt — Variable Density					
Units	Electrical Equipment	Building	Site	Total	Per Kw.	Feeder	Added Electrical Equipment	Total	Per Kw.	L.D. = 160	L.D. = 80	L.D. = 40	L.D. = 20	L.D. = 10	L.D. = 5
1-1,000...	$32,000	$8,000	$5,000	$45,000	$45.00	$2,000	$560	$2,560	$2.56	$2.41	$3.41	$4.82	$6.82	$9.64	$13.64
										47.41	48.41	49.82	1.82	54.64	58.64
										2.93	4.15	5.86	8.30	11.72	16.60
1-1,500...	45,000	10,000	5,000	60,000	40.00	3,000	788	3,788	2.53	42.93	44.15	45.86	48.30	51.72	56.60
										3.42	4.84	6.84	9.68	13.68	19.36
2-1,000...	64,000	14,400	9,000	87,400	43.70	4,000	1,120	5,120	2.56	47.12	48.54	50.54	53.38	57.38	63.06
										3.32	4.70	6.64	9.40	13.28	18.80
1-2,000...	56,000	12,000	9,000	77,000	38.50	4,000	980	4,980	2.49	41.82	43.20	45.14	47.90	51.78	57.30
										3.66	5.18	7.32	10.36	14.64	20.72
1-2,500...	65,000	13,500	10,000	88,500	35.40	5,000	1,135	6,135	2.45	38.06	40.58	42.72	45.76	50.04	56.12
										4.18	5.91	8.36	11.82	16.72	23.64
3-1,000...	96,000	20,800	12,000	128,800	42.20	6,000	1,680	7,680	2.56	47.38	48.11	50.56	54.02	58.92	65.84
										4.13	5.84	8.26	11.68	16.52	23.36
2-1,500...	90,000	18,000	12,000	120,000	40.00	6,000	1,575	7,575	2.53	44.13	45.84	48.26	51.68	56.52	63.36
										3.96	5.60	7.92	11.20	15.84	22.40
1-3,000...	72,000	15,000	12,000	99,000	33.00	6,000	1,260	7,260	2.42	36.96	38.60	40.92	44.20	48.84	55.40
										4.69	6.64	9.38	13.28	18.76	26.56
2-2,000...	112,000	21,600	14,000	147,600	36.90	8,000	1,960	9,960	2.49	41.59	43.54	46.28	50.18	55.66	63.46
										5.04	7.13	10.08	14.26	20.16	28.52
3-1,500...	135,000	26,000	16,000	177,000	39.33	9,000	2,360	11,360	2.52	44.37	46.46	49.41	53.59	59.49	67.85
										5.19	7.34	10.38	14.68	20.76	29.36
2-2,500...	130,000	24,300	16,000	170,300	34.06	10,000	2,280	12,280	2.46	39.25	41.40	44.44	48.74	54.82	63.42
										5.76	8.15	11.52	16.30	23.04	32.60
3-2,000...	168,000	31,200	19,000	218,200	36.37	12,000	2,940	14,940	2.49	42.13	44.52	47.89	52.67	59.41	68.97
										5.59	7.91	11.18	15.82	22.36	31.64
2-3,000...	144,000	27,000	19,000	190,000	31.67	12,000	2,520	14,520	2.42	37.26	39.58	42.85	47.49	54.03	63.31
										6.38	8.95	12.66	17.90	25.32	35.80
3-2,500...	195,000	35,100	22,000	252,100	33.61	15,000	3,410	18,410	2.45	39.94	42.56	46.27	51.51	58.92	69.41
										6.85	9.68	13.70	19.36	27.40	38.72
3-3,000...	216,000	39,000	24,000	279,000	31.00	18,000	3,780	21,780	2.42	37.85	40.68	44.70	50.36	58.40	69.72

Use of First Method—Assuming that a study is to be made of a district serving a demand load of 6,000 kw. from a load density of 160 kw. per 1,000,000 sq.ft., and that Table I is applicable to the case in point, it is evident that there are combinations to be considered, neglecting those combinations requiring the use of more than one kind of unit. These combinations are set forth in Table III.

The first and second plans show the greatest economy, but as only two units are required to feed the total load in either case, continuity of service would be jeopardized if either the first or second plan was adopted. Plan No. 9 involves the use of three-unit stations, and would undoubtedly be eliminated. Plan No. 8 would probably also be eliminated on account of its relatively high cost.

This leaves Plans Nos. 3 to 7, inclusive, for consideration. The maximum difference in annual cost is $1.41 per kilowatt of capacity, making a total for the 6,000 kw. area, of $8,460. Quite a range as to number of stations is provided, the range being from one to six stations. Single-, double- and triple-unit stations remain in the list, although the triple-unit stations (Plan No. 5) would probably be eliminated for practical reasons. The use of four machines would tend to insure reasonable reliability of service, and it will be noted that Plan No. 4, four single-unit stations with 1,500-kw. rotaries, has a comparatively low annual cost.

Having eliminated, for the reasons given, five of the plans, the engineer would proceed to make a detailed study of each of the remaining plans. These studies would include in each case the tentative selection of sites, the laying out in detail of complete distribution and transmission systems, and the computation of fixed charges and power loss costs on the basis of the revised layout.

Having brought this economic study to a conclusion, the engineer would next consider certain practical points which might affect the ultimate selection from an operating standpoint. Among such points might be mentioned: (a) Desirability of two-unit as compared with single unit-stations; (b) desirability of the use of a certain size and type of unit; (c) availability of substation sites; (d) availability of underground conduit for transmission cable; (e) the importance of electrolysis mitigation.

Second Method — The difference between the second method—which might be termed a practical (as distinguished from an analytical) method—and the first method, is, briefly stated, that under the first method consideration is given to practically all possible sizes and combinations of units in the preliminary analytical study, whereas under the second method the tentative selection of one or two sizes at once eliminates others from the preliminary study.

The second method readily lends itself to the study of small areas or areas of varying load density. The engineer in many cases is confronted with the problem of relieving an existing station of overload by the installation of an automatic station at some point in the district served by the existing station. Under these circumstances the size and general location of the new station are fixed by conditions, and an abbreviated type of study along the lines of the second method is all that is necessary.

The method, as set out below, follows what has been rather general practice in such studies, and the committee has simply endeavored to set down in concrete form the cardinal points of such a method By its very nature, the method is a flexible one and permits of variation (as dictated by local conditions) as the study progresses

Outline of Second Method — 1. Prepare a complete table of the costs, load constants, etc., entering into the calculation.

2. Prepare a car spot diagram (say on a maximum half-hour basis) for the area to be served and divide into feeder sections of sizes determined by load density, traffic conditions and other practical considerations. Determine the load and center of load for each section, checking the former, where possible, by ammeter readings at existing stations.

3. If the size of the general area under consideration warrants, divide the entire area into two or three districts, i.e., heavy-, medium- and light-load districts, as determined by the load density in various sections.

4. Assume, tentatively, a size of unit best fitted, from a practical standpoint, for the particular district under consideration and by the center of load method fix the theoretical location of each unit.

5. On the basis of the locations as determined, lay out the distribution system, designing the various feeders with regard to load to be carried, voltage drop, equalizing capacity between stations, etc., and using commercial sizes of wire.

6. Design the transmission system, basing calculations upon capacity required for normal service and making proper allowance for continuity of service in case of cable failure.

7. On the basis of the calculations outlined above, draw up a table showing the first costs and annual costs of the various layouts.

8. Up to this point the calculations have been based on one size of unit (for each district), arranged in single-unit and perhaps two-unit stations. The results derived may indicate the advisability of assuming a second size and making additional layouts on this basis.

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9. Having brought the study to this point economic comparisons for a number of combinations are available. Further consideration must then be given to the practical merits of the various plans.

Specific Examples—It will be evident to those who have made such studies that the working out in detail of a specific example involving a large area is quite a task. Time did not permit of the application of the first method to a specific study, although it is believed that sufficient explanation has been given to make the method clear. A specific example showing the use of the second method, however, was worked out in detail.

The Economic Limits to Which Track Drops Can Be Reduced—Assuming that the track bonds are in good condition there are three principal methods of reducing track potential gradients: first, by installing cable in parallel with the rail; second, by an insulated return system and third, by increasing the stations feeding a given area.

The first two methods require the use of additional copper cable. It is evident that if the current flow in such cable is below the economic value, the use of the wire, while perhaps advisable from the standpoint of reduction of rail gradients, cannot be justified from a purely economic point of view.

Based on the data used in the specific cases included in the report, the peak load value of current for a 1,000,000 circ.mil cable which gives the greatest economy (balancing fixed charges against power losses) is 600 to 700 amp. Such a current will produce a drop of 6 or 7 volts per 1,000 ft. of cable.

If we assume a double track line with four rails, each equal to 1,000 000 circ.mil of copper wire, and having a potential gradient of 7½ volts per 1.000 ft., it is apparent that the installation of one 1,000,000 circ.mil cable in parallel with the rails will reduce the gradient to 6 volts, which is equivalent to a flow of 600 amp. in the cable. This result leads to the conclusion that where track gradients are below the figure assumed, the installation of parallel copper is not justifiable from an economic standpoint.

If the negative feeders in an insulated return system are designed to carry approximately 600 or 700 amp. (maximum) per 1,000,000 circ.mil, the negative drop to the bus will be higher than in the case of an uninsulated system and the negative power loss, therefore, greater. The potential gradients which ordinarily obtain on uninsulated systems are of such value that any reduction by means of an insulated return system can only be made at a financial sacrifice.

As to the third method, namely an increased number of stations, the committee is of the opinion that any layout of substations, which is justified from an economic standpoint, would result in track gradients of such value as practically to eliminate danger from electrolysis.

The matter might be summed up as follows:

As a general thing, the reduction of track gradients by the use of parallel feeders or an insulated return system can only be accomplished at the sacrifice of economy. The use of automatic stations, due to the increased number which can be justified, will reduce track gradients to values which from an electrolysis standpoint are safe.

An increase in the number of distribution centers in heavily congested districts with attendant increase in trolley voltage, has, in one or two specific instances, resulted in an increase in demand load and energy consumption. This is due to the fact that whereas an increase in the number of stations reduces feeder losses, the increased voltage results in higher rheostatic losses at the car which may more than offset the saving in feeder losses.

In districts where the distance between stops is relatively long and vehicular traffic light, considerable free running is possible and the benefits of high voltage can be realized. This is not the case, however, in congested districts, where schedule speeds are dependent very largely upon general traffic conditions.

Data obtained under actual service conditions indicate that the schedule speeds possible in heavily congested districts can be obtained with a trolley voltage materially lower (150 to 200 volts) than the general or system voltage. It is evident, however, that satisfactory operating conditions, at street intersections for instance, require more than 400 or 450 volts.

Tests taken under service conditions also indicate that for congested districts, voltages between 400 and 500 result in the greatest power economy, due to the low rheostatic losses. These tests bear out the statement that increased voltage increases power costs.

Interconnection of Stations Common

It is general practice to interconnect adjacent stations through tie feeders, and the difference in bus voltage at the various stations under such conditions is limited by the feeder design, particularly where compound-wound converters are used. The use of shunt-wound converters, however, provides a very satisfactory means of regulating the voltage, for at times of heavy load the voltage is automatically lowered, while at times of light load (when traffic is lighter and advantage can be taken of high voltage) the voltage is reduced comparatively little.

It is impossible to name a figure which will satisfy all elements of the problem under various conditions. A voltage of from 500 to 550, however, seems sufficiently high to satisfy service requirements, although due to interconnection of stations a bus voltage much below 550 volts (based on a general system voltage of 600 volts) could hardly be obtained. The committee simply wishes to call attention to the fact, first, that comparatively low voltages are possible in heavily congested districts without impairment of service, and second, that increase of voltage in such districts, although of no benefit, will result in increased costs of power, particularly demand charge.

The report was signed by C. A. Butcher, J. M. Drabbelle, C. H. Jones, F. W. Peters, E. H. Scofield, L. D. Bale, and W. E. Bryan, chairman.

TABLE III—COMPARISON OF VARIOUS COMBINATIONS TO SUPPLY A DISTRICT WITH A DEMAND LOAD OF 6,000 KW. AND A DENSITY OF 160 KW. PER 1,000,000 SQUARE FEET.

Plan	No. of Stations	No. of Units per Station	Total No. of Units	Capacity of Units, Kw.	Total Cost per Kw. of Capacity
1	2	1	2	3,000	$9.10
2	1	2	2	3,000	9.67
3	3	1	3	2,000	10.32
4	4	1	4	1,500	10.93
5	1	3	3	2,000	11.15
6	2	2	4	1,500	11.35
7	6	1	6	1,000	11.73
8	3	2	6	1,000	11.96
9	2	3	6	1,000	12.20

In the discussion following the presentation of this report Adrian Hughes, Jr., superintendent of power United Railways & Electric Company, Baltimore, Md., told of the studies which were being made in Baltimore in regard to the use of automatic substations. He brought out the fact that local conditions govern the solution of the problem, and he suggested that the work of the committee on automatic substations be continued.

A written discussion by R. L. Weber, electrical engineer Kansas City Railways, was read by G. C. Hecker, special engineer of the American Electric Railway Association. This discussion described an analysis of substation requirements and location as carried out in Kansas City and results of a study that had been made.

Ralph H. Rice of the Board of Supervising Engineers, Chicago, Ill., presented several curves showing costs of substations as the number is increased. He also presented data he had worked out to show how the distribution costs vary with the number of substations. These figures were obtained by applying the methods recommended by the committee on automatic substations and included in the report.

D. D. Ewing, professor of electric railway enginering Purdue University, said that the fundamental basis of the power problem should be kept clearly in mind in arriving at any particular conclusions, and that various theoretical methods used would be influenced largely by fundamental considerations.

M. B. Rosevear, superintendent of distribution Public Service Railway of New Jersey, said that to him the outstanding feature of this committee's report, and, in fact, of previous reports of other committees dealing with this subject, was the great economy that resulted from the use of automatic substations and the increased advantages that accrued from their use.

The report of the committee on automatic substations was accepted with a vote of appreciation for the work done and for the additional points that had been brought out in the discussion. The meeting then adjourned.

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Thursday's Session A.E.R.E.A.

The report of the committee on power distribution was abstracted by M. B. Rosevear, chairman, except for subjects 1, 2, 4 and 8, which were abstracted by sub-committee chairmen. Subject No. 1 was abstracted by Charles H. Jones, electrical engineer Metropolitan West Side Elevated Railway, Chicago, Ill.; subjects 2 and 4 by H. S. Murphy, assistant electrical engineer Philadelphia Rapid Transit Company, and subject 8 by Adrian Hughes, Jr., superintendent of power United Railways & Electric Company, Baltimore, Md. Each subject was represented separately and discussed before proceeding to the following subject.

Power Distribution

The report of the committee on power distribution is divided into five principal subjects, dealing with catenary overhead construction, trolley wire specifications, pole reclamation, specifications for low conductivity trolley wire, industrious co-ordination, temporary connections to trolley wire, overhead construction for trackless trolleys, and review of existing standards. A list of power distribution matters which are being considered by other special committees and by sectional and technical committees under the auspices of the A. E. S. C. is also included.

The committee recommends that subjects assigned for 1924, in addition to those which should be continued, are concrete poles, return circuits, including bonding, standard approach ears or flexible tips, at least the ruling dimensions, standardize various types of suspensions, particularly the ruling dimensions.

Specification for Catenary Overhead Construction.—The sub-committee has prepared a detailed specification for catenary overhead construction, other than for steam railroad electrification. This specification deals primarily with the trolley wire and its supporting catenary system. The various paragraphs cover the supporting system, car clearances, trolley height, spacing of poles and pullovers, with accompanying diagrams and tabulations. The method of locating trolley wire on curves is given, with tables and graphic charts from which may be readily computed the offset required for various conditions as to trolley height, super-elevation and curvature of track, height of car and length of pole. Other graphic charts are included giving the relation between sag and tension in loaded and unloaded messengers for pole spacings from 150 to 300 ft. for steel messenger and for 300 ft. spacing for copper messenger. Temperature correction charts are included in every instance. The method of using all curves is completely explained in the text.

The specifications also include sag-tension curves for trolley wire under similarly varying conditions and cover auxiliary contact wires, hangers, steady strains, anchors and feed taps.

It is recommended that the specification be approved as a miscellaneous method and practice, and that the committee for next year be instructed to put the specification in final form for submission as a recommended specification to the 1924 convention.

It is also recommended that the 1924 committee be instructed to prepare specifications for catenary suspension materials.

Trolley Wire Composition and Wear. Specifications for Round and Grooved Hard-Drawn Copper Trolley Wire.—The sub-committee has compiled data relative to trolley breaks from information submitted by twelve companies, well distributed geographically. These data cover 3,300 trolley breaks, for 5,300 miles of overhead line, over a maximum period of two years. Three tabulations are included: (1) Trolley breaks per mile of single track, (2) analysis of causes of trolley wire failures, (3) summary of causes of trolley wire failures.

These are followed by quoted recommendations of distribution engineers from widely separated geographical locations as to methods of reducing the number of failures.

There is a discussion of the need of securing further data, particularly of a quantitative nature, and a broad research program is proposed, including:

1. The preparation of detailed information by distribution engineers of member companies.
2. The writing of a detailed history of at least one complete section of trolley wire by co-operating member companies.
3. Co-operation with committee on welded rail joints using proposed rotary service testing machine to make comparative tests on various kinds of trolley wire, fittings and collector devices.
4. Employment of a research engineer, or founding a research fellowship at some university, to study the manufacture and use of trolley wire, with such laboratory work as necessary.

As a result of joint action with the American Society for Testing Materials, a revised specification for hard-drawn copper trolley wire is presented.

It is recommended that: (1) The study of trolley wire wear be continued, including causes of wear and failure. (2) The proposed research program be approved and undertaken. (3) The revision of specification Dw 3b, for round and groved, hard-drawn copper trolley wire be approved. (4) Appropriate action be taken, so that the revised trolley wire specification may be presented to the American Engineering Standards Committee for approval, if possible, as an American standard. The American Society for Testing Materials to be invited to join with our association in presenting the matter to the A. E. S. C.

Pole Reclamation.—Reference is made to the report of the committee on wood preservation, particularly that portion relative to treatment of wood poles after erection.

It is recommended that further study of pole reclamation be dropped for the present.

Specifications for High Strength, Low Conductivity, Trolley Wire.—Reference is made to a study of existing specifications and discussion with the American Society for Testing Materials sub-committee.

Certain tentative values for tensile strengths and twist tests of high-strength trolley wire are submitted, in order to promote discussion.

It is recommended that the A. E. R. E. A. join the A. S. T. M. in requesting the appointment of a sectional committee under the auspices of the A. E. S. C. to prepare an American standard specification for high-strength trolley wire.

Inductive Co-ordination.—The sub-committee has studied and discussed this subject, including certain data jointly promulgated by the National Electric Light Association and the Associated Bell Telephone Companies. Certain information has been gathered from member companies and an additional questionnaire prepared for use by their representatives if and whenever an American committee is formed by various interested national bodies. If the American committee is formed the sub-committee can render such assistance to its representatives as necessary.

It is recommended that the study of inductive co-ordination be continued. If no American committee is formed, it is recommended that the committee on power distribution be authorized to co-operate with proper committees of other national bodies.

Temporary Connections to Trolley Wire.—Data have been collected as to various devices now in use for temporary connections to trolley wire, particularly for welders and other apparatus drawing heavy currents.

The sub-committee describes and illustrates several typical devices which it is believed prevent damage to the trolley wire if properly used.

It is recommended that the subject be continued for another year.

Overhead Construction for Trackless Trolley.—The sub-committee presents information relative to overhead construction for trackless trolley, together with typical illustrations.

It is recommended that the subject be continued for another year.

Review of Existing Standards—The committee submits a detailed discussion of each section of the manual under the heading "Power Distribution." In the main, no changes are suggested, but the following recommendations are made:

Df 2b—Specification for galvanizing or sherardizing on iron and steel. This should be included in the new manual with an explanatory note that it has been referred to the A. E. S. C.: that some objections to the present specification have been raised; and that it would probably be revised to some extent by a sectional committee before being approved.

Ds 2c—Specification for 600-volt di-

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rect-current overhead trolley construction. In the new Manual there should be added an introductory paragraph referring to other specifications for materials such as Df 4d, overhead line materials; Ds 3c, selection of poles; etc.

Dw 1c — Standard grooved trolley wire sections. This section should be withdrawn from the manual when the revision of specification Dw 3b for round and grooved, hard-drawn, copper trolley wire is approved.

Block Signal Specifications. — The committee discusses the need of referring signal matters to some specific committee. It has reviewed existing signal specifications and submits its recommendations on account of the pending republication of the manual.

It is recommended that:

1. The question of assigning block signal matters to either the committee on power distribution or to a special committee be referred to the executive committee for decision.

2. The following sections be withdrawn from the Manual because of changes in the art and pending action by a committee during 1924:

Ss 7b—Use of continuous track circuits for the control of automatic signals for high speed interurban service.

Ss 8a—Methods of signaling single-track suburban railways for headway between 5 and 20 minutes and speed not exceeding 20 m.p.h.

Ss 9a—Methods of signaling double-track suburban railways for headway between 1 and 10 minutes and speed not exceeding 30 m.p.h.

Ss 10a—Methods for signaling single-track interurban railways for headway not less than one hour and speed 40 to 60 m.p.h.

Ss 11a—Methods for signaling single-track interurban railways for headway as frequent as 15 minutes for trains in several sections and speed 40 to 60 m.p.h.

Ss 12a—Methods for signaling double-track interurban railways for headway as frequent as 5 minutes and speed 40 to 60 m.p.h.

Ss 13a—Sizes of lenses for use in light signals.

3. The other signal sections in the manual be carefully reviewed during 1924.

The report was signed by J. Walter Allen, Robert L. Allen, S. H. Anderson, L. W. Birch, H. G. Burd, Leslie E. Delf, Ralph W. Eaton, D. D. Ewing, L. F. Griffith, C. L. Hancock, H. D. Hawks, C. J. Hixson, Adrian Hughes, Jr., Charles H. Jones, John Leisenring, F. McVittie, H. S. Murphy, H. A. Pharo, W. Schaake, A. Schlesinger, James Scott, F. J. White, Charles R. Harte, sponsor, and M. B. Rosevear, chairman.

A written discussion of subject 1 by O. M. Jorstad of the Westinghouse Electric & Manufacturing Company was read by Mr. Rosevear. Several corrections in the printed report were called to the attention of the association, on pages 34, 35 and 51. These corrections were accepted by the convention and will be changed in the final report.

Subject No. 2 on trolley wire composition and wear was discussed by J. F. Neild of the Toronto Transportation Commission, who gave some results that have been accomplished in Toronto by following the recommendations contained in the committee's report. Mr. Neild said that the recommendations should be backed up by all operating companies and followed closely.

The subject of overhead construction for trackless trolley was discussed by J. F. Neild of the Toronto Transportation Commission, Adrian Hughes, Jr., superintendent of power, United Railways & Electric Company of Baltimore, Md., and H. S. Murphy, assistant electrical engineer Philadelphia Rapid Transit Company. Mr. Neild told of some of the difficulties they had in Toronto with overhead construction, while operating trackless trolleys, and changes that were made to overcome them. They use a 30-in. spacing of trolley wire and use standard line material in Toronto. He felt that subsequent committees should make recommendations for a standard spacing to be adopted by the association. Mr. Murphy said that they use a 24-in. spacing in Philadelphia and use standard line material. Mr. Hughes said they use a 24-in. spacing of trolley wires for trackless trolley operation in Baltimore and use standard line material. Both felt that a standard spacing was desirable.

C. R. Harte, construction engineer the Connecticut Company, gave an outline of the work which was being undertaken by the American Engineering Standards Committee on galvanizing and sherardizing and assured the members that this work was being considered very carefully.

The report of the committee on power distribution together with recommendations of the standards committee was received and approved by the association.

The report of the committee on power generation was abstracted in part by Chairman C. A. Greenidge, chief engineer, the J. G. White Management Corporation, New York, except the report of sub-committee No. 3, which was presented by L. D. Bale, superintendent substations, Cleveland Railway. An abstract of the report follows:

Power Generation

The first subject dealt with by the committee was recommendations regarding the A.S.M.E. boiler code. Tentative specifications of the A.S.T.M. for lap-welded and seamless steel and lap-welded iron boiler tubes were reviewed.

A second sub-committee reviewed recent progress in the design, application and operation of stokers, grates and furnaces. It is stated that this has been more an extension and refinement of previous developments than the application of any startlingly new principles. Demand has required improvements in the class of workmanship. Simplification and increased ruggedness of design through the entire redesign of some existing types have been found desirable in order better to meet those demands and the increased size of single units now desired.

The sub-committee on auxiliary equipment drive gave a brief comparison of electric and steam-driven auxiliaries. Coal and ash-handling and piping were considered by another sub-committee. The report on these subjects consists principally of a bibliography covering recent technical articles.

The greater part of the report is taken up with a review of current practice in automatic substation design and operation. This subject does not include the economic aspects of the automatic station, but is intended for the purpose of presenting an analysis of good current practices for the guidance of those who are interested in automatic substation operation.

Four general classifications were used in gathering and compiling data, as follows: Urban; steam railroad electrification; heavy duty interurban; suburban or interurban. Questionnaires were forwarded to electric railway systems operating 118 automatic substations. Answers to some forty-three questions were received from companies operating ninety-five automatic stations. These questions cover a wide range of design and operation.

A list of all companies operating automatic substations, together with the rating and type of service, is also included.

The sub-committee in presenting this report, much of which is in the form of tabulated statistics, states that it realizes that there are several very important phases of the subject that should be further investigated and given more prominence than was possible in the preparation of a report of this kind, which was only intended to cover the subject in general. Many of the individual aspects of the matter, which have been covered by the committee in this report, need not receive further consideration by engineering committees, at least until a further advance in the art is noted. There are, however, several questions, principal among which is the matter of ventilation, which should receive immediate attention. The committee recommended that the matter of automatic substation ventilation for plants in all classes of railway service be a subject for consideration by committees during the coming year.

The report was signed by L. D. Bale, W. E. Bryan, H. E. Davis, F. G. Frost, F. C. Hanker, G. H. Kelsay, H. A. Kidder, F. W. Peters, G. W. Saathoff, W. C. Slade, A. E. Stierly, R. L. Weber, G. W. Welsh, E. H. Scofield, sponsor, and C. A. Greenidge, chairman.

W. E. Bryan, superintendent of power United Railways of St. Louis, suggested that the report of sub-committee No. 3, recommending further study on the subject of ventilation, be given careful consideration and be included in the instructions to next year's committee.

The report of the committee on power generation was accepted. The report of the committee on standards, Martin Schreiber, chairman, which was acted upon in detail after the report of each committee during the convention was also accepted as a whole. In general the recommendations were approved, but in a few instances the standards

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committee did not agree. The standards which were disapproved by the standards committee follow:

Standards

Power Generation—A proposed definition of "generator output" was submitted for approval. The committee on standards voted that it would approve the definition only in the event that it had the approval of the American Institute of Electrical Engineers and similar organizations concerned with standard definitions of this character. It was further voted that there was no apparent need of this in a Manual section.

Wheel and Rail Contours—The committee passed the following resolution relative to the dimensions for steel wheels, Appendix B of the report:

"If the convention approves the new wheel contours (recommendation No. 1) this will necessarily involve the revision of certain existing tables of wheel dimensions in Manual section Et 7b as well as the revision of Manual sections Et 18a, Sm 3a and Ws 2a. The committee on standards desires at the same time to recommend to the executive committee that consideration be given to the possible expansion of the tables of dimensions (Manual section Et 7b) to permit obtaining standard flanges and treads in the standard diameters shown in Table 1."

Building and Structures—The committee on standards disapproved a recommendation that the report on prepayment and postpayment enclosures, with drawings 16 to 23 inclusive, be published in the Manual as miscellaneous methods and practices.

Way Matters — The committee on standards disapproved a recommendation that the title of Wr 1c be revised to read "plain girder and standard section rails," and suggested that the title read simply, "plain girder rails."

Equipment—Et 9b—Certain revisions to make this specification conform with A. S. T. M. specification, serial designation A-19-21 were referred back to the equipment committee to clarify an apparent conflict between proposed sections 301a and 301b.

Et 14b and Et 15b—Certain revisions were referred back to the committee on equipment for a reconsideration of proposed section 403a dealing with gear bores.

Et 22a—The proposal to omit section 111 dealing with permissible variations, since it is recommended that it be included in Manual section Et 3c, was disapproved, it being believed advisable to have this information in both specifications Et 3c and Et 22a.

B. J. Yungbluth, supervisor purchasing and supplies Philadelphia Rapid Transit Company, presented the report of the committee on purchases and stores which had been read on Wednesday to a session of purchasing agents and storekeepers for approval by the Engineering Association and inclusion in the Manual as recommended practice. This report was approved by the engineering association with the understanding that it would be submitted to the committee on standards for approval.

Purchases and Stores

Two subjects were assigned to this committee: (1) Review the classification of materials recommended in the Accountants-Engineering "joint report on stores accounting" and revise if necessary. (2) Continue the study of uniform method of taking periodical inventory with a view of the adoption of standard forms.

1. *Standard Classification of Materials and Supplies for Electric Railways*—A joint report was made on this subject by the committees on stores accounting and purchases and stores in 1921, but through a misunderstanding it was not formally acted upon by the Engineering Association. This committee, in joint session with the stores accounting committee, gave this matter further consideration and agrees with the conclusions contained in the Accountants-Engineering joint report on stores accounting, 1921, that in view of the vast sums of money tied up in inventories it is necessary to have a classification to provide a uniform and economic method of controlling the investment and to secure the advantages of a logical, physical grouping of materials and supplies for proper ordering, storing, handling, distributing, inventorying and recording. Such a classification has nothing in common with that of operating expense accounts.

It was recommended, however, that a classification of materials and supplies containing seventy-four subdivisions [published with the report of the committee on stores accounting of the Accountants' Association] be substituted for the one recommended in the 1921 report, which contained fifty-nine subdivisions. The former has been in successful use for several years and has met the test of practicability, while the latter has not yet been adopted by any company. The classification with seventy-four subdivisions, it was concluded, was more comprehensive and would more nearly meet the necessities of the larger companies, while smaller companies not requiring such detail may abridge it by making a selection of the classes meeting their requirements or consolidate them.

A monthly statement showing the operation in materials and supplies according to this classification is again urgently recommended. The form submitted in the Accountants-Engineering joint report on stores accounting, 1921, showing the revised classification is sufficiently comprehensive to meet the necessities of any company; although some companies will not require the information in such detail, they can readily consolidate certain columns and eliminate others in accordance with their necessities.

2. *Stock Books*—Before the committee could reasonably consider a method for taking fiscal inventories it was necessary to determine the basic system for stock control. The Accountants-Engineering joint report on stores accounting, 1921, recommended for the control of materials and supplies the stock book system either in lieu of the more customary form of stock card or stock ledger sheet, or in addition thereto and in conjunction therewith.

3. *Fiscal Inventories*—The purchases and stores and stores accounting committees in joint session unanimously approved the following recommendations for taking fiscal inventories of materials and supplies:

1. A general fiscal inventory of materials and supplies as designated by the accounting department for each property shall be taken annually as of one date; the date shall be agreed upon by the accounting department and the stores department.

2. The fiscal inventory shall be taken by the stores department in conjunction with and under the supervision of the accounting department, to assure its being satisfactory for fiscal purposes.

3. The quantities on hand at the time of the annual inventory shall be entered in the stock books in the "On Hand" column for the current month.

4. The form in which the list of material on the inventory will be supplied to the accounting department, and the method of pricing and extending the inventory will depend upon the practice of the various individual companies, as in some cases the accounting is done by the stores department and in others by the accounting department.

4. *Comparative Ratios — Investment in Materials and Supplies on Hand to Gross Earnings* — Realizing that the stock of materials and supplies on hand involves such a large investment, the committee sought to determine a gage by which to measure the performance of the various companies.

The ratio of materials and supplies on hand at the end of the year to gross earnings for the year was taken as a most practicable base for a comparison.

Questionnaires were sent to twenty-four companies for such information for the years 1920, 1921 and 1922; replies were received from thirteen, which show that all companies made successive reductions in the ratio for each year, and that each company maintained about the same relative rank. Taking the year 1922, the four companies having the lowest ratio show an average of 3.08; the second group of four companies showing the next lowest ratio averaged 5.64; the remaining five companies show an average of 7.34; while the ratio of all companies averaged 5.35.

5. *Sessions for Purchasing Agents and Storekeepers*—The committee recommended that such a session be held at the annual conventions.

6. *Subjects for Next Year*—The following subjects are recommended for consideration by the purchases and stores committee for the year 1924:

Method of classification and sale of scrap materials to increase the revenue therefrom.

The proper place for the purchasing and stores departments in the company's organization.

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The report was signed by William C. Bell, Jackson P. Dick, J. F. Fleming, Walter N. Ford, C. A. Harris, Harry H. Lloyd, W. S. Stackpole, W. H. Staub, and B. J. Yungbluth, chairman.

Resolutions

C. R. Harte, in the absence of H. H. Norris, read the report of the committee on resolutions, which was accepted. The resolutions follow in part:

"Our officers, through painstaking and untiring effort, have laid the foundation which has made possible the successful outcome of this convention.

"The remarks of President Emmons to the effect that it is the duty of railway men to furnish the transportation facilities that the people need, indicate the wisdom of a farsighted policy in the matter of bus operation. The excellence of the bus exhibits and the evident interest therein have vindicated the policy of encouraging the manufacturers to adapt their equipment to mass transportation needs.

"The reports of committees were distributed well in advance of the meeting, giving opportunity for study prior thereto. This resulted in pointed discussion of the salient features of the reports.

"The sponsor system is to be credited with a considerable share of the success of this meeting, as it has provided a means for the officers to keep in close touch with the progress of committee effort.

"The increasing tendency to cooperate with other associations, particularly along lines of research, is commendable.

"The increasing interest in the standing committee on purchases and stores shows the wisdom of the establishment of this committee under the auspices of the Engineering Association.

"The exhibits have been well worked out with a view to showing the progress which has been made since the last exhibits of two years ago."

The report was signed by R. C. Cram, C. R. Harte and H. H. Norris, chairman.

The committee on nomination submitted the following names for officers and members of the executive committee during the ensuing year and these men were elected by unanimous vote:

President, H. A. Johnson, assistant to the general manager Metropolitan West Side Elevated Railway, Chicago.

First vice-president, C. H. Clark, engineer maintenance of way Cleveland Railway.

Second vice-president, R. C. Cram, engineer surface roadway Brooklyn-Manhattan Transit Corporation.

Third vice-president, Charles R. Harte, construction engineer the Connecticut Company, New Haven, Conn.

Executive committee: Daniel Durie, general superintendent West Penn Railways, Connellsville, Pa.; R. H. Dalgleish, chief engineer Capital Traction Company, Washington, D. C.; E. H. Schofield, engineer power and equipment, Twin City Rapid Transit Company, Minneapolis, Minn.; M. B. Rosevear, superintendent of distribution Public Service Railway, Newark, N. J.

H. H. Adams and Martin Schreiber, past-presidents of the association, were named by retiring President Datz as a committee to escort the newly-elected officers and members of the executive committee for their installation. Before speaking of the newly-elected officers, Mr. Adams called attention to the creditable results accomplished during the past year under the leadership of President Datz. In presenting H. A. Johnson, the new president, he expressed confidence in the latter's ability to carry on the high standard of work set during the last year.

Mr. Johnson, in expressing his appreciation of the honor bestowed upon him by the association, called attention to the necessity for continued cooperation by the entire membership. He then presented the past-president's badge to Mr. Datz.

Each of the officers and members of the executive committee pledged himself to support actively the program for the ensuing year.

Mr. Harte called attention to the importance of closely studying the field for bus operation. No expressed confidence in the ability of the railway to carry on most efficiently mass transportation, but stated that the bus and car should be combined wherever necessary to give the best transportation.

James Dalrymple, general manager Glasgow Corporation Tramways, Glasgow, Scotland, addressed the association, outlining briefly the practice of his company. He also called attention to the serious unemployment situation which now exists in Glasgow.

Retiring President Datz moved a vote of thanks to Secretary J. W. Welsh and Special Engineer Guy C. Hecker for the effective work which they have carried out during the past year. He also moved a vote of thanks to the manufacturers for the splendid exhibits. Both were unanimously adopted.

New Officers of the Claims Association

The officers elected at the session of Oct. 10 to head the Claims Association for the ensuing year are as follows:

President, W. H. Hyland, claim agent Fonda, Johnstown & Gloversville Railroad, Gloversville, N. J.

First vice-president, H. D. Briggs, assistant general claim agent Public Service Railway, Newark, N. J.

Second vice-president, J. H. Handlon, claim agent Market Street Railway, San Francisco, Cal.

Third vice-president, C. B. Proctor, claim agent Memphis Railway and Memphis Power Company.

The executive committee consists of the officers and S. J. Herrell, claim agent Knoxville Power & Light Company; J. S. Kubu, assistant superintendent accident department Cleveland Railway; L. F. Wynne, general claim agent Georgia Railway & Power Company, Atlanta.

Convention secretary, E. L. Lindemuth, claim agent Wilkes-Barre Railway.

Card Parties and Dances Feature the Entertainment Program

AFTER the business of the day was done for the delegates, excellent entertainment was furnished in the evenings. On Sunday a delightful sacred concert was given before a large audience at the Marlborough-Blenheim, and on the following evenings there were dances, a carnival, and a swimming exhibition. During the daytime there were card parties for the ladies and a golf tournament.

Shortly after nine o'clock Monday evening the orchestra on the Pier broke into the strains of the "Star Spangled Banner," and at the conclusion, swung into a lively dance tune for the opening ball. Led by President and Mrs. Emmons, the crowd poured out onto the dance floor and the festivities began. The music was furnished by Paul Whiteman's Orchestra from New York and was much enjoyed by everyone present. At midnight the formal dancing at the Pier ended, but many of the dancers proceeded to the Hotel Traymore, where dancing continued until 2 o'clock.

The carnival on Tuesday evening was a huge success. Due to the careful preparations made by E. F. Wickwire of the Ohio Brass Company, there was something doing every minute. Professional and amateur entertainment was furnished, and in between these features there was general dancing. The regular lighting arrangements on the Pier had been supplanted by special lights installed expressly for the occasion by L. W. Mackall of the Crouse-Hinds Company, making the appearance of the Pier one of rare beauty. Fancy paper hats were furnished the guests as they entered the hall, and together with the gay costumes of the performers in the carnival, lent color to the scene.

More than a hundred of the ladies enjoyed a card party at Haddon Hall on Tuesday afternoon, which was more than double the number that have played at previous conventions. On Wednesday the ladies again played cards, this time at the Traymore.

The golf tournament was held on Sunday at the Northfield Country Club. As told in the CONVENTION DAILY, the attendance was as large as the scores were low.

Altogether, the entertainment committee, by providing amusement for every occasion, earned the thanks of all the delegates attending the convention.

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The News of the Industry

I. C. C. Denies Application

Decision Says Western Pacific Seeks Sacramento Northern Lines for System Purposes

The Interstate Commerce Commission handed down a decision recently denying the application of the Western Pacific Railroad, a steam property, to acquire control of the Sacramento Northern Railway and to purchase the bonds of the Sacramento Northern Railroad. A similar application was denied by the commission on May 18, 1922, on the ground that the Sacramento Northern Railway was required to apply to the commission for authority to issue its stock and assume certain obligations and liabilities with respect to the securities of the Sacramento Northern Railroad. After the applicant had applied for a rehearing, which was held on Aug. 24, the case was orally argued before the commission on Dec. 6, 1922. It was the former record, supplemented by additional evidence, which the commission considered before handing down its latest findings. The matter was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 23, 1922.

The Sacramento Northern lines are now owned and operated by the Sacramento Northern Railroad. It was proposed that this company sell all of its property to the Sacramento Northern Railway, subject to existing indebtedness, including $5,224,373 principal amount of bonds of the old company, payment on which will be assumed by the new. The new company intended to provide itself with funds to complete the purchase, and with an additional amount of working capital, through the issue and sale, at par, of $1,000,000 of its capital stock.

The Western Pacific Railroad took the attitude that the Sacramento Northern Railroad was an interurban electric railway and that the Sacramento Northern Railway would have the same status. It was the plea of that company that neither the railroad nor the railway was subject to the jurisdiction of the commission and that the denial of the application on the part of the commission was wrong.

The commission says that even if it is allowed that the commission is without jurisdiction over corporations organized for the purpose of operating independently as interurban electric railways, the new Sacramento Company does not fall within the "except a street, suburban or interurban electric railway which is not operated as a part of a general steam railroad system of transportation."

The commission says further that there are signs that such operations will be of a broader character than those ordinarily performed by an "interurban electric railway." The Interstate Commerce Commission in its findings then lists seven indications which point to a character of business being conducted by the company more comprehensive than that ordinarily performed by an interurban electric railway.

On the other hand, the Western Pacific Railroad advanced seven arguments to show that the company would be operated as an electric interurban railway. The commission said that there was a basis for the conclusion that the carrier was more than an interurban electric railway if in addition to the business of this character it performed functions which are not commonly interurban functions and, further, was empowered by its charter to engage in transportation generally. The commission says that even if it were able to find that the new company will be operated as a "street, suburban or interurban electric railway," there would still remain the question whether or not it would be operated "as a part of a general steam railroad system of transportation."

The commission could not escape the conclusion that the Sacramento Northern would be operated as part of the Western Pacific system. Further, the commission said that other statements made by the Western Pacific all went to prove that the proposed acquisition was for system purposes, and that the lines, if acquired, would thereafter be operated as part of the Western Pacific System, which is a general steam railroad system of transportation.

For these reasons the commission said that the new company would have to apply to it for authority to issue its stock and assume the proposed obligations with respect to the securities of the old company, and until such application was made, the commission would be unable to pass upon the merits of the proposed acquisition of control. The findings, in the original report, were therefore affirmed.

Time Extended.—An extension of two weeks has been granted by the Supreme Court to the Schenectady Railway in which to file its answering brief in the case instituted by the Public Service Commission in which the commission seeks to collect penalty for alleged violation of an order issued April 7 requiring the company to install increased equipment facilities, following investigation of crippled car service.

Another Co-operative Association in Prospect

At a recent meeting at Baton Rouge of the Louisiana and Mississippi Committee of Public Utilities Information it was decided to organize a state association along the lines of similar co-operative associations in other states. The purpose of the association will be to insure unity of action in all matters of legislation affecting the interests of the Louisiana association and other matters which will make for the advancement and welfare of the state public utilities. W. J. Aicklen, general manager of the Consumers' Light & Power Company of New Orleans, a subsidiary of the New Orleans Public Service, Inc., was elected chairman of the movement.

Personal letters outlining the motives of the proposed association have been addressed by Mr. Aicklen to the several utility corporations of the state. No unfavorable replies have been received so far. When a sufficient number of responses are in hand to warrant it, a meeting of the public utilities interested will be called and formal action taken to place the association on an enduring footing. Articles of incorporation will be filed. Subsequently a similar association will be formed of the public utilities of Mississippi.

Wage Negotiations in Progress in Springfield

Negotiations for a new wage contract are now in progress between the Springfield Street Railway, Springfield, Ohio, and its platform men, the old contract expiring Oct. 1. Both sides express belief that the new contract will be amicably negotiated. The employees are demanding a rate of 46, 48 and 50 cents an hour, the amount depending on the length of service with the company. The present scale is 42, 44 and 46 cents an hour. The company submitted a compromise proposal Oct. 5, offering 44, 46 and 48 cents an hour, retroactive to Oct. 1, but at a meeting of employees held on the same date the offer was rejected, although it was said that representatives of the union conducting the negotiations favored its acceptance.

The first move made by the company after the employees submitted their demands was to throw the company's books open to a committee of workers to show them the present status of the company's finances. It was said to be the result of this examination that the committee recommended acceptance of the company's offer.

No change in working conditions is proposed by either side.

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Financial and Corporate

Will Lift Receivership

Plans Being Made for Reorganization of the Birmingham Railway—$1,000,000 for Improvements

Plans are being perfected for lifting the Birmingham Railway, Light & Power Company, Birmingham, Ala., out of receivership and for the reorganization of the company. It is also proposed to spend more than $1,000,000 in the betterment and improvement of the street car service.

Arrangements have been made to take up the company's $4,601,000 of 6 per cent bonds at par and interest. The receivers have just contracted for new cars and other improvements to the amount of $600,000, according to the agreement between the company and the city commissioners, and also hope to spend an additional $100,000 for extensions and betterments.

Lee C. Bradley and J. S. Pevear, co-receivers, filed a petition Oct. 6 in the United States Court in Birmingham for authority to default in the payment of the interest on the 6 per cent bonds due Nov. 1.

SALE WILL INVOLVE NO EXPENSE

At the time of the filing of this petition announcement was made that a committee for the 6 per cent bondholders had been organized and had called for deposit of the bonds on or before Oct. 30. The committee announced that it holds a contract to sell the bonds deposited with the committee on or before May 1, 1924, if the principal of the bonds is due, at a price to yield to those who deposit their bonds the entire principal amount of the bonds and the interest from May 1, 1923, to the date of purchase, provided not less than 60 per cent of the outstanding 6 per cent bonds are deposited with the committee. If this sale is made it will involve no expense upon the depositing bondholders, members of the committee point out.

These bonds may be deposited with the Central Union Trust Company of New York, 80 Broadway, New York City, or with any of its agents, which will issue deposit receipts for all bonds deposited.

The petition of the receivers will be heard Oct. 30, before Judge W. I. Grubb of the United States Court of the northern division of Alabama. The petition filed shows about $1,975,000 of maturing company and receivership obligations due between Sept. 1, 1923, and July 2, 1924; $600,000 contracted to be spent as a direct result of the agreement with the city; $110,000 proposed to be spent in addition, as a result of the city agreement, and about $1,075,000 proposed to be spent during this period for improvements of the property. This shows that approximately $3,650,000 must be spent by the company in order that satisfactory service may be rendered. It is estimated by the receivers of the company that this program carried out through to July 2, 1924, will require almost $1,000,000 more cash than that expected to be available in this period of time.

It is proposed by the receivers to meet this deficiency by default on the 6 per cent bond interest due Nov. 1, 1923, and extension of other obligations, if such extensions can be arranged, but it is pointed out if the deficiency is not met by the extension of other obligations, the receivership might continue indefinitely. It is also stated in the petition that if a default is made and the 6 per cent bonds are made payable in full, they are advised that prompt steps will be taken to reorganize the properties and that the payment of the 6 per cent bonds will make this possible. But such default would in no way affect the company's underlying bonds, which will become due July 2, 1924, or the company's 4½ per cent bonds, of which there are now outstanding in the hands of the public $8,720,000.

The receivers say that in no event should there be a default in the 4½ per cent bonds, as that would require in the reorganization the raising of $8,720,000 cash with which to pay these bonds off in full, and probably cause the payment of a much higher rate of interest on the 4½ per cent bonds in the future.

It is believed that the company will be reorganized without delay, as details of the plans of reorganization are now being worked out.

Will Determine Fare in Duluth

In the Duluth fare case recently completed in the United States District Court of Minnesota, A. L. Drum of A. L. Drum & Company, consulting and constructing engineers of Chicago and Philadelphia, testified before Hon. Thomas D. O'Brien, special master, on the value of the property of the Duluth division of the Duluth Street Railway in a hearing at Duluth.

Mr. Drum presented valuations of the property as of July 1, 1921. He summarized the physical property, including power contract, as follows: Present-day cost, prices current June, 1921, $8,599,526; ten-year average cost, average prices 1912-1921, $6,853,120; pre-war cost, prices current year 1915, $5,207,626; estimated original cost, prices current date of installation, $5,206,267.

In addition Mr. Drum submitted a report on the developmental costs to the company, which amounted to $1,129,826, based on estimated original cost, which represents the costs that have been, or would be, encountered in creating and developing the property to its present state of efficiency. Taking these costs into consideration and the present condition of the property, Mr. Drum testified that the going concern value of the Duluth division was at least $800,000. Considerable additional testimony was heard as to operating costs, increased service, schedules, etc.

As a result of this hearing the rate of fare to be established in the city of Duluth and the value of the property of the company will be determined.

Discontinuance of Northern Massachusetts Property to Be Discussed

Patrons and stockholders of the Northern Massachusetts Street Railway in the territory served by the Gardner, Westminster & Fitchburg division are interested in the announcement of the Gardner Chamber of Commerce that bondholders of the road are threatening to foreclose. The Chamber of Commerce has called a special meeting to discuss the subject.

In a bulletin which the Gardner chamber has issued it is noted that I. M. Garfield, of the law firm of Garfield, Whiteside & Lamson of Boston, presents what is termed "the only concrete suggestion which comes from official source."

The letter from the attorneys representing the railway bondholders points clearly and specifically to the junking of the line unless local interests help in the crisis. It is said that if Gardner men and the citizens of the other towns which the road serves would agree to assistance there is likelihood that a reorganization of the Gardner, Westminster & Fitchburg branch would be arranged, thus permitting its continuance.

The bonds of this division can be bought at a reasonable figure, the letter says.

Gardner people have not warmed up to the suggestion and Mayor Chester P. Pearson of that city has expressed the opinion he is satisfied to have the line junked if it be the wish of those interested in the property.

"Ten years ago if the railway had been discontinued it would have been somewhat of a calamity but now Gardner's roads would be much better if the rails of the company were taken up," Mayor Pearson said.

The Mayor says he feels if the bondholders foreclose and some other interests take over the line a portion of the road could be run at a profit. The Mayor's suggestion is that a line from the Greenwood shop in South Gardner to Templeton could be run to the advantage of many patrons.

However, there are members of the Gardner City Council who feel discontinuance of the railway would be the loss of a modern and indispensable facility.

Templeton residents are disturbed at

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the possibility of the discontinuance for it would leave them without access to Gardner or other nearby places.

Some time ago in answer to a letter from Receiver W. P. Abercrombie of the railway the Gardner City Council expressed a willingness to consider a plan designed by that official for the operation of motor buses in the section, but nothing has come of this. There has been no action on the suggestion also made some time ago by attorneys for the bondholders for consideration by the City Council of a proposed plan for reorganization.

Receiver Refused for Dayton, Springfield & Xenia Southern

Motor bus competition during last year was responsible for the failure of the Dayton, Springfield & Xenia Southern Railway, Dayton, Ohio, to pay the interest on $396,000 in bonds during the last six months. United States District Judge Smith Hickenlooper was informed of this condition by Province M. Fogue and Judge Harry M. Hoffheimer, attorneys representing the company, when Frank Dinsmore and Judge Walter Shohl, Cincinnati, representing the First Wisconsin Trust Company, Milwaukee, trustee of the mortgage under which the bonds are secured, sought the appointment of A. H. Effner, former general manager of the Cincinnati, Georgetown & Portsmouth Railway as receiver of the lines and properties of the Dayton, Springfield & Xenia company.

Judge Hickenlooper, after hearing the arguments of counsel on both sides on the motion of the Wisconsin company for appointment of a receiver to take charge of the company, declined to make an appointment at this time and intimated that in his opinion the appointment of a receiver would not be to the best interest of the parties concerned. The court intimated also that from the evidence it had gathered there is a family controversy involved in this case and that unless it is shown that the company is insolvent it will not be disposed to grant the motion for a receiver.

The bill of complaint of the Wisconsin Trust Company was filed in the Dayton Federal court, Oct. 2. In the bill, it is said, it was alleged that the defendant company had defaulted interest due on outstanding bonds of a bond issue of $500,000 secured by mortgage to the Wisconsin company and that to protect the interests of bondholders the mortgage should be ordered foreclosed and a receiver appointed forthwith to take charge of the properties of the defendant company.

It was on the motion for the appointment of the receiver that the case came for hearing before Judge Hickenlooper, Oct. 6. The company, through its counsel contended that if a receiver were appointed it should be T. A. Ferneding of Dayton, vice-president and general manager of the company, whose administration of the defendant company's affairs had been all that could be expected, it was stated. It was declared that Mr. Ferneding is one of the principal owners of the bonds secured by mortgage to the complainant trust company and that his record as general manager has been such as would entitle him to the full confidence of the court in the event the court should see fit to appoint a receiver.

In his statement to the court showing the loss of revenue of the defendant company through motor bus competition, Attorney Pogue stated that the company lost 71,000 passengers last year. Mr. Pogue declared emphatically that the company is not insolvent and that there is no reason for the appointment of a receiver at this time.

Indications Point to Insufficient Return in New Orleans

R. S. Hecht, chairman of the board of directors of the New Orleans Public Service, Inc., in making announcement that the books of the company for the last quarter of 1923 had just been closed, declared that, in the absence of detailed figures, the indications seemed to be that the earnings of the company have been insufficient to make a rate of return of 7½ per cent on the allowed valuation under the company's reorganization agreement, though the earnings justify the rate of return on the company's bonded indebtedness of $42,000,000.

Mr. Hecht does not anticipate that the company will make application for higher rates because of its failure to carry out successfully its compromise agreement; on the contrary, he is of opinion that when the public utilities have been thoroughly rehabiliated, which they were not during the best part of the trial year, the rate return of 7½ per cent will yet be earned on an even lower scale of rates for gas and car fares.

Large sums had to be raised to bring the public utilities to the desired standard of efficiency, so that their affairs could be economically administered; but with a new power unit recently installed and a large addition of street cars, of greater seating capacity, all of which were lacking when the trial test was started, a further test under present rates may be advisable, to learn definitely whether greater operating economies will not make it possible to earn the 7½ per cent return. The detailed figures will not be available for two or three weeks, Mr. Hecht said, when it is purposed to go over the entire year's operation with Commissioner Paul H. Maloney of the Department of Public Utilities.

Auction Sales in New York.—At the public auction rooms in New York on Oct. 10 there were sold fifty shares of West Virginia Traction & Electric Company preferred, $50 lot, and three shares of Toledo Traction, Light & Power Company 6 per cent cumulative preferred, $82 per share.

Foreclosure Suits Filed

Mortgage Bonds of $30,000,000 Matured Oct. 1—Interest Centers on United Railways' Suburban Properties

The first of two threatened suits to foreclose on property of the United Railways, St. Louis, was filed in the United States District Court in St. Louis on Oct. 2 in behalf of a Colorado holder of $4,000 of the general mortgage 4 per cent bonds of the company which fell due Oct. 1.

The action was brought by Ephraim Caplan, who filed the original suits for the receivership against the company several years ago. The suit names the United Railways and Rolla Wells, receiver, as defendants, as well as the St. Louis Union Trust Company, trustee under the mortgage securing the bonds. The total general mortgage bonds maturing Oct. 1 was $30,000,000. They were issued in September, 1899.

Foreclosure on the property of the St. Louis & Suburban Railway part of the United Railways system is planned by Samuel B. Jeffries, representing a committee of the bondholders. This action was decided upon some time ago. On Sept. 29 the Suburban bondholders were successful in their efforts to have Federal District Judge Faris deny the application of Receiver Rolla Wells for permission to extend the time for payment of the three underlying bond issues aggregating $4,100,000 due on Oct. 1.

The foreclosure suit contemplated by Mr. Jeffries would bring about the sale of the Suburban property and a separation of the merged systems. There are $4,500,000 general mortgage suburban bonds outstanding. These bonds expired on April 1 but the time for payment was extended to Oct. 1. Demand for payment on that date was made on Receiver Rolla Wells several days ago.

Outside Interests Want Suburban Control

Powerful outside interests are said to be anxious to get control of the Suburban property, which includes the Hodiamont, Sarah, Union, Manchester and the Kirkwood-Ferguson lines. In this connection the Studebaker-McKinley interests have been mentioned. It is said that should this group take over the Suburban lines they would be merged with the McKinley Traction System, which now enters St. Louis, and form the nucleus for a St. Louis-Kansas City interurban line. This system would also have connections with Danville, Peoria, Springfield and other important points in Illinois, and possibly within a very short time a line into Chicago.

Part of the plans for a reorganization of the Suburban is an elevated system along the right-of-way of the Hodiamont line, which has a private right-of-way between Vandeventer and Morgan streets and the old Suburban Garden in Wellston. This would give St. Louis rapid transit, something for which the city is sadly in need.

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Traffic and Transportation

Birmingham Railway Starts Bus Operation

As a result of the abolishment of the jitneys in Birmingham, Ala., the Birmingham Railway, Light & Power Company is planning the installation of a number of motor bus lines to run to sections of the city not reached by the street cars at the present time.

One of these bus lines went into service Oct. 6 and is being operated successfully from Birmingham to Tiddlesville, a suburb lying several miles out. Another line will be established soon operating from the city of Birmingham to the suburb of Milner Heights.

Permits for the operation of these bus lines were issued by the city commissioners of Birmingham, Oct. 6. Under a new city ordinance each one of the buses operated by the company is required to make a bond of $10,000. Bonds for the two bus lines named are already made. Arrangements are made on these bus lines for the separate accommodation of both whites and negroes.

All bus lines established by the company will connect with car lines of the company, and transfers will be issued for both the cars and the buses for the additional sum of 2 cents, the same as is charged for a transfer from one car line to another.

Dispute Over Terminal Site

The permit of the Orleans-Kenner line to use North Rampart Street between Canal and Tulane Avenue as a terminal having long since expired, the Commission Council of New Orleans, upon completion of the reorganization of the New Orleans Railway & Light Company, served notice upon the company that it would have to vacate the street that it had been using without authority as a terminal. This is one of the most heavily congested thoroughfares in the city. It is traversed by several electric railway lines and on it is located the present terminus of the Spanish Fort Railway, which operates between the city and summer resorts along Lake Pontchartrain.

The Commission Council selected a site for the Orleans-Kenner line on Howard Street. This arrangement brought on a storm of protest from the people of Jefferson Parish, the other terminal of the road, as well as objection from the members of the police jury of the parish. The site selected was objected to on the grounds that it was too far away from the shopping district and would work a hardship upon the people of Jefferson Parish, contiguous to New Orleans, who made most of their purchases in this city. At a conference held recently with Commissioners Maloney and Ray of the Departments of Public Utilities and Public Safety and representatives of the Orleans-Kenner road, the New Orleans Public Service, Inc., and the police jury of Jefferson Parish, a site on South Liberty Street between Tulane Avenue and Canal Street, only a short distance away from its present terminal, was tentatively agreed to by all parties to the conference and the incident was presumed to be closed.

It now develops that the residents of South Liberty Street, at the point selected for the new terminus of the Orleans-Kenner Railway, object to the agreement reached and have suggested in its stead that the terminal be placed in the rear of the Elks' Home. It is barely possible that the Orleans-Kenner Railway may be compelled to stop operation at the Orleans Parish boundary line and issue transfers good from that point into New Orleans over the lines of the Public Service, Inc.

The South Liberty Street protestants will be heard by the Commission Council.

Freight Service at Night North from Indianapolis

Improved interurban freight service in northern Indiana territory has been arranged by the Union Traction Company of Indiana. The new service will enable Indianapolis wholesalers and business firms to compete more advantageously with Chicago firms. H. A. Nicholl, general manager of the railway, has notified John B. Reynolds, general secretary of the Chamber of Commerce, that a new freight car, the "Cannon Ball Freight," will leave Indianapolis every night at 11 o'clock, arriving in South Bend, Ind., the next morning at 8 o'clock.

The new freight schedule will enable Indianapolis wholesalers to receive and load shipments the same day and deliver goods in South Bend and Chicago territory the next morning. This will give the local dealers a decided advantage over Chicago shippers, it is pointed out.

Efforts have been made to obtain improved interurban freight facilities to the territory about South Bend.

Temporary Permits No Longer Good.—The New Jersey Public Utility Commission issued an order on Oct. 5 directing all buses operating parallel to trolley lines on temporary permits issued by municipalities to withdraw at once. If any drivers disobey the order, the commission will request William L. Dill, Motor Vehicle Commissioner, to revoke their operators' and registration licenses. This action came after a hearing at the headquarters in Newark of the utilities body. Harry V. Osborne, president of the board, announced that Commissioner Dill had agreed to cooperate in carrying out the order.

Court Approves Jitneys in Columbia

"Jitney" drivers in Columbia, S. C., have scored two victories in the courts during the past few days, and as a consequence the competition which the Columbia Railway, Gas & Electric Company is meeting with will likely be redoubled. Recently the South Carolina Supreme Court held that the city ordinance prohibiting the operation of motor vehicles for hire on certain sections of Main Street, save under restricted conditions, was null and void. The ordinance, the court interprets, is an attempt to legislate the "jitneys" out of existence. The case originated in the City Recorder's Court, where a jitney driver was tried and convicted of violating the ordinance. The case was then appealed to an associate justice of the Supreme Court, who decided that the ordinance was null and void.

The other victory for the jitney drivers was won in the Court of Common Pleas. At a recent session of the Legislature the South Carolina Railroad Commission was given authority to supervise and regulate the operation of "public" utilities. Under this clause the railroad commission undertook to regulate the operation of motor vehicles for hire, and for the protection of passengers required the vehicles to be bonded. Some drivers arranged for the bond and others continued to operate without the bond. The commission then sought an injunction requiring the drivers to show cause why they should not be enjoined from further operating the jitneys until they had complied with the requirements. The case was argued and the judge refused the petition for an injunction, holding that "public utilities" were limited to concerns furnishing gas, electricity, heat, etc. This case, however, will be taken to the Supreme Court.

Changes in Night Service on Boston Elevated

All night service into the Tremont Street subway in Boston will be instituted Oct. 14, it has been announced by the Boston Elevated. Night car service now operated to Adams Square will run into Tremont Street. Cars will run on present schedules, using the subway instead of surface lines. Shuttle service will be operated in the Tremont Street subway connecting the lines which run to Park Street with those that run to Brattle Street. Transfer privileges will remain as at present. The keeping open of the Tremont Street subway through the night is only one of the several requests for changes in the night service that could be granted. The continuance of the 5-cent fare service from 12 a.m. to 5 a.m., the Elevated officials say, is out of the question, owing to the light traffic and consequent lengthening of routes during that period. The officials also state that a 5-cent service over one line for the benefit of a special class of patrons would constitute unjust discrimination.

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Interurban's Interstate Rates Not Unreasonable

Rates on commodities in carloads from local stations on the line of the Boise Valley Traction Company, Idaho, to interstate destinations, have been found by the Interstate Commerce Commission not to be unreasonable or unduly prejudicial.

The rates were attacked by shippers on the ground that they are unduly prejudicial to the local points on the traction line. The commodity rates are made by a combination of the traction line's local rates to the junction point and the steam carriers' rates beyond. The electric line, including branches and side track, is 80 miles in length. It extends from Boise along the north bank of the Boise River to Middleton. There it connects with the Oregon Short Line Railroad's Idaho Northern branch. It then crosses the river and connects with the main line of the Oregon Short Line at Meridian. The traction line owns little freight equipment. It interchanges only three of its box cars with the Short Line and those are used in switching service only. It depends upon the Short Line for equipment used in interstate shipments.

In its decision in the case, the commission, among other things, says:

> The financial condition of the traction line is unfavorable. During 1921 it failed to earn operating expenses and interest on its funded debt by more than $54,000. Its general manager testified that its rates were established on a low basis due to the fact that the blanket rates did not apply to or from points local to its line.

Commissioner Campbell, in a dissenting opinion, holds that the shippers on the electric line are being subjected to prejudice because the Short Line fails to grant them the same rates as are granted to shippers on other short and branch lines. He said:

> The situation disclosed by the record in this case indicates that the complaining shippers are laboring under a great disadvantage and I cannot sanction the action of the majority in depriving the shippers of the relief they seek and to which I believe they are entitled.

James F. Hamilton a Model for Employees

The successful career of James F. Hamilton, who in twenty-one years rose from conductor to the presidency of the New York State Railways, is cited in a message to the platform men of the Rochester lines of the system by Charles R. Barnes, City Commissioner of Railways, in a recent issue of the employees' magazine. In this message the commissioner points to the rapid climb of the railway executive as an example. That courtesy is an important factor in success in the traction field is stressed by Mr. Barnes.

His appeal says in part:

> You are engaged in a legitimate occupation. Your uniform should be as highly respected as any other in the city. It is up to you men to maintain such a condition. This can be done by furnishing proper service to the people, which, as far as you are concerned, consists in polite and courteous treatment—in so far as possible, having your trains on time, stopping to receive and discharge passengers, when or where as provided for by the rules, keeping your cars neat and tidy, and paying special attention to your personal appearance.
>
> Presidents of railway companies are not born; they are made. The president of your company is an illustration of that statement. He rose to his present position by strict attention to his business along the lines I have suggested.

Bus Franchise Deferred

Efforts of E. W. Hicks of Worcester, Mass., to establish a jitney service between Clinton and Sterling and Clinton to Worcester were unavailing when the Clinton Selectmen put off granting a franchise. Opposition to the establishment of the lines had previously developed from the Chamber of Commerce of the town, although it was not shown when the Selectmen considered the matter. It is said the chamber is not opposed to the Sterling and Clinton line, but has objections to any line that would compete with the Worcester Consolidated Street Railway between Clinton and Worcester. The Clinton Selectmen have not entirely discouraged any attempt by Mr. Hicks to get the franchise for they have notified him their action is simply held in abeyance to give any person or persons who cares to enter objection a chance to do so. Mr. Hicks has informed the Selectmen he has no intention of competing with the trolley lines. He is desirous of getting the Sterling to Clinton route approved, he says, to enable him to connect with the line he now operates between Worcester and Holden and Jefferson.

Authorizes Abandonment, Then Gives Bus Permit

The Public Service Commission has granted the request of the Elmira Water, Light & Railroad Company, Elmira, N. Y., to abandon a portion of its trolley line operating from Elmira to Horseheads and Watkins, on the ground that the line has not paid operating expenses for some years. At the same time the commission granted a certificate for the operation of a bus line as a substitute to supply the needed transportation facilities. The order permitting the abandonment provides that the company shall do so at its own expense and that during the time that the tracks remain, the company shall, at its own expense, keep in good repair that portion of the highways and paved streets that are now required to be kept in repair under the present statute.

The bus certificate is issued to Mr. Marshall and provides that "no local passengers shall be carried from one point to another on that part of the route between the terminal of the city of Elmira and the northerly boundary of the village of Horseheads." He is further directed to bring all buses to a dead stop when approaching railroad crossings, if any exist, and to exercise care in crossing the tracks. He is not to sell his certificate without the approval of the commission. Residents of the communities interested urged the granting of the certificate to Mr. Marshall in the event of the discontinuance of service by the trolley line.

No Reduction in Fare in Quincy

Charles G. Wadleigh, chairman of the public trustees of the Eastern Massachusetts Street Railway, has replied in the negative to the petition of Mayor Bates of Quincy that a 5-cent fare be established from the outlying sections of the city and a 3-cent additional charge for a transfer. The present rate is a 10-cent fare from all points at the edge of the city to the center, although the company sells a sixteen ride ticket for $1.

The petition presented by Mayor Bates was the result of an effort made by the workmen of the Fore River Shipbuilding Corporation, who claimed they were paying 40 cents a day to get to and from work, while still living in the precincts of the city of Quincy.

In answering Mayor Bates' request, Mr. Wadleigh said:

> In 1919 and 1920 the Quincy district failed by very large amounts to earn the cost of service. Up to about the middle of 1920, the non-profitable lines of Hingham and Weymouth were included in the Quincy district, but at that time they were set apart as separate districts, and Quincy relieved of the burden. Since 1920 the Quincy district has been fortunate in having but little burden from lines outside the city.
>
> In 1921 the district failed to earn the cost of service by $15,713. In 1922 it earned the cost of service by the narrow margin of $4,621. For the first seven months of 1923 the cost of service has been earned with a margin of only $1,799.
>
> In 1920 there was a 10-cent cash fare in Quincy, with a ticket rate of 8½ cents. Since that time the ticket rate has been lowered three times, as operating results warranted, until now the rate is 6¾ cents per ride. The last reduction in fare to the present rate was made only a little over four months ago, and, as is usual on every reduction in rate, has resulted in a reduction in earnings.
>
> It has been possible to keep the present ticket rate only by practicing the utmost economy and efficiency in operation.
>
> As you are undoubtedly aware, an arbitration board has just recently awarded the carmen in Quincy a substantial increase in wages, which is retroactive to May 2 of this year. This is an additional expense which must be met out of car fares, and it has been a serious question in our minds whether we would not be compelled to increase fares in order to get sufficient funds to pay it. We intend to make every effort to meet it without increasing fares.

Allows One-Man Cars for Interurban Service

The Railroad Commission has authorized one-man interurban service by the Eastern Wisconsin Electric Company on its Fond du Lac, Oshkosh, Neenah and Menasha interurban division. The commission in its decision allowing the company this service examined the financial figures, which showed that for the first six months of the year 1923 there was available from earnings for depreciation and return on investment for the electric railway system an amount equaling only 2.26 per cent of the value of the railway property used and useful for the public. In view of the competition to which the company is subjected by reason of steam railroad and motor bus transportation, it is doubtful if an increase in rates would result in a material increase in revenue. The commission believed that all economies in operation consistent with public safety and convenience should be adopted by the company.

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Personal Items

Thomas V. Campbell Appointed Maintenance Superintendent

Thomas V. Campbell has been appointed superintendent of maintenance of the New York & Queens County Railway, Long Island City, N. Y., and started on his new duties Sept. 17.

Mr. Campbell began his railroading career in 1898 with the old Metropolitan Street Railway of New York and was with it for ten years, serving in various capacities from dynamo wiper to shop foreman. In 1908 he took charge of the equipment of the Yonkers Railroad. In 1911 he was appointed shop foreman of the New York City Interborough Railroad, which later became part of the Third Avenue Railway system. His next position was as shop foreman of the Smith Street division of the Coney Island & Brooklyn Railroad, which position he held until February, 1914, when he went with the Public Service Railway of New Jersey, remaining there three years and leaving to accept a position with the Submarine Boat Corporation in charge of the electrical installation on vessels that company was turning out during the war period. In March, 1921, Mr. Campbell became master mechanic of the Jersey Central Traction Company at Keyport, N. J.

Mr. Campbell's duties in his new position with the New York & Queens County Railway include the maintenance of the transmission and distribution system, as well as rolling stock and buildings.

George S. Brush with Motor Company

George S. Brush, for the last five years superintendent of transportation of the Houston Electric Company, has resigned to go to New York, where it is announced that he will become associated with a company manufacturing trucks.

Mr. Brush has been a prominent figure in the railway field since 1908, when he entered the employ of the Boston Elevated Railway in the transportation bureau. During vacation time, prior to this, he was employed by the Middlesex & Boston Street Railway, at Newtonville. Here he did original work in the direction of publicity for traffic stimulation. From the transportation bureau of the Boston Elevated, he was transferred to the president's office, later to the claims department, and in 1910 was appointed chief clerk of Division 6, with headquarters at Sullivan Square terminal, Charlestown. He later became chief clerk of Division 8, which comprised the entire business section of Boston and included all surface cars, subways and tunnels.

In December, 1915, Mr. Brush was appointed superintendent of the railway department of the Cumberland County Power & Light Company, in Portland. He left that position early in 1918 to become superintendent of transportation of the Springfield Street Railway, Springfield, Mass., succeeding F. V. Fabian. In the fall of 1918, Mr. Brush tendered his resignation as superintendent at Springfield and accepted the position of superintendent of the Houston company, a Stone & Webster property.

Mr. Brush was born in Stillwater, Minn., in 1884. He was educated at the Massachusetts Institute of Technology, taking the course in mechanical engineering. While he was engaged at Portland with the Cumberland County property, he was regarded as one of the best younger operating executives in New England electric railway circles.

Another Promotion for I. W. Pettengill

I. W. Pettengill, who recently was made secretary and general manager of the Cincinnati, Milford & Blanchester Traction Company, which promotion was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Sept. 15, has been elevated to the presidency of the interurban company. He succeeds J. P. Peurrung, who resigned after ten years service to engage in the match manufacturing business in Cincinnati. Before his affiliation with the interurban company, Mr. Pettengill was electrical engineer for the Cincinnati Screw Company, Loveland, Ohio.

Henry Kroger, a son of B. H. Kroger, owner of the Cincinnati, Milford & Blanchester Traction Company, has been made secretary and treasurer, while Chester Kroger, another son, has been made assistant secretary and treasurer. Under the previous arrangement Henry Kroger was treasurer and Chester a director of the interurban company. As president, Mr. Pettengill will be in active charge of operations.

H. D. Cowles Chief Inspector

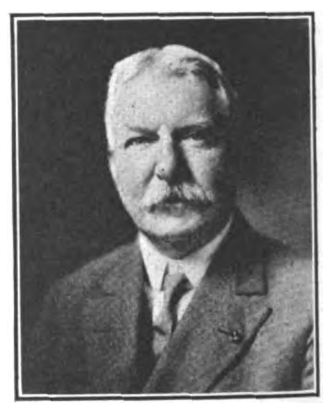
E. M. Walker, president of the Schenectady Railway, has announced the appointment of H. D. Cowles, an electric railway man of twenty-three years' experience, to the new post of chief inspector. In future, all inspectors and motorman instructors will report to Mr. Cowles, who will have an office in the waiting room in State Street, Schenectady. Mr. Cowles has been associated with the company in Schenectady for the past four months.

From 1901 to 1907 he was a motorman on the Hudson Valley lines. For the next ten years he served the same company as train dispatcher and inspector. For three years beginning in 1917 he was assistant superintendent in Youngstown and since then has been with the New York State Railways in Rochester as chief inspector and then with the United Traction Company in Albany.

Ralph Peters Dead

Was One of the Biggest Figures in American Railroading—Transformed L. I. R.R. Into Great Trunk Line

The man who changed a summer excursion line to one of the greatest passenger railroads in the United States died suddenly on Oct. 9 at his home in Garden City. He was Ralph Peters, president of the Long Island Railroad for eighteen years. On Nov. 19 next, his seventieth birthday, he would have completed fifty years in the railroad business. The romance of railroading was probably born in him, as his father, Richard Peters, was one of the pioneer railroad builders of the South.



Ralph Peters

Ralph was born in Atlanta, Ga., and after graduation from the University of Georgia entered the employ of the Atlanta Street Railways, serving in the capacity of superintendent and purchasing agent for two years. Later he went to the Pennsylvania Railroad. From 1901 to 1905 he was general superintendent of the Southwest System of the Pennsylvania Lines West of Pittsburgh, with office at Columbus, Ohio. When in April, 1905, a vacancy occurred in the position of president and general manager of the Long Island he was selected for that office. Since that date he had been at the head of the Long Island System, as president and chief operating officer of the Long Island Railroad, New York & Rockaway Beach Railway, New York, Brooklyn & Manhattan Beach Railway, Montauk Steamboat Company, Ltd., and eighteen other subsidiary lines.

When the government took over the control of the railroads in 1918 Mr. Peters was selected as Federal manager of the Long Island System. He accepted the post and was relieved of his duties as president of the corporation until March 1, 1920, when the railroads were returned to their owners.

The growth of the Long Island Rail-

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road is a monument to the untiring energy and extraordinary perseverance of Mr. Peters, who converted this line from an excursion line to one of the greatest trunk line railroads in the country.

One of Mr. Peters' greatest achievements was in the matter of electrification. Electric train service was started in 1905 between Flatbush Avenue terminal, Brooklyn, and Rockaway Park. Since that date electrification has been extended until now there are 227.2 miles of electrified track in operation on the Long Island System.

In 1905 the system carried 18,000,000 passengers and 2,745,000 tons of freight. In 1922 the road carried 79,656,891 passengers, while freight to the amount of 6,027,860 tons was hauled. More than $50,000,000 has been invested in improvements and equipment on the road since Mr. Peters assumed the presidency.

During his eighteen years as head of the Long Island he has done more than any single man or organization to promote and develop the agricultural resources of Long Island and was instrumental in bringing about the cultivation of tens of thousands of acres of hitherto idle and non-producing land on the island.

His was a policy of expansion and development. Although he lived to see many of his dreams of reconstruction and transformation come true, he still had a vision of the time when all the branches of the system would be electrified, and a four-track line from one end of the island to the other, and when Montauk Point, at the extreme eastern end of Long Island, would be a monumental port of entry for transatlantic steamers.

Although a busy executive in the railroad field, Mr. Peters cultivated other interests also. He was a member of the Society of the Sons of the Revolution and of the Colonial Wars Society and held membership in the Union League Club of New York and the Cherry Valley Golf Club of Garden City. He is survived by his wife, a son, Ralph, Jr., who is superintendent of transportation of the railroad, five daughters, a brother and a sister.

Lewis R. Schenck

Lewis R. Schenck, president of the Toledo & Indiana Railroad, Toledo, Ohio, died suddenly on Oct. 4 at his home in Toledo. For many years Mr. Schenck was connected with the J. G. White Engineering Company in New York City. When his father, S. C. Schenck, died he returned to Toledo and took up the management of the S. C. Schenck Coal Company and following the death of his brother he was elected head of the Toledo & Indiana line of which his father and brother had been president in turn. Mr. Schenck was born in Toledo, July 29, 1880. After he was graduated from the public schools he attended St. Paul Preparatory School in Concord, N. H., and later entered Yale from which university he was graduated in 1904.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

59,008 Surplus Cars on Sept. 22

The railroads of the country on Sept. 22 had 59,008 surplus freight cars in good repair and immediately available for service. This statement is in accord with reports filed by the carriers with the Car Service Division. On the same date the reported car shortage for the country as a whole was 13,515 cars. Compared with Sept. 14, the number of surplus freight cars on Sept. 22 represented a reduction of 10,072, while there was an increase of only 270 cars in the reported car shortage in the same period. The railroads reported on Sept. 15 that they had fewer freight cars in need of repair than at any time since may 15, 1920. The number in need of repair on Sept. 15 totaled 165,284, which represented a decrease of 10,043, compared with the number in need of repair on Sept. 1, at which time there were 175,327.

Anaconda Buys National Conduit & Cable Hastings Plant

The American Brass Company, an Anaconda Copper subsidiary, has purchased at receiver's sale the plant of the National Conduit & Cable Company for $3,000,000. Confirmation of this sale was made Oct. 4. The purchase price is the amount of bond issues standing against the property of National Conduit & Cable at Hastings-on-Hudson, N. Y., the bulk of which was bought up some time ago by Anaconda.

The rod and wire mill at Hastings, which is the property purchased, has a capacity of 10,000,000 lb. per month and is in good condition, requiring only minor changes to make it efficient.

This new purchase by the Anaconda organization fortifies those wire mills so located as to cater economically not only to domestic but to world demand. The Hastings plant is particularly well adapted to the exporting of copper rods and electric wires to continental Europe.

Second Power Show Scheduled

The 1923 Exposition of Power and Mechanical Engineering will be held in the Grand Central Palace, New York City, Dec. 3 to Dec. 8. The number, diversity and interest of the exhibits of the second exposition promise to excel those of the first exposition held in December, 1922. The exhibits will be supplemented by an extensive program of moving picture films to be presented in co-operation with manufacturers. Last year the picture program was found to interest the layman who was not informed about technical processes and the engineer whose close application to one field of his work had not enabled him to keep up with progress in the rest of the profession.

About two hundred exhibitors have signed contracts for space.

Chilean Railways to Obtain Block Signaling Materials from Union Switch

The electrification of the Chilean State Railways from Valparaiso, on the Pacific Ocean, to Santiago, the capital, located in the foothills of the Andes Mountains, is the most extensive trunk line electrification yet undertaken in South America. This railway, part of which is single and part double track, connects the metropolis of the west coast of South America with its most important seaport, traversing a mountain range having an elevation of 2,500 ft. The first regular electrically operated train was run over a portion of the line in July. It is anticipated that the installation will be completed and all trains electrically operated by Jan. 1.

Contract has been awarded the Union Switch & Signal Company for 515 Style R color light signals, 1,189 alternating-current relays, impedance bonds, check-locking circuit controllers, track and line transformers, pot signals, instrument housings, etc., for complete track circuit signaling between Valparaiso and Santiago, where the signals are semi-automatically controlled, and for the signaling of the Los Andes branch, where the control is manual. Check-locking using Union Switch Electrically locked circuit controllers, including complete track circuit control, will be installed on the single-track portion of the main line.

The construction work will be handled by the railway company's forces under the supervision of W. J. Evans, chief of the department of signals, telegraph and telephone, and P. Godoy, his assistant.

Metal, Coal and Material Prices

Metals—New York	Oct. 9, 1923
Copper, electrolytic, cents per lb.	13.00
Copper wire base, cents per lb.	15.25
Lead, cents per lb.	6.85
Zinc, cents per lb.	6.61
Tin, Straits, cents per lb.	42.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.825
Somerset mine run, Boston, net tons	2.375
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons	1.25
Central, Ill., screenings, Chicago, net tons	.70
Kansas screenings, Kansas City, net tons	2.25
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.60
Weatherproof wire base, N. Y., cents per lb.	18.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal.	$0.98
White lead, in oil (100-lb. keg), N. Y., cents per lb.	11.375
Turpentine, (bbl. lots), N. Y., per gal.	$1.04

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Rolling Stock

Jacksonville Traction Company, expects to buy four cars for use in South Jacksonville.

Kitchener & Waterloo Street Railway, Kitchener, Ont., it is reported, will soon be in the market for several new street cars.

Knoxville Power & Light Company has placed an order with the Cincinnati Car Company for fourteen cars of the most modern type. The order specifies seven single-truck cars and seven double-truck cars. The cars will cost $134,000 and first deliveries have been promised for February, 1924. The reported purchase was referred to in the ELECTRIC RAILWAY JOURNAL of Sept. 22.

Track and Line

Frankford, Holmesburg and Tacony Railway, Philadelphia, during the present year has constructed and equipped with new rails 2 miles of road and it is proposed to construct 2 miles more next year and another 2 miles in 1925.

Princeton Power Company, Princeton, W. Va., will extend the west end line in Graham to Maple Hill Cemetery and Shelby Heights and the loop line to the fair grounds and Bluefield College.

Conestoga Traction Company, Lancaster, Pa., is building a new section to the Ephrata-Lancaster line which will pass through Talmage, Brownstown and Akron. Construction is expected to be completed by Nov. 1.

Asheville Power & Light Company, Asheville, N. C., is arranging for improvements to relieve congestion in the Pack Square district. A loop system of tracks will be laid and new equipment added. The improvements will cost about $200,000, C. S. Walters, vice-president and general manager, announces.

Power Houses, Shops and Buildings

Illinois Power & Light Corporation, Chicago, is planning to construct a power house at Venice, to cost $1,200,000.

Tri-City Railway, Rock Island, Ill., has decided not to erect the planned carhouse in Moline, it was learned. The project would have cost the company $60,000. The company, after considering the matter for some time, decided it could not afford to undertake this construction at this time.

Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa, is improving its property, especially at Boone and Fort Dodge. The W. J. Zitterell Company has been awarded a contract for the erection of a new carhouse at Boone. President C. H. Crooks of the Fort Dodge line has announced that construction has already been started on the new buildings which are being erected at Fort Dodge, replacing structures destroyed recently by fire. The contracts for the new carhouse and yard office were let recently. The buildings will be of modern construction, brick and concrete, and the total cost will be about $150,000.

Trade Notes

American Gear Manufacturers' Association will hold its seventh semi-annual meeting at the Mountain House, Lake Mohonk, New York, Oct. 25, 26 and 27. The first general session of the meeting will be on Oct. 25, when the new president of the association, George L. Markland, Jr., of the Philadelphia Gear Works will preside. On Oct. 26 A. W. Copeland of the Detroit Gear & Machine Company will preside over a special meeting of the automotive group for the discussion of conditions in that industry.

Norma Company of America, Long Island City, has placed contracts for the erection of the first unit of its new plant upon its property recently acquired at Stamford, Conn. The company's Stamford plant will be equipped for the manufacture of Hoffmann precision roller bearings, the American rights to which, as well as to all other Hoffmann products, were recently acquired by the company from the Hoffmann Manufacturing Company, Ltd., of Chelmsford, Essex, England. The plant will also be equipped for the expansion of the manufacture of Norma precision ball bearings. The company's present plant at Anable Avenue, Long Island City, will be continued for the production of Norma precision open-type annular ball bearings.

Elliott Service Company, 244 W. Forty-ninth Street, New York, has announced through C. W. Price, vice-president in charge of the public safety division, that there is now available for the electric railways interested in reaching the public with the safety idea a plan for bringing about the introduction of instruction in accident prevention in the public schools in their respective communities. According to Mr. Price, electric railway executives were among the first to realize that the problem of street accidents will not be solved until the safety idea has been brought into the home, and that this can be done most effectively by getting school children interested in safety. Because of the increasing demand for literature and other material which could be used to introduce this subject in public schools, Dr. E. George Payne, professor of education of New York University, and author of the first definite plan for safety instruction in public schools, has prepared a series of eighteen pamphlets for superintendents, principals and teachers, together with detailed instructions and suggestions for the introduction of safety instruction in the present curriculum in the school system. This entire series by Dr. Payne may now be secured by electric railways for introduction in the public school system in their respective communities as part of the complete public safety service of the Elliott Service Company. Dr. Payne's plan is now in use in the schools of more than 100 cities. It is said that its adoption has made it possible for the cities of St. Louis, Kansas City and Detroit to cut accidents to children practically in half. In recognition of his pioneer work in this field and because of the growing interest in the subject of school safety on the part of students and graduate teachers New York University has created for Dr. Payne the first collegiate chair in safety education.

New Advertising Literature

Southern Pine Association, New Orleans, La., has issued the ninth revised manual of standard wood construction. This edition contains the information needed to solve every-day problems in wood construction.

Roller-Smith Company, New York, N. Y., has issued bulletin No. 450, describing alternating-current switchboard instruments, and bulletin No. 560 on the "safety" circuit breakers Types "P" and "E."

Rome Wire Company, Rome, N. Y., has issued two pamphlets, one describing its special, extra-flexible electric welding cable and the other the new super-service junior cord, suitable for many applications. A booklet of twenty pages has been produced giving full information on the super-service cords and cables.

Ohio Brass Company, Mansfield, Ohio, has issued its 1924-1925 catalog, which is a substantially bound book of nearly 800 pages, with special diagrams on high-tension insulators, trolley line materials, rail bonds and tools, third rail insulators and car equipment specialties. The book contains a classified index to materials, a catalog number index and a code word index.

Uehling Instrument Company, Paterson, N. J., has issued a new bulletin, 116A, which illustrates three simple devices which, it is claimed, completely eliminate three troublesome elements of the CO_2 recorder. In other words, they permanently prevent fouling and corrosion of the CO_2 equipment and the tubing which conveys the gas sample to the instrument continuously. These three devices are known as the "Pyro-Porus" filter, the gas drier and the gas purifiers. The bulletin also illustrates the small bore seamless drawn tubing used for the gas sampling line. This gives high velocity of gas flow, resulting in quick response to the CO_2 recorder to changes in furnace conditions. This tubing is much easier to erect than pipe, which was formerly employed for the purpose, and practically eliminates all possibility of sampling line leakage, which is a common failing of sampling lines constructed of pipe instead of tubing.

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New York, Saturday, October 20, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 16

A Helpful Program of Activity for 1924

CONTINUED and intensified effort toward good public relations, study looking toward uniform regulatory laws and better franchises, modernizing plant and equipment and practices, study of how to secure relief from unjust tax burdens, further treatment of valuation matters, unification and co-ordination of all forms of transportation, rapid transit, and continuation of the educational work—these are the main topics to which the work of the American Electric Railway Association is to be devoted during the coming year. These are all matters in which the industry has a keen interest, hence the year's work should prove very helpful.

One particularly important assignment is that of modernization. In line with the recommendations of the subjects and meetings committee, this topic is to be handled by two committees, one on city operation and one on interurban operation. The object sought is to emphasize the need for modernization and to show what can be done in this direction. Much more has been done along this line by city properties than by interurban. Hence the work of the interurban committee will be particularly timely. The need here for improvement in nearly every way is so great that the opportunity of this committee to perform a real service to the interurban lines is exceptional. Its efforts will certainly be appreciated and welcomed by the interurban operators.

The study of the bus this year by the parent association will be devoted to the economics of the transportation needs of the community as a whole. The affiliated associations will consider operating details of the bus.

The Accountant Has a Real Opportunity

THE importance of the work of the accountant was well exemplified by the proceedings of the Accountants' Association published in the ELECTRIC RAILWAY JOURNAL this week. President W. G. Nicholson stated the matter concisely when he said in his address that the utility accountant of today is more than a bookkeeper, and that he must be well informed in all the various branches of the business.

Some of the topics discussed were co-operation with the national associations of other utilities and utility commissioners to standardize accounting methods, control of expenditures by the budget system, classification of accounts for subsidiary bus operations and stores accounting. This wide range of subjects gives an indication of the present-day problems with which the accountant is concerned.

The discussion on budgetary control was an indication of the opportunity before the accountant. In such studies the auditor can analyze the various sources of expenditure and point out where the executive should look to save unnecessary expenditures.

Perhaps more attention should be given to elimination of unnecessary or duplicate accounting work. In the study of some particular problem the executive may call for a certain analysis of accounts continued over a period of perhaps six months or a year. The solution may be obtained and the report forgotten by the general manager, but not by the accounting department. Following the established routine, the report may be prepared month by month, only to be filed away by some clerk without the knowledge of the executive. A close watch should be kept upon special or unusual reports to prevent such a waste of effort.

Altogether the auditor is one of the most useful aids to the management. The writer of this editorial has seen numerous instances where the management did not know the true financial condition of the road, largely because the auditor was unable to give the needed figures in such shape as to be useful. The first step toward making money is to know how to spend money wisely, and if the accounting department can do this a long step has been taken toward making a property successful.

Accountants' Association Should Have Support of More Companies

WHILE the present personnel of the Accountants' Association is quite active in following up the more important questions of the day, it goes without saying that a body of men numbering less than fifty at this time is working under a severe handicap. The membership in the association and the attendance at the conventions need to be increased materially before the industry can be expected to receive the full benefit therefrom. This is largely a matter for the accountants themselves to consider, but at the same time the executives of the various companies are in a position to encourage their accounting officers to enter into the work of the association and should do so whenever possible.

During the past few years the requirements of the electric railway accountant have been increasing steadily. He is continually being called upon to answer new questions and solve new problems concerning which he has no precedents. To a great extent he must work them out on his own responsibility, and in order to be of service to his company he must develop himself. Such self-development can of course come only through years of study and experience, but it can be materially facilitated through personal contact with other members of his profession and mutual discussion of the various problems. This is one of the most, if not the

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most, valuable features of the annual convention, and it seems unnecessary to say that it should be encouraged to the fullest extent.

One instance pointed out at one of the meetings of the association is worthy of particular comment, as it clearly shows the value of accurate figures furnished promptly to the management. By means of a detailed statement of maintenance costs on certain types and units of equipment it was possible for the general manager of a large company to keep in touch with conditions from day to day and thereby effect savings amounting to hundreds of thousands of dollars per year. This is an example of what the accounting department can do.

Leadership Needed in Traffic Problems

THE need for more comprehensive knowledge of street traffic and methods of regulating it was emphasized by the report of the committee on traffic regulations of the Transportation & Traffic Association and the ensuing discussion at the Atlantic City convention. The rapid increase of population of our urban centers and the even more rapid increase of the riding habit make the outlook for the future even more serious than the present situation, bad as it is.

Although the greater part of street congestion is due to the rapid increase in the use of motor vehicles, the various national automobile organizations are doing little if anything to reach a solution. The American Electric Railway Association and its affiliated associations have taken the lead and through several committees have made a start. It is little more than this, however, and most of the work lies ahead.

An interesting commentary on the causes of congestion was pointed out in the discussion. Removal of street car tracks is frequently advocated as the one cure for the transportation situation. The falsity of this position is seen from figures collected in Los Angeles and referred to in the discussion, which showed that the automobile traffic on streets without railway tracks was only about 40 per cent greater than that on streets where tracks existed.

When the relative carrying capacity of street cars and automobiles is considered the absurdity of the removal of car tracks to solve the traffic problem is apparent. Regardless of what is said by certain enthusiasts, the street cars carry the bulk of passenger traffic. The committee on traffic regulations pointed out that the average surface car system carries daily a number of passengers more than equal to the entire population of the city it serves. Even in New York City, with its extensive system of rapid transit lines covering four of its five boroughs, the surface cars carry some 40 per cent of the total riders.

The present haphazard methods of regulating traffic should somehow be made more effective from the standpoint of the greatest good for the greatest number. The many palliatives for congestion must be studied, standardized and applied where they can give relief. Municipal authorities must be brought to see that better traffic control is necessary for the continued growth and prosperity of their communities.

In view of the present and growing seriousness of the situation, and the need for immediate constructive work, the American Electric Railway Association can well undertake aggressively to secure the co-operation and support of all the interests affected. This is essential not only to safeguard the interests of the street railway industry but to render a still larger service to the communities all over the nation.

Definite Results Obtained at the Claims Convention

THE results accomplished at the 1923 convention of the Claims Association will be recorded with credit in the history of that organization. Two subjects which have taken considerable thought by committees as well as time of delegates at previous conventions were settled definitely at Atlantic City. The first of these was the acceptance of a code of ethics for railway claim agents. One of the encouraging signs of the times is the adoption of such codes by organizations representing professional men. It helps the insider to know what to do, and it helps the outsider to know what he may expect from men in that profession. The need of such a code for the railway claim agents has been felt for some time, and this need was well supplied by the code submitted by Mr. Sears of Boston. With one or two slight changes in wording which were suggested by the committee appointed to consider the code and were accepted by Mr. Sears, the code was promptly and unanimously adopted. This code should be of great benefit to the organization.

Extended discussion took place at the claims convention between those in favor of a large claims organization, prepared to look up and settle with prospective claimants, and the advocates of a small organization. The latter based their argument on the theory that if any one wants damages from a railway he should visit the office of the company and make his claim there. Here also a definite conclusion was reached by the delegates, i.e., that neither plan can be followed exclusively to advantage. In some cities, especially where there are large foreign populations apt to be misled by the wiles of the ambulance chaser, outside investigators seem necessary. Nevertheless, it is not too much to say that the evidence presented by Mr. Robinson of Cincinnati of what a very small force can do in favorable surroundings produced a great impression. In the future the burden of proof will rest on the manager of a large staff of claims investigators, adjusters and clerks that such a staff is necessary.

Outside of these two topics, the greatest interest at the Claims Association centered around the subject of automobile accidents. This also has been a perennial subject. The private automobile has done so much direct and indirect damage to the street railway—indirect in taking away its passengers and in blocking its right of way and direct in colliding with its cars—that the outlook seems about as dark as it could be. Nevertheless, here also progress was reported at the Claims convention. On this topic Cleveland seems to be the bright spot in the country, with its traffic courts, though the sun is shining through also at Rochester, Chicago and Detroit, which have courts of this kind, and seems about to break through the clouds in other cities. In fact, the history of the automobile menace promises to follow that of many other evils. When they get too bad, the people will rise up and suppress them. It is the hope of the claims agent that through some central point, perhaps a safety engineer at association headquarters, the coming of this relief may be hastened.

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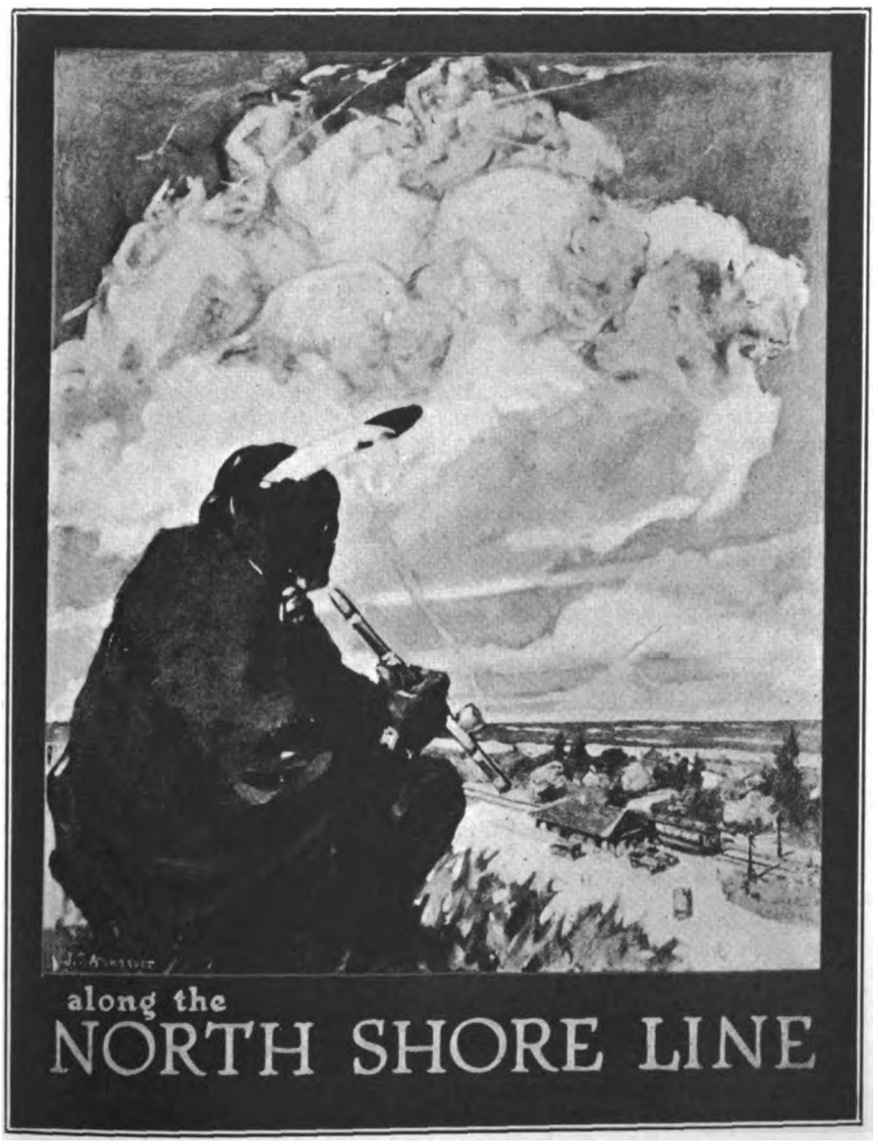
The Brief that Won the Charles A. Coffin Prize for 1923

The Intensely Interesting Story of the Chicago, North Shore & Milwaukee Railroad—a Story of Achievement—as Told in the Company's Brief Submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association Is Printed Here in Full, Together with a Few of the Illustrations

AS ANNOUNCED in last week's issue of ELECTRIC RAILWAY JOURNAL, page 591, in connection with the report of the Charles A. Coffin prize committee, the gold medal in the electric railway field was awarded this year to the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill. The brief submitted by the company is a beautiful example of the printer's art. It is a printed book with a three-color and black process cover, which is reproduced herewith, though much of the effect is lost by the absence of the colors. Inside, the matter was printed on exceptionally fine deckle edge paper with illustrations printed in sepia, with hand-lettered headings for the main subdivisions of the report and with an insert reproduction of one of the company's three-color and black process posters reproduced in the original colors. The book was well illustrated with graphic charts showing the trend of the company's business, economies effected, etc., and with numerous pictures illustrating various types of equipment, including motor buses as well as cars, samples of posters used effectively, reproductions of billboard advertising, three pages of newspaper clipping reproductions, one of the company's fine new stations, pictures illustrating safety work and others showing the work the company is doing with its employees. Altogether the book comprises forty-seven pages and represents a considerable expenditure of effort.



Reproduction of the Cover on the North Shore Line Brief

The brief of the North Shore Line starts out with an introductory statement which sets forth the eight factors drawn up by the committee to indicate the matter which would be considered in making the award, and then explains the general manner in which these eight points were treated. These eight points were printed in connection with the committee report in last week's issue of the JOURNAL. The introductory statement also explains that clauses 3 and 4, which dealt respectively with the introduction of original ideas leading to economies, and the extent to which the company had taken advantage of economies originating with others, were treated jointly. The explanation given is that while many economies in operation on the North Shore Line have resulted from original ideas and experiments, the company has nevertheless not hesitated to apply practices developed on other properties if they seemed to be an improvement. But as it is difficult to substantiate a claim for originality in ideas, the North Shore Line was content to rest its claim for recognition, it said, on the manner in which it has taken advantage of every development in the industry and turned it into achievement. The full statement of the North Shore Line after the introductory chapter follows:

Popularizing Electric Railroad Service

THAT electric railroad service can be made popular; that a railroad can get more riders and more revenue in the face of the keenest competition; that it can get the communities it serves to work for it, instead of against it, is fully proved in the case of the North Shore Line.

It has been done.

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Without increasing its trackage—except to the extent of gaining an entrance to the heart of Chicago over the elevated—the North Shore Line in the seven years of operation under the present management, has seen the number of its passengers double and its gross annual earnings multiply by five. It has seen the gross earnings from its freight traffic multiply by fifteen in five years; grow from an insignificant item to nearly a million dollars a year.

From a railroad patronized only as a necessity when other means of travel were not readily available, it has become "the most talked about electric railroad in the country," and is patronized by thousands of travelers in preference to any other means of transportation in the territory through which it runs.

How was this accomplished?

The answer may be epitomized in a single sentence: *By giving service and telling the public its story.*

Service Must Be Convenient

An electric railroad to gain and hold the confidence and support of the public, must give a service that is convenient. The traveler going a considerable distance, thinks first of the time consumed on the way. To suit his requirements, trains must be operated at a high rate of speed with as few stops as possible.

For the traveler going a shorter distance, perhaps only a few miles to the next city on the line, speed is not as essential as frequency of service. He expects a train to be there to take him at almost any time he may wish to go. If it is there, he will patronize it and praise the service. If he has to wait for a train, he will try to get to his destination in some other way and complain about the character of the service given by the railroad.

Under the present management conditions on the North Shore Line are carefully considered from the standpoint of the needs of the public, and train schedules arranged accordingly. Service is classified under three heads —Limited, Express and Local. An hourly limited service is maintained between Chicago and Milwaukee, schedules being arranged so that trains leave both cities every hour, on the hour. Travelers do not have to refer to a timetable. The service is frequent and convenient and hence popular.

Between Chicago and Waukegan, a distance of about 35 miles, the territory is closely built up. Although there are a number of separate municipalities, for transportation purposes it is almost a continuous city, making more frequent service and more stops necessary. To meet this condition a half-hourly express service was put in effect. This is distinct from the limited service, although the latter is available also for travelers between Chicago and Waukegan, if they prefer it. This schedule provides a service of three trains an hour in each direction, besides a convenient local service.

Although this service was more than the traffic at first justified, it was maintained and soon the people began talking of the excellent service the road was giving. The sentiment gradually changed, and from hostile critics, the people along the line became enthusiastic boosters.

As through travel between Chicago and Milwaukee increased, the management decided that an even faster service should be given through travelers and three extra trains in both directions were recently put into service, making no stops between Evanston and Kenosha. These trains reduce the running time twenty minutes and proved popular from the first day they were put on. One of the trains is run to connect with the Twentieth Century and the Broadway Limited in Chicago, and is popular with business men in Milwaukee, Racine and Kenosha, desirous of making close connections with those trains without loss of time. Each of these trains was given a distinctive name, mainly for advertising purposes.

Anticipating the Public Wants

It is the policy of the North Shore Line to anticipate the wants of the public and put on additional service without waiting to have requests made by its patrons. In line with this policy a half-hourly limited service was recently put on between Milwaukee and Kenosha, and although the traffic hardly warranted it, there has been a gradual and steady increase in business. The extra service is greatly appreciated by the people in the cities served, and it helps to strengthen the spirit of good will toward the company.

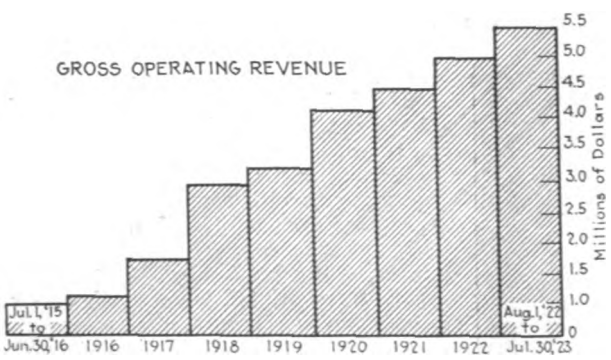
Although an average speed of almost a mile a minute is maintained on the northern division of the North Shore Line, it was found possible last September, when time schedules were being revised, to cut down the running time between Chicago and Milwaukee by five minutes. The fast time made by trains, combined with their frequency, is the biggest factor in the popularity of the company. With forty-six limited trains operating daily between Chicago and Milwaukee travelers do not have to seek other means of transportation because of inadequate service.

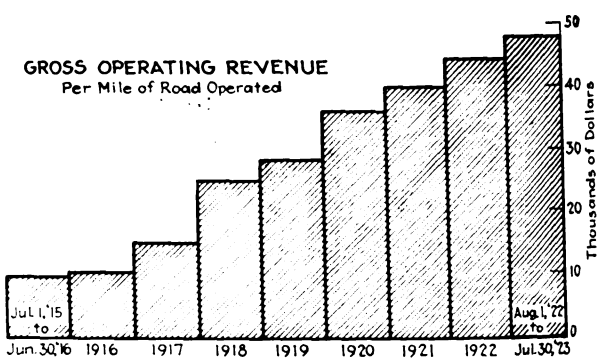
Equipment Must Be Modern

The foregoing brief sketch of the character of service given by the North Shore Line, is intended to show that adequate service is essential if popularity is to be achieved. But the mere running of trains does not mean service, as that term is understood by the traveling public of today. The term "service" embraces many things. No matter how frequently trains may be run, if they are made up of cars of obsolete type, unsightly in appearance and uncomfortable in riding qualities, they will not meet with popular favor. If the cars are good and the roadbed in bad condition, the service will not satisfy the public. If employees are untidy in appearance, careless in the manner in which they perform their work, if they do a small favor for a passenger grudgingly and only when asked, the service is unsatisfactory. If ticket agents are not ready to answer correctly and promptly any and all questions asked by the public relative to service, prospective customers will turn away disappointed and form a poor opinion of the company. It is the policy of the management of the North Shore Line to see that no detail is overlooked to make riding pleasant and agreeable. Every item which enters into giving service, in the broadest sense of that term, is carefully checked and made as nearly perfect as it is humanly possible to make it.

Improvements in Type of Car

Owing to the steady increase in business, it has been necessary for the North Shore Line constantly to keep adding to its equipment. Within the last year seventy-five new cars have been put in service, thirty-five of which were gondolas, fifteen merchandise despatch, twelve one-man safety cars, one line car, one dining car, two parlor-observation cars and nine steel coaches.





Charts from the Brief Showing the Growing Popularity of the North Shore Line

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Marked improvements have been made in all the passenger cars over cars of similar type put in service as late as two years ago. The improvements are the result of careful study on the part of the company's engineers, based on experience, and conditions peculiar to the property. Passengers are quick to notice the improvements and remark that the company is always doing something to add to the comfort of its patrons. Good equipment is conducive to goodwill.

Heating and Ventilating

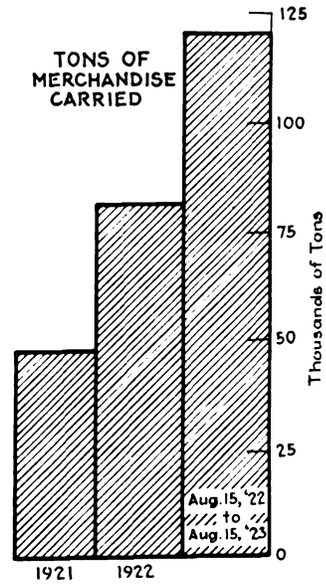
Proper heating and ventilating of cars are essential to the comfort of passengers. In those respects great improvements have been made in the latest type of coaches put in service by this company. Each car is equipped with a double system of heating, one consisting of a large water heater with circulating pipes, and the other of electric heaters of 630 watts capacity, each with thermostatic control. The electric heaters are used in the spring and fall, when weather conditions do not warrant the operation of the hot-water heaters. In extremely cold weather the electric heaters can be used in conjunction with the hot-water heater, if they are necessary to keep the cars comfortable.

For ventilation each car is equipped with one automatic intake and eleven automatic exhaust ventilators. The air from the intake ventilator is passed over the hot-water heater pipes before entering the car body. The electric lights are in the ceiling in large bowls giving a soft and well diffused illumination to the car. The dining cars are equipped with wall lighting fixtures, mounted on the panels between windows, in addition to the ceiling lights. Each car is provided with storm windows and with screens, and has three oscillating fans. Special attention was given the interior finish and fittings, so that the cars would be attractive as well as comfortable.

Parlor-Observation Cars

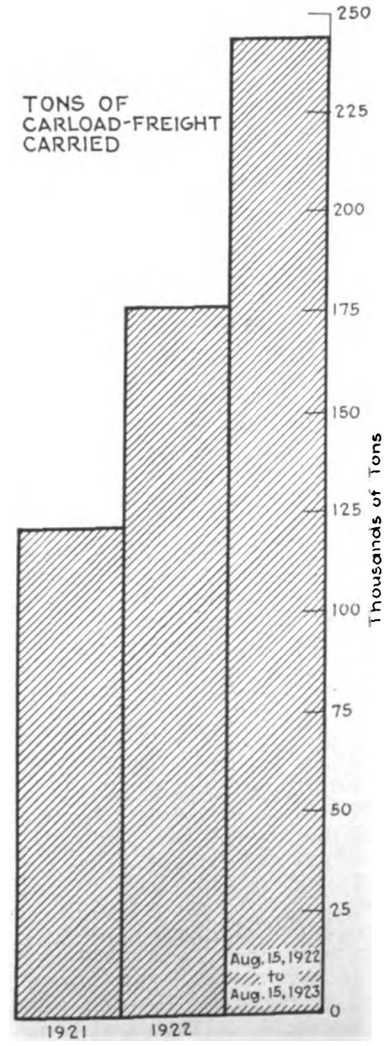
Two parlor-observation cars were placed in service in July, 1923, the first of the kind introduced on the North Shore Line. These cars have a seating capacity of 29 passengers, including the smoking compartment. They are equipped with the double system of heating used in the new type coaches, each car having twenty-five electric heaters of 500 watts capacity and a hot-water heater with circulating pipes. The ventilating system is the same as in the new coaches. The car interiors are finished in mahogany, rich and pleasing in appearance. The seats consist of large mahogany armchairs, upholstered in fine figured plush, the arms arranged to hold a small tray on which soft drinks and light lunches may be served.

That such comforts are appreciated by travelers was shown the first day the cars were put in service. Although an extra charge of 50 cents is made on these cars, they have been filled to



capacity on every trip, indicating that the public will gladly pay for special service.

During the last year the management decided to extend the service by means of motor coach lines into territory without adequate transportation facilities, through tickets being issued



Charts Used to Show How Good Service Given Shippers Brings Increased Tonnage

good for both rail and bus lines. A fleet of twenty-seven company-owned motor coaches is now operating on four routes, additional ones being rented for special days when business is unusually heavy. In line with the established policy of having the most attractive equipment that can be obtained, four types of coaches are being used by the company, one being a parlor coach, which is reserved for special chartered car passengers. While the motor coach lines give a local service, they are intended principally as feeders for the electric railroad.

Selling Transportation Service

Second in importance to giving good transportation service, is selling it to the public, and in that respect the North Shore Line has been unusually successful, as is proved by its rapidly growing business and the goodwill toward the company which exists in every community along the line. The selling of service is accomplished in a variety of ways, and no way is wittingly overlooked by this company. Giving the character of service outlined above, and providing the kind of equipment described, are in themselves strong selling factors, but they must be supplemented in other ways. The North Shore Line has a highly efficient traffic department, made up of experts trained in soliciting passenger and merchandise movements. These men make regular calls on the traffic departments of all manufacturers and business houses in Chicago, Milwaukee and intermediate cities. Even beyond the limits of those cities their efforts are extended into contiguous territory, and their personal solicitation is followed up by letters, rate cards and other literature.

Tracing of shipments is done, and advice on reconsigning or final delivery is given by long distance telephone, so the customer gets the information he seeks in a few minutes. Shippers appreciate that kind of service and feel disposed to favor a company which renders it.

Invitations are extended colleges and universities to have students in electrical engineering classes make inspection trips over the road.

Fraternal Organization Emblems

Fraternal organizations often charter special trains when making visits to sister lodges in the territory served by this company. To popularize the service with such organizations, signs bearing the emblems of the different societies are provided by the company. These signs are so constructed that they can be illuminated at night. When a chartered train pulls into a station where the members of a lodge are waiting, with the emblem of that organization looming up on the head end, it creates a favorable impression in the minds of the members. They are surprised and pleased and comment on the thoughtfulness of the company. Many letters have been received from members of lodges commending

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this feature of the service. It is just one of the small things that go to make a company popular with its customers.

In telling the public of its service, the North Shore Line advertises extensively in a variety of ways. Newspaper space is used regularly each week in all the daily and weekly newspapers in the smaller cities along the road. In Chicago and in Milwaukee, two newspapers are used each week, the schedule being arranged so that all the newspapers are given an equal number of lines. Space is taken in eighteen foreign-language newspapers in Chicago and Milwaukee alternate weeks. Car cards are placed in surface cars in Milwaukee and in surface and elevated cars in Chicago. Painted bulletin boards and posters are used, moving pictures, summer folders, and various kinds of literature.

Artistic Lithographed Posters

No form of advertising adopted by the North Shore Line has attracted as much attention, or caused as widespread favorable comment, as the lithographed posters used in the last year. These posters follow the idea of the London Underground System. They depict points of interest on the line and allow the picture to tell the story. Requests for copies of these artistic posters have come from universities and colleges all over the country, from public and private schools, church organizations and art schools. They have attracted the attention of magazines devoted to art, and the art departments of metropolitan daily newspapers. They are being used in the class rooms of high schools in Chicago and other cities and in a number of colleges. Art directors as far removed as the University of Washington in Seattle, read of these posters and wrote for copies to be used in class rooms. They are the work of well-known artists in Chicago, each one a specialist in a particular line.

Painted Bulletin Boards

Another form of advertising which has attracted a great deal of attention and helped to popularize the North Shore Line, is the large painted bulletin boards, placed at carefully selected locations on automobile highways, junction points of railroads, and thickly settled sections of Chicago and Milwaukee. Like the posters, most of these bulletin boards let the picture do the talking. For example, one board placed on Chicago's principal boulevard, depicts an electric train racing with an aeroplane. It requires no words to convey the idea of speed. The name of the road is all that is necessary. The location of the board is such that it can hardly fail to catch the eye of everyone passing in an automobile, and thousands of cars pass the point daily. This form of advertising serves to keep the name of the company before the public.

Motion picture advertising and publicity is effective when done in a way that does not convey any suggestion of advertising to the audience. Owners of motion picture theaters know that an audience will not stand for any kind of advertising, and the better class houses will not display such pictures under any circumstances. The North Shore Line, however, has been able to get two reels, one showing its passenger service and one showing its Merchandise Despatch into the best houses in Chicago and Milwaukee. "The Green Bay Trail" contrasts transportation in the days of the Indians with modern transportation on an electric railroad and is readily accepted by theatre owners as an educational film. The only advertising is the name of the railroad shown on the cars, which was enough. "The Pace of Progress" depicts the advancement in methods of handling merchandise shipments since the days of the trapper, and follows the story up by showing an actual shipment from Chicago to Milwaukee in two hours and twenty minutes over the North Shore Line.

Miniature Electric Railroad

A miniature electric railroad with two four-car trains, one a passenger and the other a merchandise despatch, giving a panoramic view of the route of the North Shore Line from Chicago to Milwaukee has been used with good effect at several expositions held in the last year. The miniature cars are exact reproductions of the regular equipment and run electrically, causing a great deal of comment and helping to sell North Shore service.

Courtesy of Employees

Every employee of the North Shore Line who comes in contact with the public is a salesman of the service and helps to popularize the road. The employees take a personal pride in the railroad and are jealous to see that their work comes up to the high standard set by the management. This attitude of the employees is a subject of daily comment among passengers, many of whom write letters congratulating the management on the high caliber of its train crews. Attentions which may seem trifling frequently make lasting impressions, and the employees of this company are ever alert and watchful of every detail which may add to the comfort of their passengers.

Satisfied Patrons Good Advertisers

Among the many factors which contribute toward the popularity of the North Shore Line, not the least important are its patrons. Many traveling salesmen are regular patrons of the road. They talk about it on their travels and induce fellow-travelers to give it a trial. Letters written to the editor of the *North Shore Bulletin*, show that the road has been the subject of discussion in hotel lobbies in Minneapolis, in Philadelphia, in Kansas City and even in Toronto and Montreal, Canada. It is the subject of many quips on the vaudeville stage from actors who have been shown some special act of courtesy when traveling between Chicago and Milwaukee. This is a valuable form of advertising, given the road gratuitously by satisfied customers and has added a great deal to its popularity.

Gaining Public Good Will

THE North Shore Line enjoys in a remarkable degree the good will of the public in the communities which it serves. This pleasing result has been brought about by careful cultivation of good will in a great variety of ways.

When the present management took charge of the property, following the reorganization in 1916, the road was in a badly run down condition. It had been operated under a receivership for nearly ten years, during which time no improvements were made and only such maintenance as was absolutely necessary to keep the line in operation. Under such conditions it was natural that prejudice against the road should exist, and the new management had to meet and overcome that handicap. It made the building up of the property and the gaining of public good will more difficult than would be the case where no prejudice existed.

First Give Service, Then Sell It

There are many ways in which a public service company may break down existing prejudice against it and gradually build up co-operation and good will. Minor details, which taken by themselves, seem insignficant, all contribute toward the general result, but there are two things which are fundamental, without which success cannot be achieved. A company in the first place must *give* the public service, and in the second place it must *sell* that service. In both these fundamental respects, the North Shore Line has been successful.

Immediate improvement of the service was the first step undertaken by the new management. New equipment of improved type was purchased, old equipment was remodeled, roadbed improved, schedules rearranged and the service classified to suit the convenience of the travelers. This rebuilding of the property was a gradual process. It has been going on since the first day the road came under the present management and will continue to go on indefinitely, for a public service company cannot stand still and hope to be successful.

"Doing Things" Brings Good Will

Public sentiment toward the North Shore Line has undergone a complete change under the present management. A new spirit has been injected into the property and the public has been quick to note the change and react to it favorably. The road is "doing something" all the time. There is nothing which arouses public interest in a company so much as to have it constantly doing something new, making some improvements here or there, showing that it is alive, and trying its best

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to please its patrons. That feeling once created in the public mind, good will must inevitably follow. Even shortcomings in service will be overlooked. The public will say: "Give it a little time. It cannot do everything at once, but it is doing something all the time." The North Shore Line has convinced its patrons that its creed is service, and that accomplished, the gaining of good will is easy.

Getting Favorable Publicity

Next in importance to "doing things," is telling the public what a company is doing. True, an improvement in service will soon be noticed by those who use it, but it is a good thing to call their attention to it. In this respect the North Shore Line is singularly fortunate. Few railroads get as much free publicity. Hardly a day passes that some newspaper published along the line does not carry a news story about the company. The accompanying reproductions of newspaper clippings are submitted, not for the purpose of showing how much publicity the company gets, but rather to show the variety of ways in which a company can get into public print in a favorable way. As a matter of fact the clippings represent a small fraction of the total number of stories printed in the last year, but are selected because of their variety. They show the various activities in which the company, or its employees, are engaged, and in no sense are they "press agent" stories, as that term is commonly understood.

The reason why the North Shore Line gets so much favorable publicity, is that it is constantly making "news." A glance at the clippings reproduced will show that they are not items prepared by a "press agent." That method of obtaining publicity, happily is disappearing. It is never even attempted on the North Shore Line. The policy of the North Shore Line is to make "news" and publicity will take care of itself. Newspapers, especially in small cities, such as those served by this company, are anxious to get legitimate news stories of new activities. The North Shore Line is a part of the communities it serves. Anything that it is doing in the way of improvements, anything that its employees may do in the communities in which they live, is of general interest and as such is worthy of space in the newspaper columns.

The "North Shore Bulletin"

As an aid in publicity work and as a medium through which to cultivate good will between the public, the employees and the company, the *North Shore Bulletin* is published monthly. This little publication has attracted a great deal of attention and has built up quite an extensive following. It has readers scattered all over the country, men and women, who have accidentally run across a copy, read something that interested them, and written to the editor to have their names placed on the mailing list. The mailing list numbers about two thousand, a majority of whom have requested to have the publication sent them, many offering to pay for it. The issue is 15,000 monthly, distributed through boxes placed in the cars and at the various stations along the line. Every copy is carried away within a few days of the time they are placed in the cars and stations.

The *Bulletin* has proved a factor in building up good will. It serves as a link between the public, the employees and the company. A passenger who has been shown some exceptional courtesy, or received a favor from a trainman, writes a letter about it to the *Bulletin*. The letter is published in the next issue. It pleases the particular employee commended and it pleases the passenger. Another passenger will read it and it suggests the idea to him of commending some employee, or some feature of the service. Many of the letters comment on the *Bulletin* itself, but whatever the nature of the letters, the important thing is that they are written and that they serve to keep the road in the minds of its patrons.

Occasionally a letter is written the *Bulletin* criticising some operating practice which may cause inconvenience. Complaints of that character are taken up at once, the condition is remedied and a courteous reply sent to the person making complaint, thanking him for calling attention to it. No criticism or suggestion is ever overlooked. If it is not practicable to carry out a suggestion, the reasons are fully explained, usually to the complete satisfaction of the person offering the suggestion. Letters in the nature of complaint or criticism are exceedingly rare, but the management welcomes them and gives them prompt attention. An average of thirty letters a month are written to the *Bulletin*.

Another way in which the *Bulletin* is useful, is as an indirect publicity medium. Every activity of the company is exploited in it. Each month some of the newspapers along the line find something in the *Bulletin* that they consider worthy of space in their columns. Sometimes items of news are rewritten as news stories, other times they are printed verbatim and credited to the *Bulletin*. Either way they make good publicity for the company.

The *Bulletin* serves as an aid to the traffic department in obtaining business. It is the practice each month to write a descriptive story of some manufacturing plant or business establishment on the line. These writeups are illustrated and are of some advertising value to the particular concern written up. They are entirely gratuitous, and tend to create a friendly feeling on the part of the concern toward the company. Requests and invitations to write up plants are sent the *Bulletin* faster than they can be complied with. Many times a firm receiving such a writeup requests a supply of copies, to mail, so in that way the *Bulletin* gets into hands it would not otherwise reach. Recently one institution requested 2,000 copies to mail, offering to pay the cost of printing.

One of Several Posters Reproduced in the Brief

Public Functions Increase Good Will

When the North Shore Line opens a new station of importance, installs a bus line, puts into service some new equipment like observation cars, it is the custom to celebrate the event with a dinner, to which public officials, representatives of business men's associations, and newspaper publishers are invited. Several such occasions have been celebrated in the last year with gratifying results in the way of obtaining favorable publicity and strengthening the spirit of co-operation and good will. On the eve of the opening of the bus line connecting Kenosha and Lake Geneva, a dinner was given in the latter city. The mayor and aldermen from Kenosha, together with representatives of the manufacturers' and retailers' associations, met with like officials and representative business men in Lake Geneva. At the close of an enjoyable evening all pledged the new line their hearty support. The same course was followed on the opening of a bus line connecting Waukegan and Kenosha, and on the opening of the latest line between Wilmette, Highland Park and Waukegan.

These public dinners serve a two-fold purpose. They bring together the public officials of different cities with officials of the company and they make

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good publicity for the newspapers. The new bus line, or whatever the particular service may be, starts out with the support of public officials and newspapers. It is an effective way of creating good will.

An improved system of ticket auditing, through which the prompt refunding of unearned revenue is accomplished, recently was perfected on the North Shore Line, and has proved an important factor in creating public good will.

When a passenger claims a refund on an unused ticket, under the new system five days is the maximum time which elapses until a check for the amount is in his hands. Usually the time does not exceed two or three days.

While this is seemingly an unimportant detail, the hundreds of letters received from pleased patrons indicate that they appreciate it. In the merchandise despatch service, refunds are made with equal promptness, many times without the shipper making any claim. When waybills are checked and an overcharge discovered, a check for the amount of overcharge is immediately sent the shipper. This promotes confidence in the company and expedites adjustments in cases where customers have been charged too little.

Economies in Operation

IN seeking to effect economies in operation, an electric railroad situated like the North Shore Line, subject to the keenest kind of competition, must consider the subject from many points of view. What may seem an economy today, may within a year prove a grave error in business judgment and bring results directly opposite to what was intended.

While the North Shore Line is steadily effecting economies in many directions, they do not necessarily loom up large on its balance sheet. They are not effected by a curtailment of the service given the public. The company operates through a rapidly developing territory. It is building up its business, and steadily creating new business.

A railroad differently situated might be able to show economy by curtailing its service. In a fully developed territory, a curtailment of service during a business slump, might prove a real economy. In a growing territory it might easily be the reverse.

Were the chief purpose of the North Shore Line to reduce its car mileage to the lowest possible point at which it might operate a service that would escape the criticism of regulatory authorities or of its patrons, it might be possible to effect an economy. But would it be a real economy? Could the company hold its patronage and increase it, if it allowed its trains to be overcrowded through insufficient service? If part of its patronage left it for other competing means of transportation, would a restoration of service bring back that patronage? Would its patrons continue to praise the service and recommend it to others?

The policy of the North Shore Line is one of strict economy, but not at the expense of the public. The management feels that the good will of the public is the road's greatest asset and it fosters and guards that good will jealously. If the gross earnings justify a measure of service better than sufficient to escape criticism, the management believes the public should have that service, even if it means somewhat less net revenue to the company. For the North Shore Line that policy appears to be real economy.

Automatic Substations

Extensive use has been made of automatic substations in expanding and raising the efficiency of the power distribution system and reducing operating expenses. The first installations were made at the time when this type of station was in its early development stages, and these installations were of material help in the development of apparatus, and demonstrating its applicability to heavy traction work, thus benefiting the industry as a whole in paving the way for greater efficiency in power distribution.

Since the first installations were made stations have been added from time to time until we now have seven in service. Six of them are new stations added to the system; one was a manually operated station to which automatic control equipment has been added, and we are now completing the changeover of a second manually operated station to automatic which will bring the total up to eight.

Considerable progress has been made in developing outdoor type power transmission apparatus which has aided in reducing cost of substation installation, due to reducing size of buildings. We have taken advantage of this development and in our latest substation have placed all high tension apparatus outside the building with a resultant reduction in first cost and fire hazard.

Extensive application of automatic substations has made it desirable to develop some means of supervisory control so that a dispatcher at a central point would know whether or not stations were operating and also make it possible for him to control these stations. This problem differs on an interurban property from an urban property and requires a different solution. We have done a great deal of experimental work with such a system and through the co-operation of the manufacturers we have developed one which gives good results with a minimum of equipment and expense.

As better and more efficient protective apparatus has been put on the market for power systems we have applied them where economy and elimination of service interruptions would result, thus keeping our system up to the highest possible state of efficiency and reliability.

The tendency of the times in power generation work is to standardize on a frequency of 60 cycle for all kinds of power work, eliminating all other frequencies as they tend to duplicate investment in station and line equipment. This changeover is being actively followed by the power companies from whom we purchase power, and in spite of the fact that our long term power contracts call for furnishing 25-cycle energy we are co-operating in the movement by installing all new apparatus with 60-cycle equipment even though it entails considerable inconvenience, additional expense and temporarily some duplication of transmission lines. The results to be obtained from this progressive policy can not help but be of benefit to the industry and the public at large in reducing the cost of service.

Reduction in Power Consumption

Believing that the greatest economy can be had only by careful analysis of all items which enter into cost of rendering service, power recording meters were installed on all passenger equipment and accurate records kept of power required per car mile in all classes of service. The reduction in energy consumption which followed the installation of this metering equipment was due to several causes, but each of the steps taken to accomplish results were studied with the aid of these meters.

Some of the factors entering into a reduction in power consumption are:

1. Careful coaching of motormen in proper operation of trains.
2. Substitution of new, lighter and more efficient car equipment.
3. Study of effect of using proper type of equipment in various classes of service.
4. Study of effect of properly balancing up motor and trailer cars in various classes of service.
5. Establishment of a number of non-stop limited trains.
6. More scientific basis of making up schedules and elimination of stops wherever possible, especially at times of peak load extra service on heavy days.
7. Enlarged terminal track facilities in Chicago which made it possible to avoid interference from local transportation system, thus eliminating unnecessary stops and slow downs.
8. Substitution of one-man cars for heavy two-man cars in Waukegan and Milwaukee.
9. Improvement in average line voltage making it possible to do more coasting.

Economies of One-Man Cars

Installation of one-man safety cars in the city of Waukegan, where the North Shore Line supplies all the local transportation service, and later in Milwaukee, where this company furnishes a portion of the local service, has resulted in greatly improving the service, increasing the number of passengers carried and reducing the cost of operation.

At the time the one-man cars were introduced in the local service in Milwaukee, February, 1923, a ten-minute

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service was being maintained and the fare charged was 6 cents. With the installation of the safety cars a six-minute service was given and the fare was reduced to 5 cents. At the same time the wages of the employees were increased 4 cents an hour.

In spite of the reduced fares and increased wages the first three months of operation showed an average increase in revenue over the corresponding months of the previous year of 34 per cent, while the increase in operating expense was 11 per cent. The increase in passengers carried was 58.5 per cent and there was a decrease of 21 per cent in power consumption.

Economies of Various Labor-Saving Machines

Previous to the installation of National Cash Register ticket machines, one-way passenger tickets were printed at a cost of about 83 cents a thousand Records had to be kept of about 4,100,000 one-way tickets. It required the time of two traveling auditors to audit the ticket accounts. Ticket agents spent from one to two hours daily making out their reports. Passengers had no receipts for the amount of money paid for tickets. Identification hat slips had to be purchased by the company and made out by conductors on trains.

With the installation of the ticket machines the advantages and economies obtained may be summarized as follows:

1. A saving of approximately forty cents a thousand in the cost of printing one-way tickets, due to the fact that these machines print the tickets.
2. A saving of about 50 per cent of time spent in keeping stock records of one-way tickets.
3. The time of one traveling auditor eliminated.
4. About 75 per cent of time spent in making out reports by ticket agents is eliminated.
5. The traveler has check for actual amount of money paid for ticket, which amount is printed on each ticket. This, in case of any claim, provides for prompt adjustment.
6. Printed identification hat checks form a part of the ticket and are easily detachable from it. These checks expedite the work of the conductor, and when detached, automatically cancel the tickets.
7. The tickets provide a positive check against the agent as each ticket has a serial number which cannot be changed.

It is the policy of this company to substitute machine for hand labor wherever possible, and a number of important improvements have been made in that direction during the last year. Among them may be noted:

Substitution of a Rand visible file for the bulky ledger formerly used for keeping ticket records. This has effected an economy of about 10 per cent in the cost of keeping records, besides being more accurate.

Analyzation machine for analyzing daily ticket sales. This machine, with one clerk working two-thirds time, does the work which formerly required the full time of two clerks.

Underwood Fanfold billing machines, installed in the two heavy merchandise despatch stations, do the work formerly done by four clerks, and the work is much neater because the bills are typed instead of being written by hand. As a result of this experience, these machines are being installed in all merchandise despatch stations.

Expressions of surprise at the smooth working of the merchandise despatch filing system, come frequently from shippers with claims to prove and others who understand shipping problems. Two recent examples may be cited:

A large shipper called at the Milwaukee office to obtain information relative to the shipments of goods which had been returned to a concern which refused credit for them on the ground they had not been received. Although the shipments were numerous and covered a period of two years the complete records were ready for him in a few minutes. He expressed a wish to know more about our system, as he said no other transportation company had ever been able to give him similar service.

An agent of another railroad called for information about a shipment which had been transferred from his road to the North Shore Line. In a few minutes he had the necessary data. He was greatly impressed and returned later with others from his company. The result was that his road installed the system.

One of the Three Pages of Newspaper Clippings Reproduced to Show How Favorable Comment Has Been Gained. The Hand-Lettering at the Top of This Cut Is a Sample of the Headings Used for the Main Divisions of the Brief

Improvements in Construction

IN seeking ways to popularize travel by an electric railroad, to create good will in the communities served by it and increase its revenue, there is nothing more important than the character of construction it adopts. This has been fully demonstrated on the North Shore Line in the case of its new passenger stations in Milwaukee and Kenosha.

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The Kenosha passenger station was opened to the public less than a year ago. An increase in business at that point was noticeable immediately after, and it is steadily growing. The station is a standing advertisement for the company.

Business conditions at Kenosha made a new station imperative. Traffic had outgrown the former station. A less pretentious station, however, might have met the requirements for several years. But the management decided that capital invested in a station that would stand out as a distinctive landmark and be looked upon with pride by the local community, would pay returns. The results have fully justified that decision.

The building is a handsome structure, the walls being pressed brick, with three-quarter inch raked joints, cast concrete trim, massive concrete pillars and a glazed tile roof. The station is equipped with all the conveniences of a modern railroad station, lunch counter, women's rest room, newspaper and magazine stands, shoe-shining parlors, etc.

The grounds surrounding the building are spacious, and here artistic flower beds have been laid out, winding footpaths, ample parking space for automobiles and for company buses, which connect with the main line at this point. It is looked upon by the citizens of Kenosha with pride and is pointed to as one of the show places in the city. The importance of that in the way of creating good will cannot be overestimated.

Making Smooth Riding

In these days when travel on rubber tires is the popular fad, when luxurious motor coaches and automobiles are competing with railroads for public patronage, the electric railroads must exert all their energies toward making travel fast, safe, smooth and comfortable. They cannot afford to overlook a single detail in the matter of equipment, roadbed, or, in fact, anything which enters into the operation of a railroad.

With this thought in mind, the North Shore Line is constantly striving to make improvements. It is now rock-ballasting its roadbed over the entire system, more than 60 per cent of this work being completed. The best equipment will not ride smoothly over a poor roadbed.

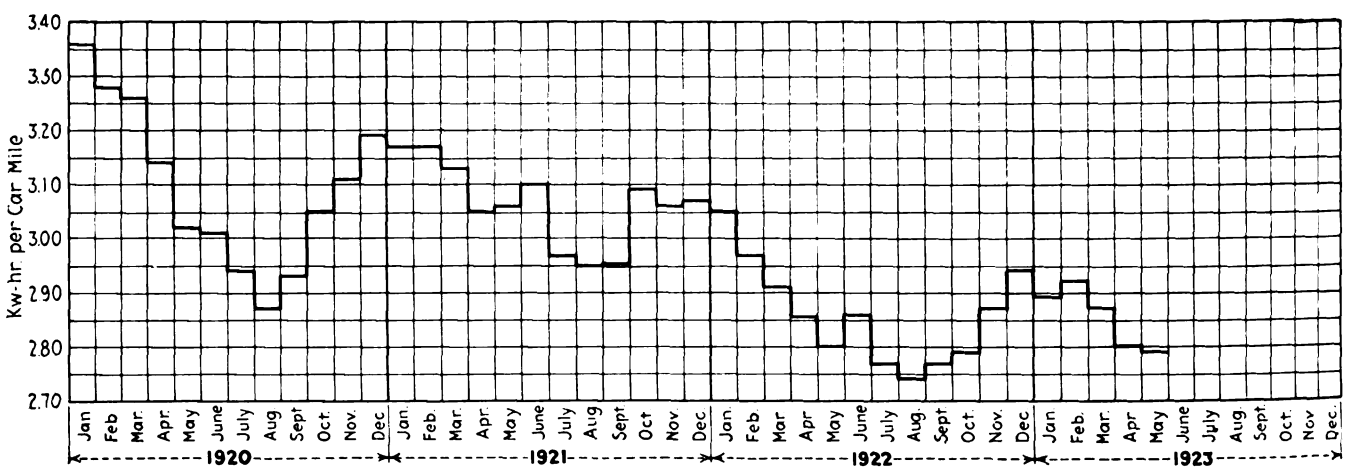
Heavy rails add to the smooth riding qualities of a train and the North Shore Line is replacing all light rail with 100-lb. rail on the main line and on some of the city streets with 116-lb. rail.

In the city of Milwaukee a new type of chrome nickel crossing has been installed at a number of locations. These crossings are made of much harder material than the ones they replaced, and being cast in one piece, the shifting or loosening of sections is eliminated.

Making It Easy for Autoists

Hundreds of automobiles daily cross the tracks of the North Shore Line. In the belief that smooth crossings create a friendly feeling toward the company on the part of the public, a new type of crossing has been placed in use that has been the cause of many favorable comments. It consists of a composition made of graded sizes of limestone with screenings and Headley road oil. Long rails were laid at crossings so as to eliminate joints. The result is that these improved crossings make as smooth riding as cement roads.

Wood platforms are being replaced all over the system. At the more important stations concrete and brick platforms are being substituted, but at the smaller stations a new type has been developed and made standard. It consists of a fill with cinder base and a top dressing of fine limestone screenings, bound by a curbing of 4x12 creosoted timber. The hazards caused by loose boards and nails are removed and there is less danger of ice forming on this type of platform.



Curve Showing Reduction in Energy Consumption Accomplished by Various Means Noted in the Brief

Accident Prevention

THE Chicago, North Shore & Milwaukee Railroad is frequently referred to by its friends the "the safest high-speed electric railroad in the country." Whether or not this claim can be substantiated, it cannot be disputed that the North Shore Line has done, and is doing, excellent work in the way of accident prevention.

Records show that the settlement of personal injury and property damage claims amounts to 1.82 per cent of gross earnings. In the year 1922 the company had one accident for every 16,081 car-miles operated. When it is considered that record is made of every accident, no matter how trivial; that the road operates through a territory in which automobile travel is heavy, with many grade crossings; that trains constantly are run at a speed of 60 miles an hour and upward, the record speaks for itself.

Safety work on the North Shore Line is not occasional and spasmodic. The safety department of the road is thoroughly but simply organized, under systematic plans which assure continuity of effort. It is required to operate with the same exactness as other departments. The management, supervisory forces, and in fact the entire organization of the company, recognize the safety department as having the same status in operation as other operating departments.

Since the North Shore Line was brought under the present management in 1916, it has constantly engaged the services of the Bureau of Safety, a well known organization specializing in the safety of public utility operation. In the last year, however, it has supplemented this service by the employment of a trained director of safety, who devotes all his time to accident prevention. The Bureau of Safety continues to give consulting service and constantly keeps some member of its staff working in co-operation with the safety director.

Community Safety Work

The work of accident prevention on the North Shore Line is not confined to employees. The company is active in community safety work in the territory which it serves. Several active community safety organizations have been formed in the last year as a result of the influence and assistance of the company's safety department. Each year the company provides the public and parochial schools within the territory with lectures on safety, paying the expenses. Illustrative of the scope of this work the records show

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that between March 1 and July 15, 1923, 570 such lectures were given before 22,548 pupils. It is difficult to distinguish between the value of the safety work within the organization of the road and that to the public, but on a property like the North Shore Line, it is essential that the public as well as the employees, should be educated.

Educating the Public

In addition to conducting lectures in the public schools the North Shore Line prints many safety posters and cards which are displayed in class rooms, libraries and other public gathering places. This summer the company had a number of decalcomania labels printed which are used on the windshields of all automobiles driven by officers or employees of the company reading: "This car stops at all railroad crossings." These labels attract a good deal of attention and suggest the thought to other drivers to do likewise.

During the year 1922, 152 safety meetings of employees' groups and committees were held. At these meetings 884 safety recommendations were submitted, 707 of which were approved and carried out. Inviting suggestions from the employees themselves and acting upon them promptly stimulates their interest in the work, and assures their co-operation.

Safety Education of Trackmen

Most of the meetings of employee groups are held after their day's work, the meeting places being arranged to best suit the convenience of the men, but in the case of track laborers, who are scattered along the entire road, this method was found to be inconvenient and it was difficult to get full attendance. To overcome this difficulty the North Shore Line devised a plan, which it is believed is not used on any other railroad. A passenger car, of the older wooden type, was fitted up suitably for safety meetings. The safety car makes periodical trips along the line, picking up the track laborers at the point they are working. It is then run on to a sidetrack where a meeting is held, the safety director, or a representative, giving the men a short talk on safety measures. At the close of the meeting the men are taken back to their working places and the car proceeds to the point where the next gang is at work. Through this plan a full attendance is assured at each meeting as the men are paid regular time for their attendance.

First Aid Drill Team

First Aid is closely allied with safety work. While the aim of safety work is to eliminate accidents among employees, it need not be expected that full realization of that aim can be achieved. Prompt medical assistance, when an accident does occur is essential, and this the North Shore Line provided in 1922 by having the medical department organize a First Aid Drill Team.

The First Aid Drill Team, composed of twenty employees, carefully selected and given a thorough course in first aid work, has demonstrated its value to the road in a number of ways. Members of the team are expert in applying artificial respiration in case of electric shock through the Schafer prone pressure method, they know how to stop a flow of blood, apply splints and bandages in case of fracture, and give other emergency relief measures, pending the arrival of a surgeon. As a result of this knowledge and prompt application of medical skill, the time lost by employees meeting with an accident has been materially reduced and much suffering avoided.

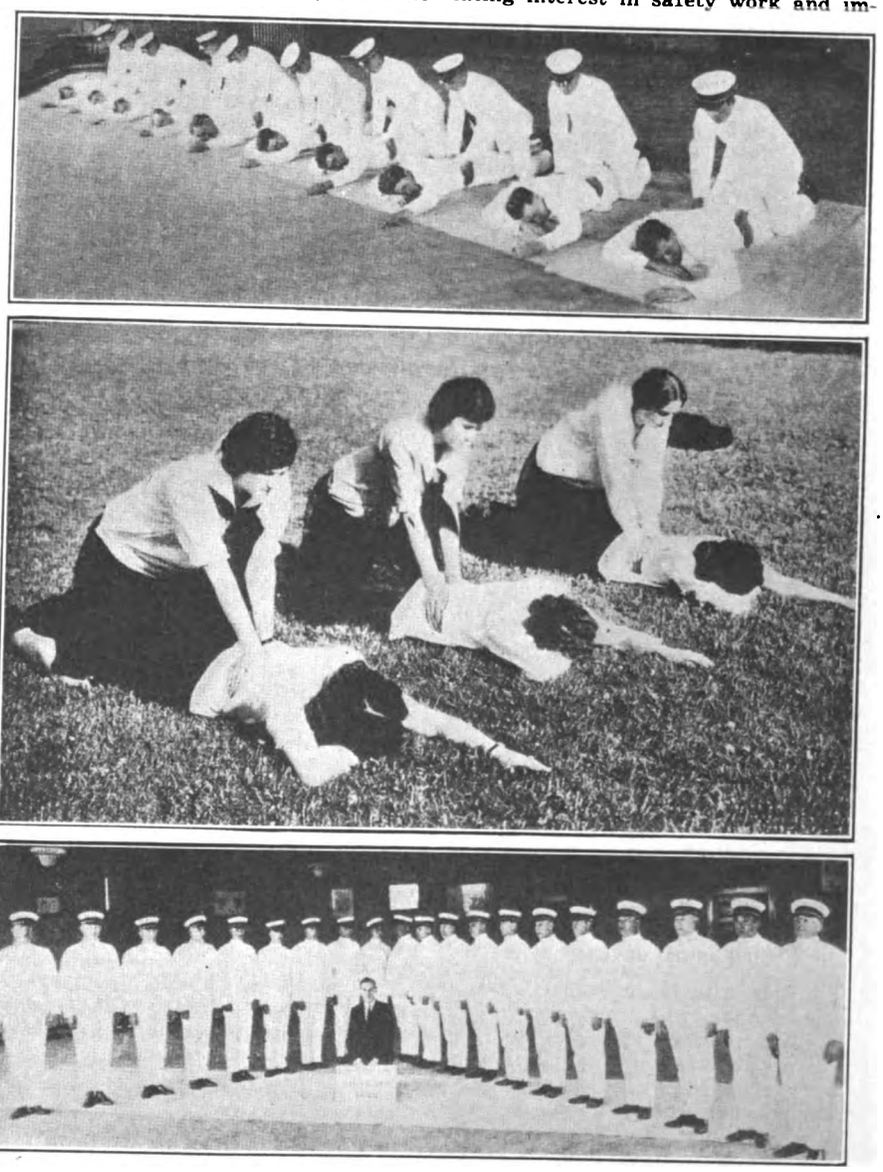
Knowledge on the part of the employees that there is always one or more members of the first aid team near at hand, has a tendency to strengthen the morale of the entire force. The policy of the company is to rotate the members of the team at stated intervals, so that eventually all employees will be given this instruction.

Aside from the practical value of having such a team available in case of accident, the First Aid Drill Team is a good medium through which to advertise the road and cultivate friendly relations with its customers. The team has been called on to give many demonstrations before chambers of commerce, business men's clubs, etc., and these exhibitions keep the name of the company constantly before the public.

Women's First Aid Drill Team

So successful have been the efforts of the First Aid Drill Team in stimulating interest in safety work and improving the morale of the working forces, that recently a number of women in the general offices requested the director of safety to give them instructions in artificial respiration and other simple emergency measures. They volunteered to give their time evenings while taking the course of instructions, and a team was accordingly organized.

This being a novel departure, good feature stories were printed in all the newspapers along the line with large pictures showing the girls in action. In this way a great deal of favorable publicity was obtained for the company.



North Shore First Aid Drill Teams

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Development of Good Relations Between Management and Employees

FRANK and open dealing with employees, is the characteristic policy of the management of the North Shore Line. The aim of the management is to make each employee feel that he, or she, is an important part of the organization; that the company is *his* or *her* company; that the future of each employee depends on the success of the company; that all are one family whose purpose is to give the public a service that will insure continued successful operation and consequent steady employment.

In departments in which the employees are organized in unions, the principle of collective bargaining is recognized, and wages and working conditions are established through joint conference. In other departments where no union organization exists, a liberal policy is followed, under which wages and working conditions are made as agreeable to employees as is consistent with management of conservative type.

That this policy is successful is shown by the fact that the North Shore Line, under the present management, has had no labor difficulties to interfere with its continuous operation. That there exists a spirit of co-operation between the management and the employees, has been proved in many emergencies, such as severe snow storms or other unusual and unforeseen circumstances, when all employees have worked night and day, without a murmur, in order that trains might be kept moving without interruption and the public given the service to which it has become accustomed.

Further proof of a spirit of co-operation might be shown in hundreds of letters from patrons of the road commenting on the good work of employees, and commenting on their courtesy and helpfulness to passengers.

Education of Employees

In line with the policy of frank and open dealing with employees referred to, the management of the North Shore Line believes it essential to give every employee an opportunity to become acquainted with, and to understand the business principles which govern every corporation. Employees in the transportation department of a comparatively small railroad like the North Shore Line, see trains well filled with passengers, or other evidence of seeming prosperity. Unless they understand something of the business end of the enterprise, something of the financial problems with which every corporation has to deal, they are apt to form erroneous impressions, which tend to produce unrest and discontent.

With that thought in mind and with the desire to have all employees of the North Shore Line familiar with the business end of the company, the management engaged Ralph E. Heilman, dean of the School of Commerce of Northwestern University, to give a course of ten lectures covering every phase of public utility operation. These lectures were given during the winter of 1922-23, and while it was impossible for all employees to attend them, most of those employed in a supervisory capacity attended and learned a great deal about the business of the company. The fact that the lectures were given by a well-known instructor and authority on such subjects, who had no direct connection with the company, and whose views were in nowise influenced by the company, made them more valuable and convincing than if given by anyone connected with the company.

Financial Assistance Given Students

As a result of the Heilman lectures quite a number of employees wished to take courses in English, mathematics, electricity, etc., at Northwestern University, or other educational institutions, to advance themselves in their particular fields of endeavor. This laudable ambition was encouraged by the management and announcement made that all employees who took extension courses at any educational institution, would have one-half the tuition fee refunded them by the company upon presentation of proof that they had completed the course. A number of the employees are now taking such courses.

Public Speaking Classes

Whether due to the stimulus in an educational way of the Heilman lectures, or some other cause, employees of the North Shore Line have recently shown a keen desire for self-improvement. One such activity was the organization of classes in public speaking. During the spring and early summer, four such classes were organized, one of them composed of women employees. The employees attending the classes in public speaking were regular attendants at the Heilman lectures. Second in importance to acquiring correct information about the affairs of the company, is the ability to impart that information to others, and the classes in public speaking are intended to supply that requirement.

Employees' Mutual Benefit Association

An active Employees' Mutual Benefit Association exists on the North Shore Line, to which about 1,000 of the estimated 1,200 employees eligible to membership belong. An active campaign conducted in the spring of 1923 resulted in adding more than 200 members to the association.

The association is financed by a payment of $1 a month per member, to which a contribution of 50 cents a member is added by the company. Liberal sick and death benefits are paid and the association in the two and a half years of its existence has built up a surplus of $8,000, which is invested in government bonds.

The association is an important factor in fostering friendly relations between the management and the employees.

Americanization Work

An important phase of the educational work carried on among its employees by the North Shore Line, is what is known as Americanization work. As in the case of all railroads, most of the men employed as track laborers are of foreign birth. Generally speaking they are illiterate, many of them being unable to read or write the language of their native country.

When it was decided that something should be done for the improvement of these men, the first step was a survey to ascertain the facts. This survey showed that of 129 alien track laborers employed at that particular time, thirty-seven could not read or write their native language, twenty-nine could not speak English at all and the others very imperfectly, eighty-two could not write English and seventy-five could not read it. Of the entire group, 101 were not American citizens and only forty-four had declared their intentions of becoming citizens.

The company at once employed an experienced man as a director of education and Americanization. Evening schools were established in buildings furnished by the company at convenient points along the line. Four classes in English were organized and later a class for foremen. Most of the men evinced keen interest in the work and within a few weeks all those attending the classes were able to write simple sentences in English. Some difficulty later was experienced in getting the foremen to attend the school. They were mostly middle-aged men and the idea of attending school did not appeal to them.

In order to overcome this objection the class was changed to a foreman's "club," which elected its own officers and conducted its own meetings. Changing the name did not materially change the nature of the class. Instruction in English continued at the club meetings, practical lectures were given on various phases of the work, and cigars and lunches were provided by the company.

Recreational Features

To sustain interest in the evening classes, it was found necessary to introduce some recreational features such as horseshoe pitching contests, moving pictures, entertainments and floating libraries, the books for which were obtained from public libraries in cities along the line. This work has made a deep impression upon the men. The improvement is noticeable in the reports on work made at frequent intervals by foremen and in the desire of the men to continue in the service of the company. The "turnover" in this class of labor has shown a marked decrease since the educational work began.

In connection with teaching the alien workmen the English language, they were given lessons in American citi-

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zenship. To those who had not declared their intentions, the advantages of becoming American citizens were explained. Arrangements were made with the courts in Waukegan, Kenosha, Racine and Milwaukee to receive applications for citizenship on a certain date, which was designated "first paper" day. Practically all the men eligible applied for their first papers on that day. The work was followed up and those who previously had their first papers were given assistance in becoming full citizens. This educational and Americanization work is being continued as one of the regular activities of the North Shore Line.

Housing Conditions of Track Laborers Improved

As a part of the educational work among the track laborers, an investigation was made of the conditions under which they lived in section houses. It was found that some of the section houses were in an unsanitary condition and immediate improvements were made. The company's visiting nurse was sent to the section houses to explain personal hygiene and the necessity for maintaining clean sanitary surroundings. All this work has tended to improve morale and strengthen the loyalty of the employees to the company.

Placement Service

Another policy adopted by the North Shore Line which tends to promote good relations, is what is known as "placement" service. If an employee fails to make good in one position, he is placed in another and another, until a position is found where he will fit. It is the policy of fitting the man to the job. This policy is based on the theory that the ordinary human being will make good somewhere, if the proper niche for him is found. It inspires loyalty to the company, as the employee feels that he will be given every opportunity to make good.

Home Building

Employees desirous of building a home are assisted by the company to the extent of procuring plans and specifications, estimates on the cost of various materials and expert advice on the most improved methods of construction.

Service Committee Deals with Complaints

In March, 1923, the management created a "service committee," offering a series of money prizes to the employees who would offer the best suggestions during the year for improving the service. The thought which prompted this offer was that the employees constantly come in contact with passengers and shippers. If they should hear a criticism of some detail of operation, the management wishes them to be in a position to assure the complaining customer that the matter complained of will be attended to immediately. Report is made of the criticism to the service committee and immediate action is taken to have the cause of the complaint removed. This plan tends to make the employees alert and watchful and to give them a sense of responsibility. They are made to feel that anything which affects the company is their personal concern and that the management appreciates any suggestion that they may offer in the way of improvement.

Social Activities

The North Shore Line encourages athletic sports and social activities among its employees, providing facilities for meetings, commissary service, and financial assistance. Within the last year a tennis court was laid out. Last Spring the North Shore Line Club was organized by the employees to direct social and athletic activities. Soon after its organization the club undertook the publication of *The Highball*, a monthly paper to serve as a mouthpiece for the club's activities. After two issues of the paper, the club found the cost was more than it could carry and the company assisted by having its publicity department take charge of the publication and pay the bills for printing. Each year the employees gave a field day and also one or two theatrical performances. They have a bowling team and a ball team, a post of the American Legion, a Company Section of the A. E. R. A., and other activities. A feature of the social side is the annual reunion of employees.

The reunion is held in some large hall rented by the company and all the employees and their families are invited. It begins at noon and lasts until midnight to give all the employees a chance to attend. The company provides a turkey dinner at noon and supper in the evening. It engages professional entertainers and an orchestra. These entertainments are attended by all the officials of the company, who mingle with the employees, and help to create the feeling that all are one big family.

The North Shore Line Station at Kenosha, Wis. This Picture Was Run in the Brief with the Caption "Popularizing Service by Building Artistic Stations"

Special Accomplishments that Reduce the Cost of New Capital

THE continually increasing revenues of the North Shore Line, which are the determining factor in the life and success of the property, make necessary large capital expenditures. Until recently, when the company completed a flexible financing plan, we were unable to obtain the required capital at a reasonable cost. However, during the war period, when obtaining capital was very difficult, the company raised seven million dollars, and the increased earnings made possible by the new capital put into the property, enabled the North Shore Company to improve its credit and further enhance its reputation for good service and reliability.

When the properties were acquired by the present management, there was no working capital—no power to issue junior securities, and a closed mortgage on the properties limiting the bond issue to ten million dollars, and limiting the interest rate.

The new financial structure makes it possible for the company to finance its growing needs through the sale of mortgage securities and junior securities.

The elastic financing plan will also enable the company to obtain capital for betterments at a materially reduced cost.

One of the most important features of the plan is that we will be able to maintain the proper relationship between the funded debt and the capital stock.

Another important point is the opportunity to interest consumers and employees in becoming part owners in the property through the purchase of stock.

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Automobile Accidents from Transportation Standpoint*

By Ralph W. Emerson
General Manager
Cleveland Railway

Ralph W. Emerson

Not More than a Fifth of Collisions Are Due to Negligence of Motormen—Safety Instruction Is Valuable Aid—Parking Rules Should Be Adhered to—Better Enforcement of Legislation Urged

THE thing that makes automobile accidents so vital is their appalling increase. In Cleveland the increase was from 1,803 collisions in 1912 to 10,353 ten years later, in 1922, an increase of over 400 per cent for the period. This is typical of most properties throughout the country and out of all proportion to the variation in any other class of accidents.

The increase in the use of the pleasure vehicle and motor truck has been so rapid and the resultant changes in methods for dealing with this new problem have followed each other in such rapid succession that transportation men as well as claims men have only been able to gasp for breath and wonder what might be done to check the apparently inevitable increase in the number of collisions with autos. Consequiently most efforts have been spasmodic and tended to deal with present conditions rather than to propose a scheme to cover the entire question and which would be satisfactory for a considerable period of time. The inauguration of each of the various remedies tried seemed to check the onward and upward rush of automobile accidents, but its effect was only momentary. Something was lacking.

The Safety Council has been very active in studying conditions and seeking a solution. Much constructive work has been done through campaigns of education, through bulletins and letters, and to them must be given much credit for the bringing together of the various civic interests of the community for the study of this perplexing problem. What is regarded by many as one of the most constructive activities fostered by the Safety Council is the work carried on among the school children in collaboration with the Board of Education. Very remarkable results have been obtained in educating these auto drivers of the future and inculcating in these young minds the habit of thinking safety.

There are at present eighty-two cities having children's safety organizations. Children are interested in the work as presented in the Cleveland schools, where a text-book on safety instruction for grades one to six has been adopted. The manual provides for forty-five minutes a week of safety study in the kindergarten and the first four grades. The fifth and sixth grades have been organized as junior safety councils.

As an indication of the beneficial results of this constructive work, traffic accidents to school children reduced 50 per cent last year and "Own Fault" accidents 82 per cent. Boy Scout training now includes instructions in safe conduct at home and abroad.

What have transportation companies done within their own ranks toward combating collisions with automobiles? Many of the companies have instituted campaigns of education, reaching their men through bulletins together with talks on accident prevention and endeavoring to win the co-operation and earnest efforts of their employees by an appeal to the heart rather than to the head.

The good results which may be attained by such work will be nullified and short-lived unless followed up with strict, fair and impartial discipline. C. B. Proctor, claims agent of the Memphis Street Railway, strikes the nail on the head when he says "Safety work is important, but it is secondary to discipline, unhesitatingly and impartially applied."

In Cleveland certain rules for safe operation have been laid before the men either by bulletins or talks. A strict account is kept of each operator and for the first violation of a safety rule he is called into the office and reprimanded. For any violation beyond the first he is suspended from his work for a number of days, depending upon the seriousness of the violation. This same discipline is administered for other violations.

It is safe to assume that not over 15 per cent or 20 per cent of collisions with automobiles are due to negligence on the part of motormen, notwithstanding the fact that they are driving vehicles weighing between 20 and 25 tons and upon fixed rails. In Cleveland of the 135 traffic accidents in 1922 which resulted fatally there were but eighteen in which a street car was involved and but five in which the liability rested solely upon the traction company. During the same period 124 persons were killed in motor vehicle accidents. It is interesting to note that more fatalities resulted from horse-drawn vehicles and bicycles than street cars in the same year.

One of the things which contributes to the development of such efficiency among the men is the fact that in the first place they are schooled as soon as their applications are accepted, which schooling involves instruction in the mechanical and electrical apparatus which they are to operate. It involves listening to talks by the superintendent of employment bearing directly on the automobile hazard and instructions as to the safe way of combating this hazard on the street.

After ten days of breaking in under competent instructors these men are then assigned to runs and from that time on they are put on their own responsibility, with the exception that they are under the watchful eyes of the chief instructors whose duty it is to ride their cars in citizens' clothes and observe the work of the operator. Should these new men show evidence of carelessness, nervousness, indifference or unsafe practices of any kind the chief instructor makes himself known to them and shows them wherein they are wrong.

Up to this time the new employee is more of a liability than an asset. The company has spent time, money and effort to enable him to acquit himself creditably in his new work, and in return we expect these new employees to render careful, faithful service to their employer. Probably 85 per cent of all employees will do this. The other 15 per cent represent that portion of our organization which gets us into trouble through accidents, and for that reason strict discipline must be applied and a final effort made to win these men over and make them good employees, not only for the safety of others but themselves as well.

If we assume that most automobile drivers are careful to begin with, we have only to deal with a small minority who persist in unsafe and reckless driving. It might be wise and beneficial to have established in the municipality or state a school of instruction, attendance at which would be compulsory for those who by their records show themselves to be incompetent drivers.

It seems to me that the administration of the same kind of discipline to these drivers as is meted out by traction companies to their employees would go farther than any other agency in cutting down the number of preventable accidents. If the municipalities would come to the realization of the importance of disciplining the reckless without fear or favor and let it

*Abstract of a paper before the annual convention of the American Electric Railway Claims Association, Atlantic City, N. J., Oct. 8-11, 1923.

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be known that there is no escaping through friendship, pull or even worse, the administration of our traffic courts would be respected by the careful driver and law-abiding citizen and equally feared by the careless.

In Cleveland we have been very fortunate in the operation of a highly efficient traffic court. During the administration of Judge A. R. Corlett, who pioneered in sentencing speeders and reckless drivers to the workhouse, this court was put on a firm, business-like and impartial basis. The fact that these sentences were meted out without fear or favor, regardless of political affiliation, friendship or any other consideration, soon caused public sentiment to rally to the support of Judge Corlett's policy. Whether or not we favor the imposition of workhouse sentences, the fact remains that the inauguration of this means of combating the reckless and intoxicated driver has done much to eliminate the small portion of automobile drivers guilty of such offenses. In 1922 of the 13,326 arrests for violations there were 12,557 convictions, or 94.22 per cent. In the first three months of this year the ratio of convictions to arrests is 96.65 per cent.

A careful analysis of data collected throughout the country reveals the fact that the precentage of accidents to motor vehicles operated is steadily decreasing. For instance, in the year 1922 in Cleveland there was a reduction of 21.6 per cent in accidents per thousand motor vehicles over the year 1919. To put this in another form, in the city of Cleveland there was an increase of 68 per cent in licensed automobiles in the four-year period 1919 to 1922 inclusive, yet in the same period automobile collisions with street cars increased only 28 per cent.

There are several causes which may have contributed to this favorable showing. Drivers are more familiar with their cars and know better what they can and cannot do with them. They are more experienced due to the longer period of time over which they have operated automobiles. They have been influenced more or less by accident prevention propaganda. They are influenced by the increased severity of discipline meted out in our courts and, lastly, the accident rate has been decreased by reason of the fact that automobile congestion is becoming more acute day by day and drivers are forced to operate their cars at a lower rate of speed, thereby being better enabled to make a quick stop when emergency arises.

This lower speed at which autos have been forced to operate is probably the principal reason for this decrease in the accident rate. By the very force of their own numbers they are helping to solve the problem of accidents. This will continue until the saturation point has been reached—whatever that is.

This phase of the question is an encouraging one to the claims man rather than a discouraging one. It shows that education, discipline and the other factors enumerated are surely cutting down not only the accident rate but the severity of the accidents which occur.

The problem of the operating man, on the other hand, is becoming increasingly difficult. His duty is not only to transport passengers safely but also expeditiously. If we wish to retain the patronage of that portion of the public which uses street cars as a means of transportation, there must be no decrease in the speed with which we deliver them to their destination.

How is this to be accomplished? Obviously, one solution is the separation of traffic by creating "street car streets" and "automobile boulevards."

Undoubtedly our larger cities, at least where physically possible, must come to the separation of traffic by the establishing of auto boulevards. This problem is now up in Cleveland, where the saturation point has been reached on many thoroughfares. The creation of main thoroughfares whereon street cars as well as autos have the right-of-way is another means of enabling transportation companies to render rapid and efficient service safely.

The Ohio State Legislature at its last winter's session passed a uniform traffic law which became effective July 26 of this year. This co-ordinates the conflicting rules of the road in various communities. Section 6,310 reads as follows:

> For the purpose of enforcing the road regulations referred to in this chapter, the main thoroughfare shall be understood to mean all sections of public road and highways on which street cars or electric cars run.
>
> Vehicles and street cars going on main thoroughfares shall have the right of way over those going on intersecting thoroughfares.
>
> A vehicle joining the flow of traffic on a road or highway from a standing position, an alley, a building or private property, shall yield the right of way to all other vehicles.

Thus we have some relief from collisions occurring at intersections where the responsibility has heretofore been equally divided.

Another condition which introduces a serious hazard and interferes with the maintaining of schedules is the parking of automobiles in the congested sections.

The writer has attended meetings of the traffic committee founded by the city council and composed of representatives of the various civic institutions and organizations. One of their meetings was devoted entirely to a discussion of downtown parking. The only thing the committee agreed on after a long and arduous meeting was that this matter should be left alone. It was suggested by the writer, in order to start discussion, that all parking of automobiles should be prohibited upon every downtown thoroughfare upon which a car line operates. Representatives of the wholesale merchants, retail merchants, taxi drivers and various other organizations presented their arguments why this should not be done. The only personal satisfaction which resulted from this meeting was a statement by the secretary of the Cleveland Automobile Club, who was also chairman of the meeting, that he believed that ultimately this would have to come, but that the suggestion was premature by a year or two.

We do have in Cleveland a traffic code which prohibits the parking of automobiles on certain main thoroughfares on the city-bound side in the morning from 8 a.m. until 9:30 a.m. and on the out-bound side between 4:30 p.m. and 6 p.m. This is intended, of course, to give the full width of the street for the use of moving vehicles.

As a matter of fact, parking in these hours is not less than any other hours of the day.

The provision of one hour parking on certain streets in the congested districts means nothing so far as accelerating the movement of traffic is concerned. A satisfactory, expeditious and safe movement of street cars and traffic in the busy, congested sections of our cities must ultimately do away with the use of these streets as a public garage and the time is coming, if it is not already here, when merchants must realize that their business will be enhanced rather than retarded by the quicker movement of customers to and from their stores and the ease with which they may reach the sidewalk after alighting from their automobiles or street cars.

At the last session of the Ohio State Legislature another bill was passed which we feel has been a distinct step forward, particularly in protecting the investment and the very life itself of interurban properties, namely, "the motor truck and bus law of the state of Ohio." This bill empowers the Public Utilities Commission to supervise and regulate each motor transportation company, whether passenger or freight, to fix, alter and regulate rates; to regulate service and safety of such companies; to prescribe safety regulations and designate stops for service and safety on established routes; to require the filing of an annual and other reports and to provide uniform accounting.

The fee charged by the state runs from $40 per year to $230 per year, depending upon the number of passengers carried. Trucks carrying freight and express are listed on a tonnage basis, the yearly fee running from $40 to $200.

The operation of this law will drive out the irresponsible and careless operators, and to that extent reduce the hazards of the road. There is nothing in this bill, however, which limits the size of trucks.

The ultimate solution of the problem of automobile transportation and the curbing of accidents which result therefrom will require a great many years for its fulfillment in most of our communities. In our large communities it will require city planning for the reason that our streets, as laid out, were never intended to be taxed as they are at present. It is going to mean the establishment of more thoroughfares, which provide for the proper separation of the various means of transportation.

The problem confronting our mu-

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nicipalities is not only to deal with the problem as it now exists and to furnish remedies which may for a short time relieve a bad situation, but at the same time they must plan on a larger and more comprehensive scale which will meet the requirements of the road imposed by the universal use of the automobile, whose numbers have increased in five years from 6,000,000 to more than 12,000,000 in the country.

In the meantime, all that we can do is to follow up, possibly a little more systematically and thoroughly than we have in the past, the choice of our employees, their thorough and painstaking education, promulgation of accident prevention work, etc., but also not to lose sight of the fact that old-fashioned discipline, fairly and impartially administered, will do more for curbing automobile accidents than all the various theoretical methods that have been suggested.

On the part of municipalities, more strict enforcement of the existing traffic laws, which will no doubt require the employment of more men in the traffic departments, which are woefully and universally undermanned, rather than the passage of more legislation, which will be equally helpless without the man-power to enforce it, and for them to work out a harmonious relationship such as we have in Cleveland between the courts, the police prosecutor and the police department, administering the same fair and impartial discipline to the reckless and intoxicated automobile drivers which we are trying to administer in the operation of our street cars.

*The Utility Accountant's Obligation to the Public**

By Dwight N. Lewis
President National Association of Railway and Utility Commissioners

While Accounting Work Is Seldom Spectacular, It Is Indispensable to Proper Utility Regulation—Accurate Figures Can Help in Combating Demagoguery

FIGURES are such soulless things, in and of themselves, that it takes a real genius to so clothe them with spiritual attributes that they become alive, attention-compelling and decidedly interesting. It is recognized now that not only do figures not lie, but the man behind the figures must play fair with the arrangement of them. To be sure, there may yet be found those who, for a present advantage, will distort accounts so that the figures presented do not tell the story as it should be told. There are yet those who, for the purpose of befuddling an issue, might, instead of saying two plus two equals four, put it something like this—78 plus two divided by four squared minus three plus two equals four. Correct, sure, but the general public would have little knowledge of what was going on.

Accounting work is seldom spectacular, though I must confess I have seen some wonderfully spectacular figures coming out of the smoke funnels of utility accountants' engines. Upon you men devolves the duty of so keeping accounts that the owners and managers of the property may know, day after day, the actual results of operation. Upon the care with which you properly allocate operating expense, interest and other items of expense to various divisions of the work depend proper readjustments for the betterment of service and the introduction of economies in operation. The public knows little of you or your work. You are like the guards in a football game—we know they're there and most mightily necessary in every play, but it's the backfield or the ends who get the applause or condemnation. I have heard times without number criticisms on the side line (may have indulged in them myself) of how the quarterback or fullback or right end or left end or a halfback ought to play the game, but I've never heard a man presume to criticise a guard. Of course, the analogy is not perfect; analogies never are. We do hear that the statisticians or accountains for public utility companies so manipulate figures as to tell a story different from the whole truth. But you are personally never blamed for it—the rotten management, the dishonest Wall Streeter, or some mythical personage representing the murderous money power, is at fault—and you are merely one of the means used to deceive and defraud the public.

SCIENTIFIC ACCOUNTING INDISPENSABLE

Scientific accounting is indispensable to the proper regulation of public utility companies. This basic truth is well recognized. I have heard the late Federal Judge McPherson many times declare that a regulating body had no standing in his court, if it fixed rates or ordered service without knowing, or at least making an honest effort to learn, the various items of cost. The state of Iowa won its express rate case in his court because the express companies had declined to furnish the information as to costs as asked for by the commission.

Bookkeepers are not necessarily accountants, and it is only in comparatively recent years that the fundamental importance of careful accounting has been recognized. Good accounting is a careful record of essential facts of business operation, the essential operating facts necessary both for the operator of a public utility and the regulator; the recording of essential facts and not the management of property. The absence of proper accounting in the early stages of railroad development proved a serious handicap to the Interstate Commerce Commission. Many of the earlier records were entirely lost or, through their indefiniteness and unreliability, were misleading or worthless.

When I was a boy I became interested in the annual reports of railroad companies to state and Federal commissions. I was early impressed with the accuracy of the figures presented and with my utter inability to find a story in them. It was amazing how little the accountants knew of details necessary for a regulating commission to know in order properly to fix rates or otherwise perform their functions as required by law, and what a vast storehouse of knowledge of details these same accountants became when they wanted to use such details in fighting some action of the commissions in the courts. They could not say what proportion of business done was state and what portion interstate while a state commission was attempting to fix a rate, but could afterward tell the court what a sorry job the state commission had made of it by fixing the rates it did, and prove their claims by endless detailed statistics. It is this sort of professional expert that has caused the public to discredit statements made by the accountants for public utility companies.

A regulating board, whether city or state, in order to make its orders stand the test of court procedure, must fix rates based upon cost of service, including a reasonable return on the value of property used in public service, and including a sufficient charge to provide for the cost of retirement of equipment. Cost figures should be actual and some of the cost figures will not be easy to ascertain, and will change from year to year and be different for different localities and different companies. No accountant for a utility company should be party to any system of bookkeeping or accounting which would permit of unreasonable use of the funds of the company or an unreasonable statement of operating conditions.

Public regulation has come to stay. It must be along reasonable lines, in the public interest, and founded on a complete knowledge of practical requirements of regulated industry. Regulation along these lines will do away with the possibility of government or

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municipal ownership and operation. No real student of a democratic form of government desires to see government ownership and operation.

It is the easiest thing in the world to inflame the public mind against any public utility that is monopolistic or nearly so. The utility companies upon which we are most dependent for the necessities and comforts of life are the ones to receive our severest condemnation. We always want to buy cheaper, while at the same time receiving more for our own services. We always want more service for our outgoing dollar, although we are not always so keen to render a greater service for the incoming dollar.

When a demagog wishes to ride into public office and has absolutely no attribute of mind or conscience fitting him for the office, he bases his campaign on hatred for public utilities of one kind or another. United States senators, as well as congressmen, are made by lambasting railroads, mayors, councilmen, even governors, are elected because they declare what rotten institutions water companies, gas companies or street railways are.

A movement which is on foot now, I believe, will have a tendency to cure the worst symptoms of this form of demogoguery and that is public ownership through buying of stocks and interest-bearing securities. I am most heartily in accord with the efforts now being made by public utility companies to promote customer ownership. It goes without saying that when one owns an interest in a going concern the viewpoint changes materially as to the needs of that institution. The more we can induce the men and women of America to own something—to have property interests—the more certain we are that the red radicals will never get a foothold in our beloved republic.

In the meantime—yes for all time—you men have it within your power largely to prevent injustice being done to either the public or the utility companies by the frankness and fairness with which you do your work.

*The Preparation of Litigated Claims**

By Edwin F. Livingston
Chief Investigator
Boston Elevated Railway

The Importance of Having an Adequate System and Experienced, Capable Investigators—Complete Records of All Cases, Properly Filed, Are a Safeguard Against Fake Claimants

Edwin F. Livingston

THE two main requirements for the proper preparation of claims are (a) an adequate system and (b) experienced, capable investigators. Any system of preparing claims that tends to fix the investigator in a groove should be avoided. An investigator may do one thing day after day, but he should be flexible, physically and mentally, capable of making quick adaptations, and alert to all the possibilities of his work. In the preparation of claims a knowledge of the essentials of that branch of the common law and the statute law relating to negligence and damages as applicable to electric railway cases should be possessed and understood by those having to do with the work of preparation. It is also equally necessary and important to keep in close touch with the decisions which, from time to time, are handed down in our cases.

The investigator's work should be laid out for him in the simplest form consistent with the proof wanted, and under a schedule which will avoid multiplicity of work and unnecessary expense. While it is desirable that the chief investigator should indicate specifically the general ground to be covered in the preparation of the case, he should not deprive the investigator of initiative or power of instituting local investigation as to any matter concerning the case which may arise during his field inquiry into the facts. Every alert investigator will find abundance of opportunity in the cases he handles for the exercise of his best efforts and talent.

An Adequate System

The company should provide its investigating department with all practical things within reason to aid it in its work, for instance, the latest, as well as the older, directories of the cities and towns in and near which the company operates cars; also copies of new and the older voting lists, telephone books and other sources of similar information, so that the investigator before he leaves the office may be able to trace people if necessary from one address to another and also enable him to find those who had lived at various addresses at certain times. The company should also keep an index file showing the name and address of all previous claimants, as well as an index showing all present and past employees giving their full names and addresses and the names and addresses of their references. The company should belong to at least one local index bureau or clearance house, where a daily list showing the full name and address of all claimants could be consulted when necessary, and that it should be a member of at least one index bureau of national repute.

The chief investigator should, in addition to the above, keep a record or "dope" cabinet, so called, of all things which were of great importance to his company, but of no importance to other companies. The filing of newspaper clippings at the local index bureau or in the chief investigator's cabinet is always of great assistance, for it often opens up much information of great value. The writer well recalls a case where such a clipping was used some five years after it was filed and it opened the door to information which showed that a woman had two claims at the same time, under two different names and addresses, and that she was connected in many ways with fake claimants.

The dictagraph or dictaphone may have its special field of usefulness and should be furnished by the company when necessary. The subject of photographs is too well known to require much comment here, but an expert photographer who is a practical railroad man should always be at the service of the investigator when needed, as should also an engineer, who could take measurements, make plans and testify in court later, if needed.

Declarations should be promptly obtained after entry day, and when needed, specifications filed, and when answers are received and it is fully known what plaintiff's claim is, searching interrogatories should be filed in all cases of any great importance and should be followed up until they are fully and properly answered.

Passes or identification cards should be furnished investigators so they may readily identify themselves when and wherever needed.

Experienced, Capable Investigators

The successful preparation of litigated claims is nothing more or less than a search for the truth, and to be able to do the work of a first-class investigator one must be intelligent and honest, a hard worker, and willing to pay strict attention to business, a clear, cool-headed person, one capable of sizing up all kinds of people with whom he comes in contact. He must constantly be studying his cases, the people he meets and the locality in which he is working. An investigator should always try to leave a favorable impression with those he does business with so that they will have confidence in him in the future. Even when his

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work takes him to people of the "underworld" he should strictly keep his word to him. If he will do this and is a good investigator he will often be able to obtain much valuable, honest information. An investigator should be a practical railroad man and often the best results are obtained by promoting a man from the ranks of conductor or motorman. It is highly desirable that the man seek the position rather than the position the man. He should be promoted strictly on his merit for work done. A first-class investigator is not the product of one season. The man who has been in the business many years may continue to learn something about investigation. [The author then gave several illustrations from actual cases to show the difference between a first-class and a poor investigator and their value to the company for whom they work.]

To prepare cases for trial successfully, one must have first-class investigators. The investigator's job if he hopes to be successful means a great deal of hard work, each man should be paid according to the value of the work he does. Did you ever know of a first-class investigator being paid more than he was worth? I never did, but I have known poor investigators being paid more than they were worth, for a poor investigator is of but little value. An investigator's personal appearance means much and may be a valuable asset to him.

It is very important that a first-class investigator who has had a thorough experience in doing all kinds of the work and is entirely familiar with the operating department, should be furnished as a court assistant to the trial attorney. In the trial of cases this kind of a man is of great value, as he will readily grasp many a situation of which even the best of trial attorneys might not think, or might overlook. I cannot say too much in favor of this kind of a man as a court assistant, but believe the hardest of all positions for an investigator, is where he is required to do plaintiff's history work in a blind case, or where large amounts are asked and the company does not know whether the claim is an honest one or a fake case. In such cases the investigator often has nothing definite on which to work and the success or failure of the case depends on his ability to cope with existing situations and to secure the truth. To do this work well a man must be a constant, hard worker and not become discouraged when he is not able to obtain results. The whole value of first-class investigation will never be fully known, for in some cases where the whole truth is never found out the company never knew what it lost as a result of its incomplete investigation. Then, again, in the case where the fake claimant is thoroughly shown up, the investigation in many cases helps to stop other fake claims, even in some instances where claimants are waiting to see what the outcome of a certain case may be, and if it is fatal to claimant, the claim is never made.

Of course there are many cases where the injury and nature of the accident are not, to any great extent, debatable, and such cases call for little, if any, fine investigation work, the only problem being one for the trial attorney, to see that the questions of law or fact are properly presented to the court or jury. It is largely in cases where doubt as to the happening of the alleged accident is raised or fraud suspected as to the genuineness of the alleged injury that the talents of the trained investigator are required.

It has been the experience of the writer that a man who can not only obtain statements from plaintiffs and witnesses but who can also get a record in the handwriting of the person making the statement, showing that statement is correct and that they have read it over, is a valuable man. Statements unsigned and not showing that they have been read over by claimant or witness are of but little value compared to those which have been properly taken.

*Proposed Code of Ethics of the Claims Association**

Drafted by
Russell A. Sears
General Claims Attorney
Boston Elevated Railway Company

Russell A. Sears

Some of the Leading Principles Which Should Guide Claims Men and All Other Persons in Similar Positions

THE street railway is comparatively a new industry and like all conveniences of modern life brought with it some of life's inconveniences and hazards. In the early days the president, the manager, the superintendent or attorneys undertook the adjustment of claims against their railway until the unprecedented growth of this form of transportation and the alarming increase in injuries called for those of special fitting and experience to undertake the work of this character. Then was born the claims agent, who has finally, it is hoped, established himself as a respected, self-respecting and useful member of the business world. From a few dozen of them spread throughout the country in the early nineties, they have grown to hundreds, and with the influx of similar situations in all industries now number themselves in the thousands.

These thousand of claims agents have conducted their business without standardization or without a declaration of any basic principle which would seem to meet with the approval of all concerned. Believing that the time has now arrived when this association, representing one of the greatest industries of the country, whose members desire under all the circumstances to be just and honorable, should gather together some of the leading principles which should guide its members and all other persons in similar positions, it hereby declares and adopts the following sections as its Code of Ethics:

I.

Code as Proposed

It is the duty of the claims agent to serve his company with absolute fidelity; entrusted as he must be with wide latitude of discretion in the discharge of his duties, many of which must be accepted on his unconfirmed statement, he must at all times be faithful to the interests of his employer. The nature of the business which he transacts is such that temptations toward dishonesty abound; he is subject to approach or evil suggestions from those whom no code of morals could bind; he must often in emergency act quickly and make decisions which afterthought may not confirm as wise; he may be imposed upon and misled by those of greater adroitness or who are untruthful or intentionally fraudulent. The test should be fidelity to his company under all circumstances, leaving to others the results of dishonesty, and for himself his future advancement based upon his honesty and fair dealings.

II.

The claims agent in adjusting a claim should be fair and just; while he may assume that a person of mature age will care for his own interests, the representative of the company should not by fallacious reasoning or cunning seek to reduce the claim below a reasonable amount, much less should he seek to take advantage of ignorance or inexperience. It is his duty in dealing with claimants or their representatives to disclose clearly the fact that he represents his company and never by words, actions or intimations lead those with whom he deals to believe him to occupy any other capacity than his true one. When it is apparent that the injuries were sustained through the negligence of the company and that the claimant was not at fault, the law considers the injured party entitled to proper payment. The law favors compromises and protects those attempting to adjust their differences from any prejudicial inference.

Settlement should not be effected while the claimant is in pain or anguish to the extent that his mind is not clear. Adjustments made under circumstances when the claimant is not in a condition to intelligently transact business are odious and for the reputation of the company and the good name of the claims agent should be avoided, however great the temptation.

Wholly fraudulent cases under no circumstances should be compromised, however great is the expense necessary for resistance. Those guilty of perpetration or attempting to perpetrate a fraud on the company should, if the evidence warrants, be

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turned over to the public authorities for prosecution. This is a duty owed the community.

III.

In taking a written statement from the injured person, the injured party's statement and not that of the claims agent should be made. Such statements should be as full as desired by either party and should be honestly and accurately transcribed in writing, and the person making the statement, if he is asked to sign the same, informed of the nature and effect of the statement he is signing. The taking of written statements has often placed the claims agent in an embarrassing position, hence all precaution should be taken to surround the transaction with evidence of good faith.

IV.

When it becomes desirable to obtain the statements of witnesses, the truth only should be sought and it is the moral duty of all persons to be truthful in matters pertaining to the rights of their fellow citizens; to whom such statements are made is immaterial. A true and accurate statement should be taken and neither directly nor indirectly should any improper suggestion or intimation of reward be made by the company's representative to any witness.

V.

If a claims agent is called upon to attend court, either to assist counsel or to testify, his conduct should be deferential to court, counsel and all concerned. To attempt to curry favor with the judge, to meddle with the drawing of jurors or to directly or indirectly influence the verdict is wrong. There is very little satisfaction in a victory gained by unfair methods.

VI.

It is the duty of the claims agent who is intrusted with the privilege of employing his associates to choose men and women of good moral character. A company soon becomes favorably known if its representatives stand as men of integrity and honor in the community. No person, however alert, cunning or efficient in the business, should be employed unless this standard of character is fulfilled. When a person new to the particular company is employed to investigate or adjust claims he should be thoroughly instructed as to the policy of the company and should be required to live up to it.

VII.

In all his transactions with the company the strictest accuracy and honesty should prevail. No meretricious report, no unsubstantiated self-serving figures or accounts should be submitted. A candid report best serves the claims agent.

VIII.

The claims agent should deal only with the injured person or his properly authorized attorney or agent. To deal with one who has solicited the case from the injured person is to ignore the law and participate in an odious practice. In nearly all the states laws have been enacted against the solicitation of accident cases and in all civilized places such practice has been condemned. To recognize a person who has solicited a case by discussion or adjustment is participating in a wrong and is calculated to increase the growth of an evil situation. It is proper to discuss or adjust a case directly with the injured person without conferring with or notice to any person who has illegally or improperly procured authority to act as the injured person's representative.

IX.

When it becomes desirable to have a medical report of the condition of the injured person, only surgeons or physicians of competency and high standing should be employed. Such doctors should understand clearly that only a report of the true physical condition of the examined person is expected or desired.

Such reports, if prejudiced or unfair, mislead the adjusting authority and are to be condemned as seldom bringing even temporary satisfactory results.

X.

The reports of the accident made by the employees, being generally the starting point of the claims agent's duty, should be frank and truthful and all employees should thoroughly understand that they best serve their company and themselves by making such reports. Rules should be formulated and promulgated, according to each company's method of bringing such notice to its employees, stating clearly that the true facts only are desired in such reports.

XI.

The street railways are quasi-public corporations to the support and success of which the public contributes its money. The return which the public has a right to expect is good service at reasonable cost. All payments made by the claims agent in the adjustment of cases are charged to the cost of service. It therefore follows that sound judgment should be exercised in these payments. Unjustifiable or over-liberal payments should be avoided. The public has a right to expect the application of sound business principles in all branches and departments of the street railway which it supports.

Even-handed justice, as far as the claims agent can see it, should be administered to all. The rich or powerful, those of political influence or holding political positions, should be treated on the same basis as those in humbler life. Pain or suffering—or the law—make no distinction as to personages.

XII.

The claims agent, having unusual opportunities to witness the effect of accidents both to the individual injured and the cost that results therefrom, should by all means in his power advocate the adoption of safe methods and practices on the part of his company and should unceasingly work with his management in the prevention of the loss of life, suffering and money. This is one of the highest duties of the claims man and commends itself to the approval of all. He, too, has the unusual opportunity of witnessing the evils to the community resulting from the practice of soliciting personal injury cases. It is his duty insomuch as the practice is condemned by all to do what he can to discourage the same by the advocacy of legislation or other means tending to stop it and properly to punish those who indulge in it.

CONCLUSION

In its last analysis, the duty of the claims agent toward his company, the injured person and the public resolves itself, like all human action, to nothing more or less than living up to the Golden Rule. The claims agent who transgresses the settled rules of procedure in his business offends against his company, the community and his brethren.

*Construction Cost Accounts**

By Weston J. Hibbs
Treasurer
U. G. I. Contracting Company

Weston J. Hibbs

Exact Principles Govern Cost Keeping—Accuracy of Results Depends on the Skill with Which They Are Applied—The Accounting System Used by the Speaker Is Described

A GOOD construction cost system should function in such a manner so as to produce the following results: (1) To enable those in charge of the work to have revealed to them all the cost of the work as it progresses, so that the figures will assist in pointing out efficiencies and inefficiencies promptly and in time for remedial and productive action, thus helping to save time and money instead of simply accounting for and analyzing the outgo after it has been spent; (2) to permit readily of a financial audit; (3) to divide the various elements of cost so as to permit of an accurate detailed record of all the multitudinous parts of the work; (4) to be sound in theory and accurate in practice; (5) last but not least, not too expensive to operate, nor too difficult to keep accurate.

The fundamental principles of cost keeping are as positive and exact as the fundamentals of mathematics and every variation from these principles results in error. Accuracy of the results are predicated on the degree to which these principles are skillfully applied.

These fundamental principles may be defined as follows:

1. *The Principle of Cost Definition.*—The cost of an item of product is the sum of the expenses involved in its production and distribution up to any predetermined point. It is the price at which an article may be sold without either loss or gain to the seller.

2. *The Principle of Element Definition.*—Each cost element is definite in amount, purpose and object. An element of cost is any expense incurred. Expenses may be classified as normal or abnormal, normal expenses being those incurred directly as the result of premeditation or planning with a view of obtaining some definite result.

Abnormal expenses are incurred as a result of unpremeditated contingencies of business such as accidents, fires, carelessness, or other causes which were not definitely planned. Expenses having a single beneficiary are "direct" expenses; those having two or more beneficiaries are "indirect" expenses and require distribution.

3. *The Principle of Expense Grouping.*—Indirect expenses may be grouped for simultaneous distribution only when their benefits are measurable by a common unit and their beneficiaries participate in identical ratios. The combining of all indirect expense items in a single group and designating them as overhead, burden, or general expense, not only obscures the purposes and benefits of these expenditures but

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also renders their correct distribution impossible.

4. *The Principle of Expense Distribution.*—In the distribution of indirect expenses, single or grouped, the proportions of benefits conferred indicate the proportions of the expense or expense group total, chargeable to beneficiaries. If it is wrong for a merchant to charge to the account of one customer the cost of goods delivered to another, it is equally wrong for the manufacturer to charge against an item of product made for one customer any part of the expenses incurred in production of an item made for another.

5. *The Principle of Contingent Expense.* — Contingent expenses, such as repairs to equipment, shrinkages in values, losses by error in workmanship and design, sick and absent, and vacation expenses, constitute legitimate charges against production. The causes of such expenses and losses generally serve to indicate the character of the resulting benefits or losses for the purpose of applying the rule for their distribution. This system is now in use by the company with which the writer is associated and has been brought about by the necessity and the requirements of the business.

These requirements are very severe in that most of the construction work done by the company is on some basis in which the price is determined by the cost, and that "cost" must be such a cost as will justify itself in an audit by the customer. This system has stood numberless audits and has successfully weathered all storms.

It seems to me that logically the first step of a cost system, is to define definitely "What is Cost?" There are many definitions of cost, some of which endeavor to state specifically what items constitute cost, but it has always appeared to me that for a definition of cost the best way to make it is not to say what it includes but to say what it does not include.

In our system we define cost as "All expenses incurred in carrying out the provisions of the agreement except the following: Salaries of the officers of the contracting company, purchasing expenses, new business and selling expenses, interest and legal expenses."

We exclude the above five elements of expense from our cost, because we admit our inability to properly allocate these to the various jobs and also because the question of the amounts disbursed for certain of these expenses, particularly such as new business and selling expenses, might in an audit be readily criticised.

Having determined upon our principles and definition of cost, our next step in the work is to prepare an estimate for the work. An estimate, however, is nothing more than the combination of a number of guesses of the ultimate cost of various parts of the work, and its accuracy depends on the knowledge and accurate work of the guesser. Therefore, we built up our estimates by detailing these guesses and calling each little guess or division of the work a sub-account.

Actual expenditures in the field may be divided into the four general divisions of material, labor, freight and cartage, and miscellaneous.

I show freight and cartage as a distinct division owing to the fact that this is a cost which may be very materially affected by the location of the work both as regards its surroundings, distance from points of shipments, and of deliveries.

In some cost systems only the total labor and total material costs are shown, but I personally cannot see that this information is of much value. What we want to know is what is the cost of the physical divisions of the work. For instance, what is the cost of the foundations; what is the cost of excavations; what is the cost of clearing the site?

Sub-Accounts Clarify Records

Owing to the demands of the estimator, sub-accounts are quite numerous, but the more there are, the easier it is to compare the resultant cost with the original estimate and also to ascertain more readily the reason for over-runs and under-runs of the estimated cost. It also assists those in charge to see at a glance during the progress of the work the likelihood of each division or sub-account of the work exceeding its budget.

The usual practice is to open in the ledgers an account to represent the total cost of the job and keep memorandum ledgers showing the details of the cost divided into sub-accounts. This will simplify bookkeeping very materially and the memorandum ledgers may be kept in as much detail as desirable. If in these memorandum ledgers an explanation of each item of cost is written, a permanent record will exist for future information.

In the system I am outlining this method is followed, and at the end of each month a typewritten copy of the memorandum ledger entries made during the month is prepared for the customer so that the customer has in his office complete detailed costs and is able to compare them with the original estimate in case of an over-run or under-run.

Care should be taken by the contractor to allocate to each job such expenditures as are caused by the job and to charge to it only such expenditures. This means that the contractor's home office and engineering force should require its employees to keep time vouchers so as properly to allocate their time.

Care should be taken by the contractor to see that there is charged to the job the cost of only the work covered in the estimate. If the customer desires any work done which is not included in the estimate, it should be done under a separate job number and its cost kept separate. If you do not follow this plan it is very difficult to make comparisons of the resultant cost with the original estimate. This is a very important point and should be very carefully followed out.

Also, care should be exercised to see that each contract is charged with its proper costs and only its proper cost for the use of the contractor's tools and equipment, for the use of the contractor's standard drawings, patterns and molds, etc. These charges should be based on some fair equitable plan, the basis of which is the benefits in service or commodity to the job.

There are a few expenditures of the contractor which cannot be allocated direct to a contract. An illustration of this would be time of clerks in the contractor's home office not chargeable to a particular contract, rent of the contractor's home office, and also the cost of vacations granted to employees.

It is suggested that such expenses be combined under some general heading and in the system I am describing, they are combined under a general account entitled "construction general expense" and distributed over the cost of all contracts on the basis of the labor costs, and are allocated to sub-account "general."

This seems to be the fairest way to break up these few elements of cost having no factors upon which to distribute them to the contracts.

These elements, however, should be apparently small in comparison with the total cost of the work, and in the system I mention they are less than 2¾ per cent of the total cost, and the total of sub-account "general" is less than 5 per cent of the total cost.

Care should also be taken by the contractor to see that those elements of expense which occur to a greater extent in one month than in another are distributed fairly over the whole year's work through opening reserve accounts for this purpose.

A reserve is maintained for what is termed the cost of errors in workmanship and design. By this is meant errors in workmanship and design by the contractor or the contractor's subcontractors. In the system I am describing, the reserve to carry this cost is based on one half of one per cent of the cost of production, and in establishing this system the contractor guarantees the customer against any loss or expense of this character.

Contractors necessarily must make a certain number of such errors and this plan seems to be the most satisfactory as the amount charged the customer is small and the protection is great.

The points that I have brought out in this system as being of advantage to cost plus work are equally as advantageous to flat price work, but as most of the business of our company is done on a cost plus basis, it is this class of work that has brought about the system just outlined.

There are many advantageous points in this system which I have not been able to describe in this article but which will develop where such a system is in use. But I want to say that for such a system to be a success it must be predicated on careful, accurate, and intelligent estimating on the part of the contractor, accurate allocating of costs by the contractor, and of his being ethical and honest in his charges.

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Operating Reports and Their Usefulness to the Management

By E. H. Reed
Auditor Brooklyn City Railroad

EVERY public utility should adopt correct and sound accounting methods, for it must be understood that there are several parties interested in the correctness of utility accounting: First, the patrons or consumers, second the holders of both stocks and bonds, and, third, the state commissions, which have broad powers over construction, accounting, financing rates and service.

Out of commission form of regulation came the standardization of accounts, which has a very important advantage over the old method of accounting. It is essential that the accountant in charge should make a very careful study of the basic principles involved in the classification of accounts, so that a thorough knowledge may be imparted to those who are directly responsible for the distribution of the accounts.

Monthly income or operating reports give the investor reliable information as to the current affairs of the company, furnish the public and the commission with data necessary to judge fairly the company's public relations and give opportunity to the management to make comparisons of costs with similar utilities operating under like conditions, so that the relative efficiency of operation may be determined. It is usually the practice of utilities to make comparisons of the current month's income and expenses with the corresponding month of the previous year so that any increases or decreases in the accounts, for the period under review, may be shown. It should be the duty of the accounting department to make a thorough and complete analysis of these increases or decreases and a statement of the results found should be incorporated in the regular monthly report.

Another forward step could be made by a further division of accounts with very little extra expense to the utility and with no objections on the part of the state commissions. From inquiries made we find that very few companies, whether large or small, make any further subdivision than that shown in the classifications of accounts prescribed by state commissions. Under the head of "Repairs to Revenue Cars," we find that one company in New York City shows nineteen subaccounts, while another shows fourteen, with practically only two accounts that are comparable. In making a further comparison of accounts of the first company with those of a large Southern corporation, we find that the latter company has six more accounts than the one in New York with only twelve out of an average of twenty-two accounts that might be comparable. The same differences are found in comparisons of power, transportation, traffic, general expenses. In way and structures expenses we find a more comparative basis.

Under modern public utility statutes power has been given to commissions to prescribe systems of uniform accounting which furnish the facts necessary to determine the relative cost of service and the efficiency of operation. For obvious reasons the commissions go no further than the classification of accounts prescribed. With the management of a modern public utility, however, it can readily be seen that greater detail of expenses is required for the purpose of enabling those in charge of operations to more quickly locate any abnormal increase in any one unit of cost, the result of which might be the means of preventing moneys expended unnecessarily. It is information of this character, furnished promptly by the accounting department, that gives to the management a more distinct appreciation of the operating condition of a public utility. We recommend to the members of this association that consideration be given to a more uniform system in classifying these sub-accounts, to the end that regular monthly reports may be standard.

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Psychology of the Automobilist*

Tendency Toward Reckless Driving Should Be Overcome by Education and Restraint—Greater Care Should Be Exercised Also in Issuing Licenses

By L. F. Wynne
General Claim Agent Georgia Railway & Power Company, Atlanta, Ga.

LONG experience has taught us that the mental processes of the average citizen undergo a remarkable change the moment he purchases an automobile. He became a different person over night. Where he was once of a kindly disposition, considerate of the rights of his fellow men, and well content with the comfortable though comparatively leisurely mode of transportation afforded by the street cars, he suddenly becomes, when placed behind the wheel of his own motor car, a metamorphosed being obsessed with the sole idea of arriving at his destination in the shortest possible time, regardless of the rules of the road and the rights and desires of anybody else.

The lowly pedestrian, from whose ranks he has just been graduated, becomes in the motorist's eye an unspeakable being; a furtive, deceptive, dodging target whose peregrinations, if they are to be tolerated at all, should be confined strictly to the footpaths designed for them; and the street-car motorman, in this man's opinion, becomes a ruthless, scheming creature, an abysmal brute whose sole joy in life is derived from the pleasure he gets out of scattering the *disjecta membra* of motor cars over the surrounding landscape. This is the type of motorist, and he is shamefully numerous, who delights in just missing the wretched pedestrian as he scurries for safety, and who gets an unholy joy from "cutting off" a street car or another automobile in a tight place. Sometimes there is a moment's miscalculation and then the poor pedestrian, not as nimble on his feet, perhaps, as the driver anticipated—is removed piecemeal from the running gear. And quite frequently the street car, sailing serenely on its way, cannot be stopped quickly enough to allow this lord of creation to cut in ahead, and then there follows what is thechnically known as an automobile accident.

This tendency towards recklessness on the part of automobile drivers is, I suppose, but a manifestation of the trend of the times; an outgrowth of our vaunted hustle and speed. It would seem that we have for so long enjoyed and revelled in the reputation of being a nation of hustlers that the very fabric of our country's prosperity is builded on a callous disregard of all the amenities of life and that the theory of the survival of the fittest is the only principle by which our actions should be governed. Of course, this constant hustling and striving has been largely responsible for our country's rise to its present pre-eminence, but there are limits beyond which this utter disregard for the rights and conveniences of others should not be pushed. When this spirit of speed reaches the point where the lives of our citizens are constantly endangered it is time to call a halt and to cast about for ways and means of abating this constant menace to our communities' safety.

It cannot be denied that one of the greatest contributing causes of automobile accidents can be traced directly to the lack of even ordinarily intelligent methods of issuing licenses to prospective motor-car drivers. Every person is not fitted to drive an automobile any more than every person is fitted to take charge of a locomotive. A locomotive's course is confined to its path of steel rails and its operation is bound about and controlled by some of the most stringent laws on our statute books. The engineer attains his position only after years of apprenticeship and after passing the most rigid of tests. And

*Abstract of a prepared discussion on automobile accidents before the annual convention of the American Electric Railway Claims Association, Atlantic City, N. J., Oct. 8-11, 1923.

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yet virtually anyone is allowed, after the most perfunctory of examinations, to take charge of a powerful automobile, a machine as potentially destructive as a locomotive, and drive it where he likes through the crowded streets of our cities. That such a person might be unfitted to assume the responsibilities attaching to his duties is rarely discovered until after the accident. The motor car may fairly be said to be a deadly weapon of which we must take account only when it is in the wrong hands. It should be our business to see that it gets into the right hands and into no others, so far as that can be accomplished by measures of education and restraint.

To insure this, a mental and physical examination should be made of every applicant for a motor-car license. Furthermore, the applicant should be required to present such a certificate of character as will afford at least an indication of his sense of responsibility to others. He should also be required to show that he is thoroughly familiar with the rules of the road and with the traffic regulations in the territory in which his car is to be operated. Finally, he should be made to show by a road trial that he has a satisfactory understanding of the operation of the car which he proposes to drive. The possession of an annual license, however, should entitle its holder to the issue of a new annual license provided only that his record of the twelvemonth past was clear of serious breaches of the law.

We claim agents, through our intimate association with accidents and claims, and our wide knowledge of the many ramifications of the problem, should begin to take an active and leading part in the promulgation of laws designed to enforce the safe and sane operation of motor cars. Public opinion at large has so far contented itself with expressing its indignation at the time of serious accidents and saying that something should be done. That is perhaps true also of us, though our remarks might have been more than ordinarily comprehensive and vociferous. But the time when we simply "stood aghast" or "viewed with alarm" is about over, I hope, for the time to act is close upon us.

First Educational Convention Conference Indorses Plans of Committee

President Budd Promises Backing of Association in Efforts to Inform and Train Employees—Delegates Approve Plan for a Course in Economics and Ask for Definite Information as to Getting Educational Work Under Way on Electric Railway Properties

AT THE invitation of Edward Dana, chairman of the committee on education, twenty-five or more railway men, manufacturers and educators met at the Marlborough-Blenheim for luncheon on Thursday, Oct. 11, to compare notes on employee training.

Mr. Dana first called on Britton I. Budd, newly elected president of the American Association, to open the discussion. Mr. Budd said that he had grown up in the electric railway business. Among all of his interests that in men stands out strongly. He had been impressed with the difficulty of explaining to railway men the economic side of the business. The fault here lies largely with the managements which have not furnished the information which the men desire. It is an educational lack.

Again, supervisors grow old and must be replaced. Educational work must be done to provide competent successors for these employees. Technical men also need to be obtained and fitted into the organization. The work should be attractive to them.

To illustrate the possibilities of educational work on an electric railway property Mr. Budd told of the successful lectures which had been given to large numbers of men on his property and the outgrowth of the educational work in the spread of the idea to other properties. Arrangements have been made by which courses on public utilities have been instituted by Northwestern University and the University of Illinois.

Mr. Dana said that there is no question as to the value of this work. How to carry it on for the benefit of the industry generally is the problem. He asked for critical suggestions of the work of the committee. M. McCants, San Francisco, said that the committee's suggestions are vague. They need to be more specific. Railway managers are too busy to apply the committee's outlines to their own specific cases. There is a chance for the association to do this. This idea was voiced by several other railway men.

Engineers' President Explains Comprehensive Program

H. A. Johnson, Chicago, president-elect of the Engineering Association, told of the educational work done by the Chicago Elevated Railways. This started gradually with the company's system of training understudies to take the places of all men in the organization. In encouraging the employees to improve themselves the company cooperates with the trade schools informally, and assists in financing tuition. The lectures on economics, etc., which were given recently held the interest of the men in a remarkable manner, showing the keen desire for information. The company each spring sends representatives to the technical schools to select promising technical men, who on entering its employ are given an all-round practical training. Their work is under the supervision of an executive of the company. The main problem is to find suitable jobs for these men so that they will be satisfied to remain with the railway. Under this plan only as many men should be taken on as can be conveniently accommodated in this way.

Mr. Dana asked a number of educators who were present by special invitation to give the point of view of the teacher in this matter. Prof. N. C. Miller of Pennsylvania State College explained the operation of the extension courses conducted in connection with the industries by various methods. He said that the colleges are prepared to put business information into text form and to supervise the class work or correspondence instruction, but the industry must supply the fundamental facts. He asked for co-operation in connection with the plan outlined in an appendix to the 1923 report of the committee.

J. A. Moyer of the Massachusetts State Board of Vocational Training, said that the syllabus for an industrial course must be complete if instructors are to be able to conduct it in accordance with the desire of the promoters. With a general outline like that given in the report it is largely up to the man in charge of the course to fill in the details. This requires men thoroughly in touch with the industry involved, and each will give his own interpretation of the situation. Such instruction is difficult to supervise.

Mr. Dana then read the outline of the course as given in the report and the conference agreed that some such course should be given.

C. R. Dooley, who is in charge of vocational education for the Standard Oil Company, said that work such as that proposed by the committee will bring good results, but it should not go too fast. Instruction should preferably be given to small groups and under everyday working conditions. A study of the program of the Atlantic City convention showed a remarkable amount of attention given to what are virtually educational subjects, indicating the interest which the association is taking in this line of activity. Mr. Dooley was particularly impressed with the number of companies which had appointed educational representatives, which he considered a highly encouraging indication of practical interest.

The net result of the conference was a definite determination to urge the pushing of the educational work for which the committee's efforts of the past two years have prepared the way. There is no question as to the opportunity, but the difficulty is to furnish specific help to individual companies whose requirements differ through a wide range. The proposed course in electric railway economics should be generally useful.

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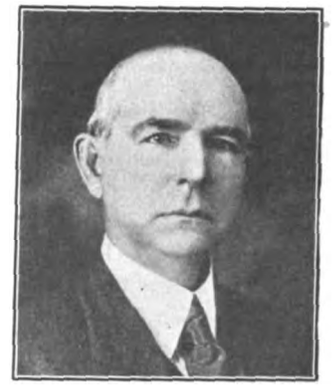
Proceedings of the Claims Association

Wallace Muir
Retiring President

Code of Ethics for Railway Claim Agents Considered and Adopted. Active Discussions on Proper Organization of Claims Department and Other Topics



W. H. Hyland
President-Elect

THE American Electric Railway Claims Association held four active sessions at Atlantic City last week, the interest in the discussions being as great or greater than at any other convention of the association. This interest partly centered about the question of the proper organization of a claims department, initiated at the 1922 convention but carried over to the 1923 meeting. Great interest was also caused by other very live topics on the program.

The first session was on Monday afternoon, Oct. 8, and the first order of business was the annual address of the president. An abstract follows:

President's Address

In his annual address, President Muir explained that the program for the 1923 session had been built about three ideas, namely: (1) the operation of a claim department at a minimum cost, consistent with efficiency; (2) reduction of accidents, and (3) the automobile hazard. He commended the reports and addresses on these subjects to the attention of the delegates.

In speaking about the report of the committee on automobile accidents and its recommendation for the permanent engagement of a safety engineer by the American Electric Railway Association, he gave full credit for the idea to the committee. He said that if the report met with the approval of the delegates he hoped the next administration would be able to convince the parent association of the value of the plan.

Speaking of the value of the exchange of ideas, Mr. Muir said, in part:

"No claims agent can succeed who lives within himself. He must work, study and accept the advice and counsel of others. He must benefit not only by his knowledge of the achievements of others in the same line of work, but also by their mistakes, and this can be accomplished in only one way, and that is by a large number coming together once a year and discussing the important questions confronting them.

"Those of us who have attended these conventions from time to time know the advantages received, and we should not lose the opportunity at all times to convince other claims men, as well as executives, of the importance and benefits of these meetings. I feel sure that none of us has ever attended any of these conventions that he did not return to his work better fitted for the task and with a feeling that he had been fully repaid for the time and expense given in attending the convention."

Mr. Muir discussed the qualifications of a claims agent and outlined them in the following words:

"No one connected with the railway industry has a greater responsibility than the head of the claims department. No one has more complex and important questions to determine than he. The claims agent must be a man not only of ability and excellent reasoning power, but he must be alert to his duties and responsibilities. He must be scrupulously honest and one whose integrity cannot be questioned. He must be willing to sacrifice his personal affairs and pleasures for the benefit of his company, and above all, he must so conduct himself as to command the respect of the community in which he lives and works.

"Notwithstanding these qualifications and with all that is intrusted to him by his company, executives often times injure his work and curtail his influence in the community by their attitude toward him and his department. He must have the confidence of his superiors, and the superior must recognize his capacity and give him such a standing in his company as will show to the community the esteem in which he is held by the company. He cannot expect to succeed if he is to be but a middle man between the company and the public. He must be a part of the company."

Report of Secretary

On motion the recommendations of the president were referred to the incoming president and executive committee for consideration and action.

The reports of the executive committee and the secretary then followed. The latter gave a list of the questionnaires sent out and showed thirty-two individual members in the association. This is of course in addition to the number who belong because of company affiliation. S. B. Hare, William Tichenor, and John J. Reynolds were appointed members of the nominating committee.

Code of Ethics

Russell A. Sears, general claims attorney Boston Elevated Railway presented a paper on "A Code of Ethics," published in abstract elsewhere in this issue. At the conclusion of his address, President Muir expressed the indebtedness of the association to Mr. Sears for the paper and said that if the principles as laid down by him in the paper were carried out by the claim agents there would be a much better understanding in the community. He then explained that at the request of Mr. Sears, this paper had been referred to a committee, of which W. H. Hyland of the Fonda, Johnstown & Gloversville Railroad was chairman.

Mr. Hyland urged the adoption of a code of ethics, and while he was in great accord with most of the code as suggested, he had some changes in wording to suggest. These included, in section 4, the omission of the phrase, "The representative of the company is not bound, unless requested, to disclose his identity," and in section 7, "future uncomfortable or unexplainable situations are thereby avoided."

Mr. Jack of Wilmington, in referring to section 8, asked how it was possible to know whether the injured person's representative had illegally or improperly procured authority. Mr. Sears explained that that clause mentioned was founded on a ruling of the bar association, which has always declared that if a case has been illegally or improperly solicited by the person representing it, it was not unprofessional to go behind his back and transact business with the injured person, just as though there had been no attorney. On vote further discussion on the code was carried over until the following session.

The report of the committee to investigate and report on the proper or-

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TABLE GIVING ANALYSIS OF THE WORK AND COST OF SETTLING ACCIDENT CLAIMS, SUBMITTED BY COMMITTEE TO INVESTIGATE AND REPORT ON THE PROPER ORGANIZATION OF THE CLAIMS DEPARTMENT

Question	Group A (Companies with more than 5,000 accidents a year)		Group B (Companies with from 1,000 to 5,000 accidents a year)		Group C (Companies with from 500 to 1,000 accidents a year)		Group D (Companies with 500 accidents or fewer during year)	
	No. of Cos. Reporting	Amounts or Percentages	No. of Cos. Reporting	Amounts or Percentages	No. of Cos. Reporting	Amounts or Percentages	No. of Cos. Reporting	Amounts or Percentages
1 Number of accidents in 1922	15	171,620	32	69,508	14	11,744	39	6,931
2 Number of accidents of companies reporting the number of accidents investigated	10	109,107	25	51,640	13	10,933	37	6,155
2a Number of accidents investigated by companies replying to question 2	10	48,360	25	28,420	13	6,307	37	3,892
2b Percentage of accidents investigated to total	10	45%	25	55%	13	57%	37	63%
3 Number of accidents of companies reporting on number of claims made	14	165,560	29	63,338	11	9,431	38	6,532
3a Number of claims made (all descriptions)	14	50,203	29	17,405	11	2,965	38	2,059
3b Percentage of claims made to accidents reported	14	30%	29	27%	11	30%	38	31%
4 Percentage of companies reporting an increase in claims	10	.....	12	.....	8	.....	12	.....
4a Percentage of companies reporting a decrease in claims	3	.....	13	.....	6	.....	25	.....
5 Percentage of settlements made for personal injury and property damage	13	30,484	29	12,237	11	1,467	39	1,153
5a Percentage of claims filed against companies answering question 5	13	47,203	29	17,405	11	2,965	39	2,148
5b Percentage of settlements to claims made	13	65%	29	70%	11	49%	39	56%
6 Employees in claim department or in its behalf a	14	491	27	284	13	80	29	106
6a Total number of accidents of companies replying to question 6	14	163,967	27	57,616	13	10,933	29	5,709
6b Average number of accidents of companies replying to question 6	14	11,711	27	2,133	13	841	29	196
6c Average number of employees per company	14	37	27	7	13	6	29	4
7 Number of companies reporting increase on number of suits filed and disposed of during calendar year	6	.....	12	.....	6	.....	13	.....
7a Number of companies reporting decrease in same	7	.....	13	.....	4	.....	1	.....
8 Total expenditure of claims department during year b	15	$5,998,658	30	$2,581,016	13	$483,870	27	$261,673
9 Cost of maintaining claims department	15	$1,436,723	30	$645,315	13	$104,096	27	$71,874
9a Percentage of amount in question 9 to that in question 8	15	25%	30	15%	13	21%	27	27%
10 Average percentage of amount given in question 8 to gross	15	3.25	30	3.01%	13	2.5%	27	1.77%
10a Average total expenditures per company	15	$400,000	30	$86,000	13	$37,220	27	$9,700

Notes—a Including doctors, lawyers and all persons whose salary, expense or any part thereof is charged to injuries and damages. b Including expense of claim organization.

ganization of the claims department with written discussions by Messrs. Drown and Robinson follows:

Claims Department Organization

The report of the committee to investigate and report on the proper organization of the claims department took the form this year of statistics which have been compiled in tabular form and are presented herewith. The committee reports that about 100 companies replied and points out that the statistics from them have been arranged in four groups, depending on the number of accidents reported per company. The following summary is also given:

Average percentage of accidents investigated to accidents reported	55
Average percentage of claims made to accidents reported	30
Average percentage of settlements to claims made	62
Average claims per company	789
Average employee per company	10
Average settlements per company	494
Average number of claims per employee	78
Average number of settlements per employee	49
Investigation shows litigation increasing in a majority of sixty-two reporting companies	62
Average percentage of claims department expense to total expenditures (approximate)	25

The report is signed by Neil W. Funk, J. S. Kubu and Walter E. Robinson, chairman.

Comments by Mr. Robinson

Walter E. Robinson, claim agent Cincinnati Traction Company, the chairman of the committee on the proper organization of the claims department, also presented a paper on this topic. Briefly, it was a defense of the position taken by him at the 1921 convention in which he argued against "over-organization" in the claims department.

Commenting on the statistics obtained by his committee, he said it was a matter of surprise to learn that such a proportion of the reported accidents require investigation, and he felt the importance of this part of the duty of the claim agent has been exaggerated without reason and has resulted in unnecessarily over-manning many departments. In fact, he thought that an investigation in many instances is detrimental because the too enthusiastic investigator paves the way for endless trouble.

The speaker declared that the value of organization is manifested nowhere more than in the rate of percentage of expenditures to the gross revenue and that in the natural order of things the rate should decrease with increased earnings. Nevertheless, the report showed that the companies maintaining the highest earnings are likewise maintaining the highest percentage of damage expenses to the gross revenue, indicating, in the speaker's opinion, an expenditure in excess of what it should be. He thought the practice of settling claims outside the office to be the most glaring disorder of the claims department. This leads to the settlement of many claims wholly without merit or substance and can be accounted for only by the undue anxiety of the traveling adjuster. In the speaker's opinion, this method was "the surest means of incurring the displeasure of those who are seriously injured and of the greatest assistance to those who are not so sure of their injuries."

Comments by Mr. Drown

In a written discussion H. V. Drown, general claims agent Public Service Railway, Newark, took issue with Mr. Robinson. He remembered that Mr. Robinson had declared at the 1921 convention that by the simple expedient of sitting tight in his office and compelling all claimants to come to see him he was able to keep the claim disbursements down to a fraction less than 2 per cent, and Mr. Robinson appeared to believe that any higher rate of expenditure could be explained only through over-organization in the claims department. Mr. Drown's position was that local conditions have a great deal to do with the percentage rate and that the low rate in Cincinnati is not due to the policy of having claimants come to the office of the claims agent. To prove this he quoted the figures from several companies in cities not far from Cincinnati which have as low or nearly as low a rate as Cincinnati, although the method followed by them is to go out and settle claims. As examples, the speaker mentioned Columbus, Dayton and Indianapolis. Farther to the north the percentages are higher, but it will be found also that the ratio of foreign born to the total population is higher. This ratio in Cincinnati is 10.70 per cent, whereas in Cleveland it is 30.14 per cent and in Newark, N. J., 28.36 per cent.

Another local condition affecting the percentage rate is the character of right-of-way. Thus, subways and elevated railways and railways operating over private right-of-way should have low percentage. The condition of track and equipment and the width of the street or highway has also much to do with results. Thus, Washington, D. C., with its broad avenues, should have a lower percentage than Providence, R. I.,

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with its narrow lane-like streets, other things being equal. The attitude of the public press also affects the figure, not only in the treatment of the company as a whole, but in its inclination or disinclination to feature accident news. In some cities the account of an accident is often accompanied by lists and addresses of the injured and writeups of court results, with the names of the plaintiffs' attorneys, thereby giving them valuable free advertising. Politics also plays a part.

Another factor is the law as regards negligence. Thus, in New Jersey the court has held: "It is not negligent *per se* or negligent in law for a person driving a vehicle in approaching a street crossing over which he intends to cross to fail to look for an approaching street car in order to avoid danger from it. The question of whether he was negligent or not must be submitted to the jury for them to determine as a question of fact." It has also been the tendency in decisions in New Jersey to hold that a pedestrian starting to cross the street and seeing a trolley car a sufficient distance away to justify him in assuming that he has the right of way need not look again toward the approaching trolley car, but can assume that the motorman will respect his right of way. In Pennsylvania the law is much more strict as against the driver of the highway vehicle as well as against the pedestrian. A somewhat corresponding difference between the laws of New Jersey and New York occurs in the extent to which the negligence of a parent can be chargeable to a child when parent and child go hand in hand into danger, if the child is too young to be chargeable with contributory negligence. The rate of compensation considered proper by the court to allow in death and personal injury cases also greatly affects the percentage. The speaker said that for some years he had been connected with the claim department in Cincinnati, and during that time he was greatly impressed with the fact that the general run of claimants was exceedingly fair to deal with. Most of them were either of German birth or descent, and the Teutons are known to be non-litigious and not ready to exaggerate or mis-state facts in the presentation of damage claims.

As a further example of the effect of local conditions, the speaker referred to Montreal, where the percentage of gross for the "injury and damage liability" was a bare 0.974 per cent of gross receipts. This the speaker attributed largely to the basic law which is modeled on the French code Napoleon. He believed that at the present time when a pedestrian is injured in collision with a vehicle in Paris he is subject to arrest for being presumptively an offender against the laws relating to traffic. In New Jersey, on the other hand, the courts have not only held that pedestrians have as much right on the highway as vehicles, but have held also that public streets in a populous city are playgrounds for children and that users of the highway must anticipate that the streets are subject to such uses. Such circumstances necessarily increase the damages.

Discussion

J. H. Handlon, Market Street Railway, San Francisco, said that when he first went to that city the company was paying out a large amount of money in settlement. He decided to follow the policy of Mr. Robinson and was able to dispose of 99 per cent of the claims. He believed that in some cities one plan would work better; in other cities the other plan was preferable.

In answer to a question, Mr. Robinson said that his organization in Cincinnati included four persons besides himself, and a stenographer. All are inside men. There are no outside men. He doubted whether his plan would work on a distinctly interurban property, as people cannot be asked to come a long distance. In Cincinnati, however, they can ride to his office for 8 cents. In answer to still another question, Mr. Robinson said that the largest verdict ever paid by his company while he had been connected with the claim department was $10,000.

Joseph F. Kubu, assistant superintendent accident department, Cleveland Railway, said that in the claim department of that company there were sixty-five employees including twenty-three investigators. The company does not investigate every case, and an average of about fifty claimants call at the office every day, but he believes that there are cases where it is necessary to go outside the office to see the claimant. He thought it was a great help for a representative of the company to say to the claimant: "You may call at our office when you get better. If the company is responsible, we shall take care of you. If it is not responsible, we will not be able to do anything for you." Ambulance chasers force the company to take this course.

John W. Yensen, Third Avenue Railroad, New York, said that that company had been impressed with the remarks of Mr. Robinson at the Chicago convention, and during the last year it had been applying his policy with some of the minor claims. He thought that a year from now he would be able to tell better the practical results. He was inclined to agree with a number of other speakers that much depends on conditions, and he did not believe that Mr. Robinson had to contend with a large foreign population, such as exist in many cities.

William Tichenor, claims agent Terre Haute, Indianapolis & Eastern Traction Company, said that he settled many of the claims against his company in his office, but was not able to settle all of them. He thought the proper plan was to come as near the policy of Mr. Robinson as possible.

I. S. Fairty, legal and claims department Toronto Transportation Commission, said that in a case of collision, three things were necessary. One was to be sure the person supposed to have been injured was on the car; second, to find out the extent of his injury, and, third, to show him that the company has sympathy in the case. Accidents are investigated in Toronto by a representative of the department, but only in rare cases are claims settled out of the office. He has sixteen employees in his department, including stenographers. He explained that in the Province of Quebec, the civil law rule of common fault, whereby both parties are guilty, applies, and this explains to some extent the low figures for Montreal which had been mentioned in one of the reports. The Canadian Bar Association has passed a resolution that this law should be adopted throughout Canada, though he doubted whether the law was more favorable to the defendant than the common law rule.

W. H. Renaud, Jr., claims agent New Orleans Public Service, said that the figures of that company for the past fifteen years average about 2½ per cent of its gross, and this year during the first eight months the percentage was 2.14. He has a total of fourteen employees, including office men and outside men, and believed in following up accidents. The company has had several large claims, as, last year one of $28 000, another of $11,000, and another of $14,000; yet the percentage was kept down to 2.14. In Louisiana nine members of the jury can agree and bring in a verdict, even if the other three differ, but the Appellate Court has power to review both the law and the facts in a case.

It was decided not to continue the committee, and the meeting adjourned at 6.30 p.m.

Tuesday's Session A. E. R. C. A.

THE first order of business at the meeting of the Claims Association on Tuesday afternoon, Oct. 9, was action on the code of ethics as submitted by Mr. Sears, with the amendments proposed by the committee, of which Mr. Hyland was chairman, as given in the report of Monday's session. Mr. Sears said that he had no objection to the amendments offered by the committee and moved that they be adopted. Mr. Hyland then moved the adoption of the code which was unanimously accepted. The association then through a rising vote extended to Mr. Sears a vote of thanks for his splendid work in the preparation of the code.

The paper as printed elsewhere in this issue includes the amendments.

G. T. Hellmuth, Chicago, presented the report of the committee on automobile accidents. In doing so, he referred to the meeting in Buffalo of the electric railway section of the National Safety Council, at which he was present and suggested that great benefit would follow a close connection between the electric railway section and the

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Claims Association. An abstract of the report of the committee on automobile accidents follows:

Automobile Accidents

The report of the committee on automobile accidents consisted largely of the recommendation that a safety engineer be permanently engaged by the American Electric Railway Association "to vitalize and make enduring all association safety work." In its opinion this was the most important thing to do to reduce accidents arising through the operation of motor vehicles. In support of its position the committee reviewed recommendations made at previous conventions of the association, some of which had not been carried out largely because the Claims Association had no permanent staff man. In conclusion the committee says:

"Your committee feels that no business so conducted that its officers and management change each year could hope to achieve the utmost success and it believes further that we need a paid executive secretary or a paid safety engineer, call him which you please, to knit together our activities and to build up and make continuous the work of the association. This man will have to be very carefully selected by the incoming president and possibly by a committee appointed by him, and his salary should be adequate to insure getting a man with experience and ability."

The report was signed by D. M. Finch, J. G. Bruce, Carl Young and G. T. Hellmuth, chairman.

Ralph W. Emerson, general manager Cleveland Railway, presented a prepared discussion to this committee report. An abstract will be found on another page of this issue. It describes among other things the method followed by the authorities of Cleveland to curb reckless driving and the resulting reduction of automobile accidents.

L. F. Wynne, general claims agent Georgia Railway & Power Company, Atlanta, presented a written discussion on the report of the committee. An abstract appears elsewhere in this issue.

In calling for discussion from the floor, President Muir said it was generally admitted that the most important question confronting claim agents at present is the automobile hazard, and he hoped that the discussion would bring out helpful remarks. He also pointed out that the suggestion for the employment by the association of a safety engineer had been made and remarks on the plan were pertinent to this topic.

I. S. Fairty, Toronto, in referring to Mr. Emerson's paper, asked whether any other states besides Ohio had a law giving street cars the right of way over automobiles. He said he was under the impression that there was such a law in Alberta.

In reply C. B. Proctor, claims agent Memphis Street Railway, said that in Arkansas the law gave the street car the right of way both at intersections and elsewhere, and Mr. Hyland, Gloversville, said that under the New York State law cars have paramount right of way between blocks, but at intersections the rights between the vehicle and the street car are equal.

Address by President Emmons

At this point President Muir said that C. D. Emmons, president of the American Electric Railway Association, would speak to the delegates.

Mr. Emmons said that he had simply slipped into the back of the room to see each section in action, but it was a great pleasure for him to address the delegates. He thought the success of the entire convention depended upon the affiliated associations and the way in which they had taken hold of their individual problems. No matter what kind of transportation the street railways used, the claims department would be necessary, and the faster the transportation, the more the claims department would have to do. He also complimented the claims representatives on the wonderful work which they had done in safety work and consequently in reducing accidents and accident claims.

J. W. Welsh, executive secretary, who was introduced, explained that the whole headquarters organization was at the service of the delegates and asked the delegates to send in at any time suggestions as to how the work could be improved.

Continuation of Discussion on Automobile Accidents

In answer to a question, J. S. Kubu, Cleveland, said that before new men are put to work on the cars in that city they have a lecture on accident prevention, and such lectures are given at intervals to all inspectors, motormen and conductors. The work is done through the accident prevention department of the company. J. J. Sharkey, claims agent, New York State Railways, Rochester lines, said the same practice was followed in that city.

L. S. Wynne, Atlanta, gave statistics showing that the safety work of his company had been followed by a reduction of accidents.

H. K. Bennett, safety manager United Electric Railways Company, Providence, said that 404 accidents out of 659 in a recent period in Providence were connected with automobiles and that the cost in 1922 for automobile accidents was more than 40 per cent of the entire accident cost. In Massachusetts a law has been seriously considered requiring automobiles to stop before passing over railroad crossings and to be obliged to maintain such a speed when coming out of intersecting streets on the main thoroughfares that they can be brought to a stop before coming into the highway. If such a law should prevail all over the country, it would reduce automobile accidents to a minimum. Of the 404 accidents mentioned, ninety were from right intersecting streets and eighty from the left intersecting streets; a large number were "sidewipes" where automobiles attempted to pass other traffic; seventeen were where automobiles ran headlong into the cars; thirty were where automobiles ran into the cars which had stopped to take on passengers, etc.

S. B. Hare, claims agent Altoona & Logan Valley Electric Railway, then read the following report of a recent New York court decision:

Report of Court Decision

The burden of responsibility for motor accidents at railroad grade crossings is placed squarely upon the motorists in a decision handed down by the Appellate Division, third department, at Albany, N. Y., the text of which has just been published and is attracting widespread attention among lawyers. The decision upsets a jury verdict in which the administrators of the estate of a victim of a grade crossing accident were awarded damages. It relieves the New York Central Railroad, whose train killed the motorist James W. Horton in Albany County, of all responsibility.

The fact that the so-called disk sign existed at the approach to the grade crossing, and 300 ft. distant from the tracks, was sufficient to establish contributory negligence on the part of the motorist who was killed. The Appellate Division for the first time interprets the disk sign act, passed by the Legislature in 1919, and the court places such a construction upon the act as to make elimination of grade crossings only a matter of convenience for motor traffic, not a matter of obligation on the part of the railroads in the interest of safety of motorists.

Incidentally, the court lays down rules of conduct for motorists approaching grade crossings, and those rules form an interesting code. Among them are these:

1. The safe limit to speed in approaching a crossing is that speed at which the driver of an automobile, as he arrives at a point where he can see an oncoming train, when it is near enough to render crossing ahead of it dangerous, can stop his car if necessary before he reached the track.
2. If he can not see without stopping, he must stop. If he sees a train threatening danger to him, of course he must stop. If he cannot see whether or not he is so threatened, likewise he must stop.
3. It was the intention of the Legislature by this act that no driver of an automobile should come within the limit of the narrow strip occupied by a passing train at a time when he could collide with it.

HARD TO RECOVER DAMAGES

The effect of the decision is to make it extremely difficulty for any motorist who is struck by a train to recover damages from the railroad. The court recognizes this and says:

It is said, if so strict a rule is laid down by this statute and upheld by the courts, that seldom if ever could recovery be had for injuries received at a crossing. It is out of view that if the drivers of automobiles obey this statute in its letter and its intent, seldom if ever will injuries be suffered at a grade crossing. The price of safety by obedience to this statute means no more than three or four seconds of time —a small price for a life. And in any event we believe the Legislature was more interested in preserving life and limb than in preserving the right to recover damages for life and limb lost.

The disk sign act, Chapter 438 of the Laws of 1919, provides that the municipality or other authority charged with the duty of maintaining a highway at a grade crossing shall install and main-

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tain an approach warning sign on the highway each side of the grade crossing at least 300 ft. from the track.

THE DISK SIGN

The approach warning sign shall consist of a metal disk 24 in. in diameter with a white field and a black border line 1 in. wide and with black perpendicular and horizontal cross lines 2½ in. wide, the reverse side of each disk colored black. In each of the upper quarterings shall appear in black the letter R, 5 in. high, 3¾ in. wide, lines 1 in. stroke.

The act further provides that the railroad company shall furnish the authorities with these disk signs for erection 300 ft. from the grade crossings, and if physical conditions make it impractical to place the signs 300 ft. from crossings, other suitable locations or signs may be furnished. Then the statute says:

It shall be the duty of the driver of any vehicle using such street or highway and crossing to reduce speed to a safe limit upon passing such sign and to proceed cautiously and carefully with the vehicle under complete control.

The court remarks in discussing the statute that the advent of the motor car brought a new law and new rules, and continues:

The motor car is quite distinct from the horse-drawn wagon. It both introduces new dangers and removes some of the old dangers. It tempts high speed; it inspires impatience and encourages the driver to take chances to beat the train. Because of its weight, its momentum, its inertia, its strong metal construction and its speed, it wrecks trains. On the other hand, when properly driven and maintained in good condition, it is under complete control; it may be stopped or started at will; it will stand without hitching and may be safely left unattended; it will not take fright at a train, however close to its nose. Our old rules must be adjusted to the new condition, or new rules must be made to cover the new needs. Considerations similar to those we conceive induced the Legislature to enact the statute of 1918. The act was intended to accomplish something toward increased safety by establishing new rules of conduct.

SUFFICIENT WARNING

It has been the custom to place warning signs immediately at the crossing. One not familiar with the crossing or inattentive might not realize as he aproached a crossing, its existence until he reached it. Now he is informed of it when 300 ft. away, at which point he receives timely warning; he must therefore reduce his speed to a safe limit. The safe limit is a limit at which, with his attention no longer distracted while controlling and directing his speeding car, he may discern the approaching train and stop his car before he is in the danger zone, namely, the track, which, with the overhang of the cars, means a width of only nine feet.

As to the case in hand, it is held that the motorist was familiar with the locality, and could have seen the train when he was 18 ft. from the track. If he had been proceeding carefully and cautiously, as required by law—if he had obeyed the statute he would not have been struck. The railroad gates were open, and there was no flagman at the crossing at the time, but this did not excuse the motorist. The disk signs had been erected and were sufficient warning. The estate of the victim could, therefore, recover nothing.

The decision, lawyers believe, introduces a new principle of law so far as the question of contributory negligence is concerned in grade crossings accidents. Under the old practice, the fact that the driver did not stop at a crossing was not in itself contributory negligence. It was a matter for a jury to decide. Now it would appear that if a driver doesn't stop, after passing the disk sign, he is guilty of contributory negligence, as a matter of law.

Discussion Continued

Russell A. Sears, Boston, told of a conference of the street railways in Southern New England two or three years ago to consider what could be done to reduce the cost and number of automobile accidents. It was found that these accidents were costing the public $2,000,000 a year, to say nothing of loss of life and limb. The interest of the Department of Automobile Licenses was secured, and the speaker expected that a bill would be introduced into the Massachusetts Legislature this fall giving the Register the right to revoke the license of any motor driver who collided with a street car at an intersecting street.

W. H. Renaud, Jr., New Orleans, believed that such a law would be very desirable if generally applied.

Cecil G. Rice, superintendent claims department, Pittsburgh Railways, said the idea of safety should be sold with every automobile. Many people are deterred from buying automobiles because of the danger of operation, and the manufacturers for business reasons should co-operate in any plan which will decrease automobile accidents. Thus the manufacturers should encourage the plan by which no one could procure an automobile license without an examination and test, and they should encourage the strict application of the traffic laws. Pittsburgh has a traffic court, similar to that at Cleveland, and it has proved of great value. Recently drivers convicted of intoxication or recklessness have been receiving jail sentences.

H. D. Briggs, assistant general claims agent Public Service Railway, Newark, thought the biggest hope for the reduction of accidents caused by automobiles was in legislation, and he urged that a committee be appointed to report at the 1924 convention on legislation of the various states on this subject, with a view to making it as complete and full as possible, as well as uniform in the various states.

William G. Fitzpatrick, general claims attorney Detroit United Railway, pointed out that legislation should give railways the right of way at all highway intersections and should include all occupants of the automobile in statutory negligence of the operator of the automobile. He thought these two things would do more to reduce the automobile hazard than anything else.

William Tichenor, Indianapolis, declared that while the legislation proposed would be helpful, the companies should not relax every effort possible through themselves. He cited the case of a car on a railroad right of way, which after whistling had struck an automobile, but of twenty-five persons who might have heard the whistle, only four did so. If the whistling had been so loud that all of the twenty-five witnesses could have heard it the occupant of the automobile might also have done so and the collision might not have occurred. He thought that some benefit would come if automobile operation, even if in a small way, could be put under the control of the state public service commissions, for instance, in connection with the location of warning signs.

By request of a member, Mr. Hellmuth then outlined his ideas of the duties of the safety engineer proposed for employment by the American Association. Among other things such an engineer would collect claims data of interest to the association, circularize the members, and exchange their views of the legislation wanted, making it possible to advocate some specific law. His instructions would come from the executive committee, and he could suggest to the committee work he thought he could profitably perform.

Russell A. Sears, Boston, suggested that it would be more effective in public discussions on the automobile to emphasize the benefit of a clear roadway to the passengers on the car rather than demand a "right of way" for the company. He also pointed out that the registrar of automobile vehicles in Massachusetts had declared that the plan of educating motorists to greater care was all right, but it was a slow process. Immediate action is what is needed, and the one thing the driver of an automobile fears is to lose his license. This penalty has had effective results in Massachusetts.

On motion it was then decided that the incoming president of the Claims Association should bring to the attention of the executive committee of the American Association the desirability of the employment of a safety engineer.

E. L. Lindemuth, claims agent Wilkes-Barre Railway, presented the report of the committee on the Hooper-Holmes Bureau. An abstract follows:

Hooper-Holmes Bureau

The Hooper-Holmes Bureau, as is known to most of our members, operates for the insurance, railroad and street railway companies a clearing house through which information is exchanged relative to personal injury claimants. This work was inaugurated in 1899 for the accident insurance companies and a few years later was extended to the railroad companies, and, through a special subscription arrangement made with the American Electric Railway Association, to the individual member companies of the organization. Its purpose is to furnish information regarding personal injury claimants by whom prior or concurrent claims have been maue against other companies. Such information in many cases is extremely valuable, the reports thus rendered affording substantial protection against fraudulent and excessive claims.

The method of handling the reports is as follows: Each subscriber or participating company is supplied by the bureau with blanks on which to report its claimants. On receipt of every such report the bureau records are carefully

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examined to determine whether the party has previously been reported by any other company either for the same or a previous injury. If not, a record of the claim is simply filed away in its alphabetical place for future reference, but if the records show one or more other reports on the party, each of the companies which reported it is at once notified and can thus immediately communicate with one another and exchange information concerning such claimant.

At the present time the bureau files contain over 8,000,000 records covering the entire United States. These are now increasing at approximately 600,000 a year.

In the handling of a personal injury claim there is probably nothing more important, aside from determining the question of liability, than a knowledge of any previous claim record which the party may have. Quite often it is difficult, if not impossible, to secure this through investigation, and in some instances the information obtained is not received in time to be made practical use of in connection with the settlement. Such a service, therefore, as is rendered by the bureau constitutes a valuable adjunct to the work of the claim department, and the reports not infrequently are of such a character as to show that the claim is wholly without merit or to furnish information which is of material value in the event of litigation.

The following is a comparative statement of reports made to the Hooper-Holmes Bureau by member companies for the years ended May 15, 1923; May 15, 1922, and May 15, 1921, in which you will note there were eleven member companies reporting to the bureau in 1923, fifteen in 1922 and nineteen in 1921.

Company	Number of Reports 5-16-22 to 5-15-23	5-16-21 to 5-15-22	5-16-20 to 5-15-21
Cleveland Ry. Co.	1,421	1,545	2,515
Detroit United Ry.	....	....	1
Duluth Street Ry.	100	82	255
Fonda, Johnstown & Gloversville R. R.	1	3	1
Georgia Ry. & Power Co.	5	93	260
Hudson & Manhattan R. R.	3,366	564	238
Illinois Trac. System	2	2	....
Market St. Ry.	410	345	397
New York State Rwys., Rochester	2	13	27
New York State Rwys., Syracuse	51	213	108
New York State Rwys., Utica	185	200	168
Northern Ohio Trac. & Lt. Co.	1	....	5
Pittsburgh Ry.	327	87	83
Puget Sd. Elec. Ry.	....	....	5
San Francisco-Oakland Term'l. Rwys.	....	....	17
Tacoma Ry. & Power Co.	21	25	23
United Rwys. & Elec. Co. of Baltimore	2,251	2,423	3,704
United Rwys. of St. Louis	1,148	496	539
United Trac. Co. of Indiana	105	75	110
Wisconsin Public Service Co.	....	....	1

In addition to the companies above listed the following named association members for several years past have been actively participating in the bureau work as individual subscribers and I understand that during the three-year period mentioned reports have been rendered by them annually approximately as follows: Boston Elevated Railway, 960; New York Railways, 340; Philadelphia Rapid Transit Company, 2,400; Public Service Railway of Newark, N. J., 2,600.

The work of this bureau for the member companies of our association has been discussed on some occasions at considerable length at various conventions of the association, at some of which a representative of the bureau was present and addressed the members on the value of the service to the member companies. One of our members has written me at length on the subject, saying he had never been able to understand why the members of our association have not participated more generally and to a greater extent in the work of the bureau. If the street railway companies generally more freely reported their claims, the reports received by them from the bureau would save them annually many thousands of dollars.

The report was signed by E. L. Lindemuth, convention secretary.

After the motion had been carried to refer this report to the incoming executive committee of the Claims Association, the meeting adjourned at 6:30.

Wednesday's Session A. E. R. C. A.

ON WEDNESDAY the claims association held a session by itself and also a joint session with the Transportation & Traffic Association. The latter was reported as such in the issue of this paper for Oct. 13. The separate meeting of the Claims Association convened at 1:45 with President Muir in the chair. E. F. Livingstone, chief investigator of litigated claims Boston Elevated Railway, presented a paper on "The Preparation of Litigated Claims." It will be found in abstract in another column.

J. Frank O'Hare, trustee of the Boston Elevated Railway, said the time had come when street cars should have right of way on streets over automobiles because of the larger number of people carried per vehicle. The rights of passengers should be paramount to the rights of the individual, especially in the rush hours in the morning and evening. He also urged more strict sentences for violation of traffic laws by automobile drivers.

At the request of the president, a discussion of the subject of organization of the claims department, as considered on Monday, was taken up by S. B. Hare and Cecil G. Rice. Mr. Rice presented the report.

Special Committee on Organization of Claims Department

Since its inception the street railway industry has been marked by discussion of methods and practices of operation, engineering, accounting and claims. There have been exhaustive researches, broad surveys, deta led comparisons and complete data compilations. In all branches selection has been made of those things found to produce the most satisfactory results when applied to the particular property making the study.

Because claims are influenced and affected by the multitudinous matters noted by the human mind, universal practices are not and cannot be adopted. Surviving through all these years is the elemental question of whether to await the presentation of a claim or to hasten conclusion of the potential liability by personal call and the extent to which inspection should be made.

During the past three years and at this convention in particular, the matter has been debated to tireless completeness. Both methods find supporters. Results reported vary. In this detail as in most matters affecting the industry action according to the circumstances is indicated, varying with the locality, the occurrence, the individuals involved and the ramifications of community life.

Comparison of results collect too many variables to warrant conclusions of cause and effect from incidental routine. Therefore this convention records adherence to the objects of the association:

To endeavor through co-operation, study and discussion to ascertain, inaugurate, maintain and develop those modes of procedure, practices, policies and ethics most effective in preventing accidents, determining and discouraging unreasonable claims, minimizing inequitable expenditures and other waste, defending against unfair demands, equitably adjusting claims owed, and otherwise advancing the ultimate best interests of member companies and those they serve.

Recognition is given to the right of any necessity for each member to determine by judgment and experience what is "most effective" according to the circumstances surrounding the interests he serves in the light of all information presented to the convention for his consideration.

A most important fundamental truth is that to prevent an accident is to eliminate a claim.

The report was signed by Cecil G. Rice and S. B. Hare, special committee.

Question Box

The questions in the question box were read by E. L. Lindemuth, Wilkes-Barre. There was time only for the discussion of one. This was "Is it worth while to try to collect damages from automobile owners who break our cars in collision, where we are free from blame?"

W. H. Renaud, Jr., New Orleans, said it was the custom in that city to collect such damages, as it had been found to help reduce automobile accidents. It brings the matter home to the owner of a car and in the case of a commercial truck, the owner often would not hear of the accident, except in this way. Many of the truck owners carry accident insurance, and the collection stimulates the insurance companies to stop accidents.

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Cecil G. Rice said he followed the plan in Pittsburgh in only a few carefully selected cases.

On the Detroit United Railway, according to Mr. Fitzpatrick the work is done entirely by one individual, and the recovery pays his salary four times over during this period. The greatest good has come in a preventive way.

In San Francisco, according to Mr. Handlon, the claim is always presented where the driver has damaged a standing car or where the driver of the automobile, according to records, was intoxicated or violated a traffic rule, but where it is thought the company is partly responsible, the benefit of the doubt is given to the automobile.

New Officers

The report of the nominating committee was in the favor of the following as officers for the ensuing year:

President, W. H. Hyland, claims agent Fonda, Johnstown & Gloversville Railroad, Gloversville, N. J.

First vice-president, H. D. Briggs, assistant general claims agent Public Service Railway, Newark, N. J.

Second vice-president, J. H. Handlon, claims agent Marget Street Railway, San Francisco, Cal.

Third vice-president, C. B. Proctor, claims agent Memphis Railway and Memphis Power Company.

The executive committee consists of the officers and S. J. Herrell, claims agent Knoxville Power & Light Company; J. S. Kubu, assistant superintendent accident department Cleveland Railway; L. F. Wynne, general claims agent Georgia Railway & Power Company, Atlanta.

Convention secretary, E. L. Lindemuth, claims agent Wilkes-Barre Railway.

These officers were unanimously elected.

President-elect Hyland in a few well-chosen words said that he greatly appreciated his election and hoped that he would receive the support and help of the members during the coming year.

A past-president's badge was then presented by Mr. Bennett to Mr. Muir, who suitably replied. The other officers were then installed. The meeting adjourned at 6:30 p.m.

Large Attendance at Purchasing Agents' and Storekeepers' Meeting

Thirty-five Men Attended the First Special Meeting Under the Auspices of the Standing Committee — Interest Was Well Sustained and Attendants Voted to Recommend the Appointment of Regional Sub-Committees

THE initial meeting of the committee of purchasing agents and storekeepers at a separate session was held Wednesday afternoon, Oct. 10. L. C. Datz, president of the Engineering Association, delivered an address of welcome. An abstract follows:

MR. DATZ'S ADDRESS

It is a pleasure to welcome you here this afternoon at this your first special session of purchasing agents and storekeepers under the auspices of the American Electric Railway Engineering Association.

This has been an eventful year for the purchasing agent and storekeeper contingent of our association. This is evidenced by the interest shown by your committee throughout the year and by its splendid report to be submitted for your consideration at this convention.

Your committee has functioned well, and at the very outset I anticipated that it would, from the tone of a letter received from your chairman, accepting the appointment to head this committee.

The attendance at this meeting convinces me that the approval given you by the executive committee of the Engineering and American Associations to hold such a meeting was fully justified. You are to be congratulated on the fruit of your efforts to bring your colleagues together from all parts of the country.

In getting this approval your committee showed a marked ability as lobbyists. When I submitted to the American executive committee for approval the request of your committee to hold a special session, this request having previously been unanimously approved by the Engineering Association executive committee, I found that individual members of your committee had thoroughly sold the idea of the special session.

And so I say that a gathering of such a representative body of purchasing agents and storekeepers is certainly worth while, and, quoting from your report, I am sure that this is an excellent opportunity to vitalize this branch of the association for the common good of the member companies and the purchasing and storekeepers individually."

I want you to feel that the purchasing agents and storekeepers have a definite place in our association and in our conventions.

A roll call was taken in order that a permanent record would be available showing the attendance. Thirty-five members were present.

In order to promote constructive discussion, B. J. Yungbluth, chairman of the committee, read the entire report.

Work Planned by Section

A few years ago a group of purchasing agents complained to the American Electric Railway Association that purchasing agents and storekeepers were not being given any recognition, and though their affiliation was with the Engineering Association, the latter made no provision for them.

The outcome of this complaint was that at the 1919 convention, arrangements were made for the purchasing agents and storekeepers in attendance to hold several meetings, so they could determine what they wanted. It was finally decided, as a result of these meetings that the interests of this group could best be served by a standing committee to be known as the "Committee on Purchases and Stores" affiliated with the Engineering Association, which plan was adopted at the 1920 convention.

One of the first subjects assigned to it was a material classification for electric railways. There was evolved in collaboration with the stores accounting committee of the Accountants Association, the material classification as embodied in the joint committee's report on stores accounting presented at the 1921 convention. It was reconsidered and amended by this year's committee, which recommends that it be adopted. It is expected that such action will be taken at this convention.

This committee also made arrangements for and inaugurated the Purchases and Stores Question Box in *Aera*.

It is suggested that all purchasing agents and storekeepers endeavor to answer the published questions, and to furnish new questions from time to time. If this is done, we have no doubt that interest will be stimulated and maintained, and continued success will be assured for this feature.

The subject, "Proper Methods for Taking Periodical Inventories, with a View to Adopting Standard Forms," was reported on at the 1922 convention. The subject was continued and referred to this year's committee, which reviewed both reports presented by the previous committees, and recommends for adoption by member companies, the material classification and the stock book system, as suggested.

The aim of the committee is to see that purchasing agents and storekeepers are properly recognized at all times in the association's proceedings, to consider subjects of interest to the industry at large, and when recommendations are made, endeavor to have same put into effect, and carried out.

Discussion on the report was comprehensive, indicating that many had studied the advance report with an idea looking to constructive commendation. It was brought out that an increasing number of companies are arranging their stockrooms in order to adopt the classification of accounts as recommended for standard by the committee. G. H. Harris, Oakland, Calif., led the discussion with a paper explaining the methods as used on his property, particularly the application of the recommended stock book to the stores department. With this stock-book method, which, by the way, is not an accounting feature, it is possible to know exactly what is on hand in the storeroom. In further amplifying the

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report, Mr. Yungbluth stated that the report contained tried methods by which it is possible to do away with the "bugaboo" yearly inventory.

Figures on the expense of installing physical changes in his company's stores department, making possible the adoption of the committee's recommendations, were given by W. C. Bell, Virginia Railway & Power Company, Richmond. In the past year $2,500 has been spent, this being the first of a total of $5,000 necessary to place the department on an efficient operating basis. A. E. Scott, Philadelphia, Pa., stated that a reduction of $500,000 had been made during the past year in stores department investment, and during this same period a payroll reduction of $25,000, or 31 per cent of the whole, had been effected.

As no corrections were suggested, the entire report was approved, with the recommendation that it be submitted to the Engineering Association for formal action.

A progress report of a sub-committee on questionnaires was given by W. N. Ford, Memphis, Tenn.

History of the Committee on Purchases and Stores

W. H. Staub, Baltimore, Md., outlined the history of the committee on purchases and stores. This is the outgrowth of a plan adopted at the 1920 convention. To date, the activities of the committee have been confined principally to the materials classification and the perpetual inventory. The committee has furnished questions for the question box in *Aera*, which have brought out a great deal of valuable information. The members should cooperate by furnishing and answering questions.

H. H. Lloyd, Indianapolis, Ind., suggested that the work of the committee could be expanded through the agency of small sectional sub-committees. This suggestion met with approval and a motion was passed requesting the incoming committee to appoint regional chairmen. Each of these would form suitable committees, consisting of men who could get together easily.

P. F. McCall, Chicago, Ill., then read his paper on "Proper Control and Handling Materials and Supplies." This appears in abstract elsewhere. He was followed by J. P. Dick, Atlanta, Ga., who suggested that the questions submitted for the question box be utilized in the discussions of the committee. He read a list of suitable questions which he had prepared. He stated further that meetings like this furnish a great opportunity for purchasing agents and storekeepers, providing for them a quorum for their discussions. Previously there was no place into which they particularly fitted at the conventions. The purchasing agent is responsible for the expenditure of large sums of money and needs the opportunity for discussion such as this committee provides.

New American Executive Committee Holds First Meeting

THE first meeting of the new executive committee was held at the Marlborough-Blenheim Hotel, Atlantic City, on Thursday afternoon, Oct. 11, the final session of the American Association having been held that morning. Britton I. Budd, the new president, introduced the new members of the committee, who were as follows:

J. H. Hanna, Washington, D. C., and H. B. Flowers, New Orleans, representing the railways; E. F. Wickwire, Ohio Brass Company, and Cornell S. Hawley, Consolidated Car Heating Company, representing the manufacturers, and H. A. Johnson, new president of the Engineering Association. J. K. Punderford, new president of the Transportation & Traffic Association, and W. H. Hyland, new president of the Claims Association were not present. E. M. White, new president of the Accountants' Association, was represented by W. L. Davis, first vice-president.

Other members of the executive committee present were W. H. Sawyer, F. R. Coates, J. N. Shannahan, C. E. Morgan, R. P. Stevens, J. P. Barnes, J. G. Barry, C. R. Ellicott, A. A. Hale, H. D. Shute, and the following past-presidents: C. D. Emmons, A. W. Brady, R. I. Todd, C. L. Henry and Gen. George H. Harries.

Executive Secretary Welsh reported the final registration figures at the convention to be 4404, which he said beat all previous records. President Budd appointed a committee to make nominations for a member of the executive committee to fill the vacancy made by the elevation of R. P. Stevens to the position of fourth vice-president, the term of the new member to expire Oct. 31, 1924. The committee appointed for this purpose was R. P. Stevens, J. P. Barnes and R. I. Todd.

Mr. Shannahan read the report of the committee on subjects and meetings, which was approved as it appears in another column.

A letter was then presented from H. W. Alden, president Society of Automotive Engineers, suggesting definite co-operation between that body and the railway engineering association in matters of bus design. In discussing this, reference was also made to the suggestions of Alfred Reeves, general manager National Automobile Chamber of Commerce, made in his address before the American Association at Atlantic City, urging co-operation between the railway association and this body. In view of these suggestions the executive committee decided to appoint a committee to consider broadly the question of the relationship of the American Electrc Railway Association with the automotive industry. The committee named for this assignment is composed of L. S. Storrs, chairman; C. D. Emmons, F. R. Coates, R. P. Stevens and J. G. Barry.

President Budd was also authorized to appoint a new committee to award the Charles A. Coffin prize for the year 1924.

The executive committee approved the application of the following companies for membership in the association:

Osgood-Bradley Car Company, Worcester, Mass.; Pittsburgh Testing Laboratories, Pittsburgh; E. R. Caldwell & Son Brass Company, Inc., Syracuse; the Western Ohio Electric Company, Inc., Lima, Ohio; Gustave Schaefer Wagon Company, Cleveland; Bacon Safety Fender Company, Philadelphia; Wellman-Seaver-Morgan Company, Columbus, Ohio.

The membership of the association in the National Industrial Conference Board was continued for another year.

The president was authorized to delegate members of the executive committee to attend the annual meetings of the state and sectional association as representatives of the American Electric Railway Association.

The referendum of the United States Chamber of Commerce on reforestation was turned over to Mr. Shannahan, chairman of the policy committee, with power to act, after consultation with the wood preservation committee of the Engineering Association.

C. E. Morgan presented an application with some fifty signatures for a community section of the American Electric Railway Association in Greater New York, to be known as the Metropolitan Section of the American Electric Railway Association. The executive committee approved. Mr. Morgan reported that it is also likely that application for other sections will shortly be made.

Mr. Henry requested and was granted authority to appoint a subcommittee of the National Relations Committee consisting of members of that committee and also non-members to have charge of the association's appearance at the hearing before the Interstate Commerce Commission on Nov. 7 in Washington on the subject of depreciation.

General Harries requested the committee to appoint a representative to attend the meeting and assist in the work of organizing a national committee of national defense. Col. E. J. Blair, Chicago Elevated Railroads was appointed.

President Budd was authorized to appoint a committee to consider the location of the midyear meeting. He named the following men: J. P. Barnes, J. H. Hanna, Edward Dana, E. B. Meissner, D. W. Pontius, H. B. Flowers, G. H. Clifford, M. B. Lambert, E. P. Waller and L. E. Gould.

The next meeting of the executive committee will be held at headquarters, New York City, at 10 a.m., Friday, Nov. 16.

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Accountants' Association Proceedings

W. G. Nicholson
Retiring President

Budgetary Control of Expenditures, Classification of Accounts for Bus Operation, and the Value of Operating Reports to Executives Were Leading Topics—Co-operation with Other Associations Urged

E. M. White
President-Elect

THE first order of business at the opening session of the Accountants' Association, Tuesday afternoon, Oct. 9, was the annual address of President W. G. Nicholson. An abstract follows:

Address of President Nicholson

The business of providing transportation for the public is useful and honorable. Without adequate transportation facilities our large urban centers would not exist as they are today, and the rural sections of the country would return to the isolation of former days.

It is a business which is not nourished on the misfortunes of the public but rather lends to the prosperity and well being of the communities served.

The thought uppermost in my mind during all of this year has been the devising of some way to arouse renewed interest in the work of the association and its annual gatherings. One step was taken in this direction by the appointment of an attendance committee which, following the plan adopted by the Claims Association, covered almost the entire country. It is hoped that a large attendance will result from the splendid work of this committee.

It has been suggested by Mr. Welsh, executive secretary of the American Association and secretary of this and the other affiliated associations, that some plan be arranged making it possible to have the Accountants' Association represented at the meetings of the executive committee of the American Association. The president of your association is of course a member of this executive committee. It is suggested that if it is not possible for him to attend he may delegate one of the vice-presidents to act in his place. I am heartily in sympathy with this idea. I think such an arrangement will be of great benefit to our association, and I hope the incoming officers will join Mr. Welsh in fostering the adoption of this plan.

The work of this association has been of lasting benefit to the industry. Prior to its organization there was little or no uniformity in the accounting practice of the street railways and much constructive work was required. A survey of the papers read and discussed and the work performed by its various committees reveals the birthplace of most of the methods in use today.

The public utility accountant of today is more than a bookkeeper. His responsibilities are great. He must be well informed in all of the various branches of the business, and although public utility accounting practice has been largely standardized, he is constantly confronted with new problems. Nowhere is the opportunity offered to discuss these problems such as that afforded at these conventions.

Much constructive work remains to be done by this association. Matters of immediate interest will be reported on by your committees at the meetings this week and ample opportunity will be given each member for the expression of his views. It is hoped that all will participate actively in the discussions which arise. The thought you have in mind and hesitate to express may be the most vital and important contribution to the subject.

Report of Secretary-Treasurer Presented

Following the president's address the report of the executive committee was presented and accepted.

O. H. Bernd presented the annual report of Secretary-Treasurer J. W. Welsh, who was unable to attend the meeting. In his report Mr. Welsh called attention to the fact that this is the first year he has acted as secretary of the Accountants' Association, and spoke of the closer degree of co-ordination made possible by this new connection. He also called attention to the service available by the Association's Bureau of Information and the Question Box in *Aera*.

The report of the secretary-treasurer was then adopted.

The report of the committee representing the Accountants' Association at the annual convention of the National Association of Railway and Utility Commissioners was presented by W. L. Davis. An abstract of the report as given by Mr. Davis is presented below:

Report on Utilities Commissioners' Convention

The report of the committee to represent the Accountants' Association at the National Association of Railway and Utilities Commissioners is intended to summarize the subjects brought up at the annual convention held at Detroit during the week of Nov. 13, 1922. The chairman of the committee attended this convention. A member of the subjects discussed were of interest to the Accountants' Association. Among them are:

Standard classification of accounts.
Segregation of accounts between transportation and non-transportation activities—pertaining to express and other contract carriers.
Motor transportation, with particular reference to classification of accounts and a suggested general law to cover this field.
Recent valuations of steam railroads, with particular reference to figures representing appraisals of land and right-of-way.
Methods for keeping valuation data up to date.
Division of railroad valuation data to show subdivisions by states.
Depreciation reserve (with reference to telephone companies only).

In connection with standard annual reports there has apparently been no action taken by the Commissioners' Association, but during the past few years there have been published standard classifications of accounts by that association to cover electric companies and other utility corporations. No such action covering the requirements of electric railways has yet been taken, but it has been considered.

In this connection the committee made a brief review of the principal points in the National Association classification for electric companies as compared with the 1914 classification for electric railways prescribed by the Interstate Commerce Commission. No very important points of difference were noted, with the exception of the requirements for depreciation or retirement reserves. The classification prescribed by the

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National Association of Railway and Utilities Commissioners is more specific than the I.C.C. classification, and in the explanatory text the Utilities Commissioners' classification states that the reserve should in all cases be sufficient to provide during a period of years a reserve against which can be written off all losses sustained upon the retirement of property for any cause whatsoever. This classification also provides that the cost of dismantling or removing abandoned property may be charged to the retirement reserve, while the I.C.C. classification states that the expenses incident to the retirement shall be charged to profit and loss. The former classification also states that the corporations may equalize from year to year through the creation of adequate reserves the losses incident to important retirements of buildings, structures and other property units. The I.C.C. classification is not quite so specific.

There are some points of difference between the balance sheet accounts and income accounts of the two classifications, but these are of a minor nature and consist principally of the manner in which the accounts are grouped.

In view of the fact that the National Association of Railway and Utilities Commissioners had been preparing these standard classifications, it might be well for the Accountants' Association to defer any action toward the preparation of standard annual reports until the commissioners take final action concerning a standard classification.

Under the subject of valuation is the obvious necessity of detailed construction records reflecting the cost of property additions by units. It is also desirable to establish methods of securing either actual or approximate book values of material retired from service.

During the discussion of the matter of depreciation it was generally conceded that some effort should be made to ascertain whether or not public service corporations could, by excessive charges, build up depreciation reserves which would include elements representing more than the actual cost of the units included in the plant account.

The report was signed by C. S. Mitchell, B. W. Fernald and W. L. Davis, chairman.

Following the presentation of the report there was some discussion on the subject of segregation of values by states, applying to roads that engage in interstate commerce. It was voted that the report of the committee be adopted and that a final report be printed and issued within sixty days after the convention of the National Association of Railway and Utility Commissioners.

Budgetary Control

The report of the committee on Budgetary control was presented by T. B. MacRae, general auditor Chicago Elevated Railways. The report follows in abstract:

The committee is inclined to recommend restricting the term "budget" to expenditures and the word "estimate" to revenues.

Any discussion of budget control will fall naturally into two divisions: First, estimated revenues; second, expenditure, both operating and capital.

These two again may be divided into four heads: First, period covered by budget or estimate; second, originating source; third, authority; fourth, checking budget or estimate.

Period—As, in our industry, comparisons are made month by month, and reports are made annually, the calendar year appears to be best period for which a budget should be prepared. In addition to the annual budget, the committee believes the best results can be secured by also submitting a monthly or a periodic budget. It is essential to a budget system that all estimates be made before the close of the year for the following year, or as soon as possible after the first of the year.

Authority—On a small property the auditor will take charge of the budget, confer with department heads, assemble the figures and submit the budget as finally agreed upon. On a larger system, it probably will be found more advantageous to refer all questions arising from the system to a special committee. The duties of this committee are advisory only and its findings must be approved or disapproved by the president. Such a committee will be referred to as the expense and budget committee.

Estimated Revenue—While it is theoretically impossible accurately to forecast the revenues of a railroad company, yet a reasonable estimate for an entire year can be made by months, with totals for year. A correct estimate of revenues is extremely important as the authorization of expenditures depends upon it.

In addition to the revenues, it is important that an estimate of cash requirements for the year be made, based upon the estimated revenues and expenses. The chief purpose of this estimate is to show the amounts necessary to meet taxes, rentals, fixed charges, dividends, and any financing the company contemplates.

Expenditures—Operating—The success of the budget system depends to a very great extent upon a departmental head having full information as to the cost of operating his department. Under a departmental system of accounts, this is under his control, but under the now general method of concentrating the accounting in the auditor's office, the departmental head is dependent upon the auditor, or a statistical department, for his costs.

Both operating and capital budgets should be prepared in two ways: First, the road, electrical and shop departments should map out a program for all work contemplated during the coming year and the estimated costs. This program should be prepared in as much detail as possible, showing the nature and location of the work. This estimate should also indicate whether the work is essential or can be deferred. The traffic department also may lay out a definite advertising program and ask for an appropriation. As the transportation department transports traffic offered to it, no fixed program can be made out. The accounting department should prepare an estimate of general expenses; second, all estimates should also be prepared by operating accounts. This is essential as there is no other way of checking the budget (unless a cost accounting system is in use) and for many accounts no program can be prepared.

Extraordinary expenditures arising during the year and not authorized by the budget, should be covered by some form of special authority. It is also often desirable that the cost of a particular piece of work be kept separate and not buried in some account number.

Expenditures — Capital — The same general plan followed in the operating budget must be observed. In general, capital expenditures can be outlined to better advantage than operating expenses. Where capital expenditures are authorized on a special form, statement should be made that such expenditures were, or were not, authorized by the budget.

Authorizing the Budget—All details prepared by operating heads as above outlined, and all working papers are submitted to the expense and budget committee. This committee also has before it the estimated revenues and cash requirements. It becomes their duty to pass upon the operating and capital expenditures, as it is assumed the estimates submitted by the accounting and treasury departments cannot be changed. It is also within the authority of this committee to determine whether expenditures are necessary or may be deferred. The budget authorized by the committee must necessarily come within the limits fixed by the estimated revenues and cash. This committee then makes a full report to the proper official stating what expenses have been allowed and what disallowed and the reasons therefor. When the budget has finally been approved, the operating expenses for the year are theoretically fixed and cannot be exceeded except by special authority. The purchasing agent should be informed of expenditures authorized in order that he may make proper contracts and place orders for material required.

Extraordinary operating expenses or capital requirements should be submitted in detail to the committee, which will pass upon them in the usual way.

Checking the Budget—Near the close of the month, each department head should send to the committee an estimate of the operating and capital expenditures for the following month and submit a statement showing how far the program has been completed. The treasurer should submit a statement of cash requirements. Statements should be prepared showing the budget authorized for month and period. As soon after the close of the month as possible, the accounting department should submit, for month and period, detailed

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earnings and operating expenses and capital expenditures, with any additional information the committee may require. Both the approved budget and estimated budget for month should be compared with actual expenses as shown by auditor, and discrepancies explained by department head. The committee will then report to the management the results obtained to date.

If the revenues fall below the estimates, or special financing is required, the committee and department heads are in a position to recommend reductions to be made in operating or capital. If on the other hand, earnings increase sufficiently, work that was deferred may be authorized.

Accounting Department—The following information should be furnished department heads for their information in preparing and checking budget:

First, detailed distribution of payrolls, by departments, if possible; second, full information as to material charged out; third, man hours by operating and capital accounts; fourth, in addition to above, co-operate with department heads to secure useful statistics and eliminate unnecessary information.

Conclusion — The committee recognizes that budgetary control is not primarily an accounting proposition. It is very largely a matter of policy to be determined by the president. The results secured in definitely controlling operating expenses far outweigh the labor and expense involved in working the system.

The report was signed by L. F. Rye, F. E. Belleville, C. A. Briggs, C. A. Dugle, T. B. MacRae, chairman.

Discussion

In presenting the report Mr. MacRae called attention to the statement regarding the monthly budget. He stated that the idea which he intended to convey in the report is that the department concerned was to submit an estimate of what it was doing during the following months. That is, the statement is merely an estimate of the monthly operating expenses. A written discussion was presented by C. R. Mahan of the Chicago, North Shore & Milwaukee Railroad.

In his written discussion Mr. Mahan called attention to the statement of the committee that it thinks the best results can be secured by also submitting a monthly or a periodic budget in addition to the annual budget. He believes that what the committee had in mind was a monthly or periodic program. In lieu of this Mr. Mahan proposed a "change of budget authority expenditure request." This request would be prepared by the department head and would indicate an appropriate detail the necessity or desirability of respreading the unexpended portion of the annual budget outlay.

The relationship between the program and the budget should be considered. The program need not cover every expenditure included in the budget. For instance, the traffic department might lay out a definite program for the amount that it anticipated spending for advertising, but it would not be necessary to file a program for the routine office expenditures and expenses incidental to this work, as they could be estimated with sufficient accuracy to spread over the period covered by the budget. Upon completion of the program they would be submitted along with the budget to the committee under whose direction the master budget would be prepared. If on completion of the master budget it should appear necessary to curtail the expenditures, the committee upon making its report to the president would suggest how and in what particulars the curtailment should be made. Upon the president's decision a final master budget would be prepared and receive the approval of the president.

Mr. Mahan also believes that the budget should be fixed for the year and should be strictly adhered to in so far as each department head can consistently carry out his part of the budget, in order that the goal set may be accomplished at the end of the budget period. However, if at any time during the budget period some extraordinary occurrences might arise, over which the carrier had no control, the effect of which would seriously distort the budget to a degree that it would be impossible to carry it out as planned throughout the year, then, in his judgment, it would be necessary to prepare a new budget for the remainder of the period. A most careful study should be made to forecast the revenues from transportation, and after all the factors are assembled they should be compared in detail with the revenue for each month of the previous year in order to determine that each element has received minute attention and nothing has been overlooked. The accounting department should prepare an estimate of the general expense requirements for the year, and although the expenses are subject to a rather wide range of fluctuation, the forecast can be made with a sufficient degree of accuracy so as not to impair the value of the budget, and any fluctuations therein are readily explainable.

R. O. Crowe, Los Angeles Railway, stated that his company follows in general the recommendations of the committee, but uses the budget as a guide only, the control being a daily analysis. He mentioned a possible difficulty with the budget that certain officials may watch it too closely and so make it difficult for department heads to obtain money for necessary expenditures. M. W. Glover, West Penn Railways, stated that his company had been very well satisfied with the use of a construction or capital budget and intended installing an operating budget next year. He called attention to a possible difficulty that operating officials might use for construction purposes amounts allotted to operation in the budget, provided they could keep their operations below the estimated amount. C. H. Allen, Stone & Webster Company, stated that there is a tendency to use the budget merely as a bogey. In summing up the discussion Mr. MacRae said that the budget gives information which can be presented to the president on the first of the month, and while it is impossible to give complete figures on the operations of the preceding month at such a time, it is possible to give the operating officials information that will assist them in laying out the work for the succeeding month.

A paper on "Construction Cost Accounting from the Viewpoint of Both the Contractor and the Company" was presented by Weston J. Hibbs of the U.G.I. Contracting Company. An abstract of this address appears elsewhere in this issue.

President Nicholson announced the following committees:

Nominating committee: M. W. Glover, F. E. Webster, I. A. May, T. P. Kilfoyle and W. E. Jones.

Committee on resolutions: T. B. MacRae, E. H. Reed and W. H. Lemons.

President C. D. Emmons, of the American Association, who was present at the session, made a few remarks to the members. He called attention to the interest being shown in the meetings and the splendid exhibits. He also pointed out that new accounts will have to be included to take care of the motor bus and perhaps later the aeroplane.

L. E. Lippett pointed out that this is the first time a president of the American Association has been present at a meeting of the Accountants' Association.

Wednesday's Session Accountants' Association

The first part of the afternoon was taken up in a joint session with the Engineering Association. A report of this was given in last week's issue in connection with that association. Following the joint session the Accountants' Association continued with its own business, with President Nicholson presiding.

In the absence of Mr. Wallis, the report of the committee on standard classification of accounts was presented by M. W. Glover. He stated that the tentative classification of accounts for motor bus operation, prepared by the committee, had been undertaken at the request of several companies which were thinking of going into this class of business, and that it was not expected that the committee would present a classification for immediate announcement. In fact, the committee requested that the association do not at this time adopt the report as a standard classification of accounts, one reason being that the committee had been working in close harmony with the representative of the Interestate Commerce Commission.

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and felt that this suggestion should be presented to this representative to secure his co-operation in getting the classification adopted. The committee hoped that the association would offer suggestions and objections at the meeting, so that the committee could revise the report and then take it before the Interstate Commerce Commission. The report follows in abstract:

Standard Classification of Accounts

During the year the committee, as usual on request, co-operated with the Division of Accounts of the Interstate Commerce Commission in interpreting accounts.

Because of the growing use of buses by member companies the committee was requested to consider and present to the association a classification adaptable to the use of companies operating buses. This classification covers operating revenues and expenses and is drawn so it can be used by companies having either a bus department or a subsidiary bus company.

The committee has laid down the principle that such a classification should conform as closely as possible to that of the electric railway accounts, first, because it believes that it will be largely used by railway companies, and second, that the railway classification has stood the test of time and proved that it is well adapted to the transportation business. For profit and loss accounts, classification for balance sheet, and road and equipment accounts, the committee recommends that the electric railway classification be used.

The committee further states that in cases of companies operating a large number of buses a further diversification of accounts may be desired. The classification presented is intended to be basic and elastic and not elaborate, and if further detail is desired the classification can be elaborated as is done for class A, B and C electric railway companies and the form of the classification still maintained by using designating letters for the sub-account numbers.

The report is signed by Henry L. Wilson, William F. Ham, P. S. Young, M. W. Glover and Robert N. Wallis, chairman.

The classification of operating expense accounts for automotive transportation companies as presented and recommended by the committee for use by electric railway companies doing a bus business is divided into five primary accounts with thirty-one sub-accounts as follows:

Maintenance Plant and Equipment

B 1—Superintendence of plant and equipment.
B 34—Buildings, fixtures and grounds.
B 30—Passenger motor buses.
a—Painting and varnishing.
b—Bodies.
c—Chassis.
d—Tires.
e—Engines.
f—Storage batteries.
B 31—Freight, express and mail trucks.
B 32—Service trucks.
B 36—Shop equipment.
B 37—Shop expenses.
B 39—Miscellaneous equipment expenses.
B 40—Depreciation of equipment.
B 41—Equipment retired.

Power

B 53—Power.

Transportation

B 63—Superintendence of transportation.
B 64—Motor bus operators.
B 65—Freight, express and mail truck operators.
B 66—Miscellaneous service employees.
B 67—Miscellaneous motor bus service expenses.
a—Lubrication.
b—Other miscellaneous.
B 68—Station employees.
B 69—Station expenses.
B 70—Garage employees.
B 71—Garage expenses.
B 77—Loss and damage.
B 78—Other transportation expenses.

Traffic

B 79—Superintendence and solicitation.
B. 80—Advertising.

General and Miscellaneous

B 83—General office salaries and expenses.
B 86—Law expenses.
B 89—Miscellaneous general expenses.
B 92—Injuries and damages.
B 93—Insurance.
B 94—Stationery and printing.
B 98—Rent of equipment.

The operating revenue accounts are divided into two primary accounts with six sub-accounts as follows:

Revenue from Transportation

B 101—Passenger revenue.
B 103—Special bus revenue.
B 109—Other transportation revenue.

Revenue from Other Operations

B 110—Station and bus privileges.
B 116—Rent of equipment, buildings and other property.
B 119—Miscellaneous.

Mr. Glover explained that the standard classification presented was prepared from that of an electric railway operating buses, but that it was much condensed, as the committee did not feel it necessary to include so many sub-accounts in its classification.

In the ensuing discussion, which was entered into by I. A. May, the Connecticut Company; T. B. MacRae, Chicago Elevated Railways; Mr. Coalthard, Toronto; N. E. Stubbs, United Electric Railway Company of Baltimore; A. G. Neal, Washington Railway & Electric Company; W. E. Jones, United Electric Railway Company, Providence; J. E. Heberle, Capital Traction Company, Washington; R. O. Crowe, Los Angeles Railway; E. M. White, Binghamton Railway, a number of questions were raised about individual accounts in the classification. Mr. Glover stated that he had been in the minority in desiring to include a larger number of sub-accounts than were recommended by the committee, but that the others felt these should not be included, but should be worked out for each individual property. A conference of the representatives of the Interstate Commerce Commission is scheduled for early in November, and it is considered desirable that any suggestions that are to be made be given to the chairman promptly.

The report was received as tentative and left with the committee for further consideration.

M. W. Glover presented the report of the committee on relations with other associations. This report follows in abstract:

Relations with Other Associations

In its report the committee states that, during the year representatives have attended meetings of other associations in the gas and electric fields dealing with similar accounting problems.

As a number of member companies are interested in the operation of gas and electric properties, as well as electric railways, the committee suggests that any questions which may arise in connection with differences in accounting practices of the three classes of utilities be brought to its attention in order that the subject may be discussed with representatives of the other associations with a view of promoting uniformity in such practices.

The report was signed by L. T. Hixson, I. A. May, F. H. Sillick, F. E. Webster and M. W. Glover, chairman.

The chairman followed the report with the statement that he believes certain minor details should be worked out with representatives of the other associations in order to bring about greater uniformity. The report was adopted.

Usefulness of Operating Reports

A paper was presented by Edwin H. Reed, auditor of the Brooklyn City Railroad Company, on the subject, "Operating Reports and Their Usefulness to the Management." This paper is abstracted elsewhere in this issue.

The discussion on the paper was opened by President Nicholson, who said that it is his experience that much of the detail given the executive is useless; that is, the executive does not use it. His opinion was that in a majority of cases the preparation of such detailed reports does not justify the expense. J. J. Duck, Chicago Surface Lines, felt that when the executive asks for details they should be given regardless of the opinion of the accountant, although he felt that sometimes they are not useful in proportion to the cost. C. L. S. Tingley stated that much of the difficulty comes from the executive desiring a certain form of report for a specific study that may last for several months, after which the demand ceases. He may, however, forget to tell the accounting department to discontinue making up statements so that it will go on to eternity unless someone stops it. Mr. Reed defended his position, citing a number of cases in his own experience where a study of the detail figures had resulted in reduction of operating costs. C. E. Morgan, vice-president Brooklyn City Railroad, stated that the special reports rendered by the accounting department are to the executive what the sickroom chart is to the doctor. He is interested not in having something that indicates what the symptoms were thirty days ago, but in what the daily symptoms are, and that if he had to wait thirty days his patient would have died. He indicated that the executive has to form snap judgments, and sometimes merely glances at a report that may take an accountant several days to prepare. This should not discourage the accountant, as the vital point may

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be seen in an instant. He stated that his company has information of the business up to 2 o'clock in the morning of any particular day, which acts as a guide. While these figures may not be absolutely correct, they are accurate to within a fraction of a per cent and keep the finger of the executive on the pulse of the business. The accountant's report which comes along the twentieth of the month following is used as a check on the approximate figures.

Mr. Morgan also called attention to the value of the exhibits for accountants at the convention this year and suggested that operators stress this with the representatives of the various manufacturers of accounting devices during the year.

James Dalrymple, general manager Glasgow Corporation Tramways, stated that he places a great deal of dependence on detail costs. He does not believe that the accounting department can give the general manager too much detail.

Thursday's Session Accountants' Association

The third session of the Accountants' Association was opened by President Nicholson, who called for the report of the committee on stores accounting. This report, which was presented by Chairman R. A. Weston, follows in abstract:

Stores Accounting

The committee decided to give its attention this year to the matter of inventories of materials and supplies. It corresponded with the purchases and stores committee, and the two committees gave joint consideration to this subject.

After experience by some of the roads with the material classification recommended in the 1921 report, it was felt by the majority of the members of the purchases and stores committee that the classification as recommended, which was comprised of fifty-nine classes, could with some advantage in arrangement of material in storehouses, be somewhat amplified and enlarged into a classification of seventy-four classes. This classification is along the same lines as the one recommended and there is no change in matter of principle. It was finally voted to recommend the enlarged classification of seventy-four classes as a substitute for the classifications of fifty-nine classes. The revised classification is submitted in detail with this report.

The next matter was the use of stock books and this was substantially as recommended in the 1921 report, with the addition of detailed instructions showing how the stock book would be actually worked in the storehouses.

The third topic discussed was that of taking inventories. The recommendations of the committee on purchases and stores in regard to inventories is based upon the use of the stock book system and provides for taking the inventory in the stock book. It was agreed by the two committees that the more desirable practice is to take a complete physical inventory of the entire stock annually, on a date to be agreed upon by the general accounting officers and the head of the stores department, and it was agreed that the physical taking of the inventory should be handled by the stores department under the supervision and jurisdiction of the accounting department. It was agreed that all of the materials in the material and supply account should be inventoried, but it is possible that there may be some misunderstanding as to the definition of what is included, or what should be included, in the material and supply account. The committee feels that it is desirable to state quite specifically in the rules for taking inventory as to the inclusiveness of the inventory, so that there may be no misunderstanding on this score.

The committee feels that the rules for the annual physical listing of the materials and physical work in counting the materials had better be left to the committee on purchases and stores as it believes that the physical taking of the inventory should be handled by the stores department. As its contribution to this subject, the committee has recommended for insertion in rules which would apply to the taking of inventories on all street railways, paragraphs which relate to the inclusiveness of the inventory, and which state plainly the accounting department's jurisdiction in the matter, and which deal with certain adjustments that have to be made in inventories due to material received and issued during progress of counting, material received or issued which has not been entered on the company's books and such matters. These recommendations are briefly set forth below.

It is felt that a complete physical inventory once a year is very desirable. Even though a perpetual inventory system is maintained by the records and check is made from time to time by physical count, yet a complete annual inventory brings to light many things with regard to the stock of unapplied material on hand that are not brought to light in other ways.

The question arises as to the best practice of handling authorization material at inventory time. By this is meant special material, or unusual quantities of material carried in stock which may have been ordered for construction or improvement and betterment work. If such material has been once charged to the construction account, should it be included in the inventory? It is much better if facilities and organization permit to charge such material to general stores account when received and to the capital account when used. This should result in material being better checked up on receipt, better cared for and recorded, and give the stores department an acquaintance with the matter that would be advantageous.

Another question that arises is with respect to the supervising of the inventory by the accounting department. In view of the fact that the chief accounting officer should satisfy himself of the substantial correctness of the inventory, and has to certify to the correctness of the company's balance sheet on which the inventory is one of the chief assets, it is desirable that the taking and the completing of the inventory should be supervised and directed by the auditor's representative.

The manner of adjusting the inventory for the stock issued during the progress of the inventory may be handled in either of two ways as proves most satisfactory locally. Any material issued from a bin after the count has been put on the card up to and including the inventory date shall be put on the card showing the date of issue. Similarly for any material received and placed in the bin. If the count for a bin has not been made before the inventory date, all material issued from and including the inventory date to the date of count must be placed on the bin card, and similarly for material received and placed in the bin.

Or all requisitions for material issued during the progress of the inventory should be rubber-stamped "Before" or "After" opposite each item issued, the stamp "Before" to be shown opposite each item issued after the counting has begun and before the particular item was counted, and the stamp "After" opposite each item that is issued after the item has been counted.

The inventory quantities will be adjusted by additions or deductions called for by the above records.

All materials received prior to the inventory date, whether on hand and in inventory, or whether issued and used, for which no invoice has been received, should be listed on separate sheets, and this should be checked against the receiving record to make sure that the list is complete. The material on hand should be included in the inventory. This list should be sent to the accounting department immediately after the last invoices have been sent in for the month's account, and the auditor should charge general stores account with the value of the list in the month's account in which the inventory is being taken, setting up on the books the same amount as a credit to accounts payable or some other appropriate account, and the invoices as they are passed for the material on these lists should be charged to accounts payable and not to general stores account. This list should be made up in detail showing date received, name of shipper, quantity, description, price and value. If a

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copy of the invoice or a shipping memo has been received the date and amount should be shown and a reference to the purchasing agent's order number.

A detailed list should be made of any invoices taken into account prior to the inventory date for which the material has not been received prior to the inventory, such as invoices for material in transit passed in order to save the discount. A detailed list will also be made of all materials shipped away or issued and used which for any reason have not been billed or charged out. These lists will be treated as additions to the inventory.

In pricing the inventory the last recorded price should be used unless it should appear that the inventory quantity is made up of more than one lot, and at different prices, in which case the average price shall be figured and used.

All labor and material on incompleted shop orders must be entered on inventory sheets separately by shop orders and checked with the material in process of manufacture.

The report was signed by C. L. Bartlett, C. J. Bent, C. H. Caskey, A. E. Hatton, J. Scott Pardoe, J. B. Walker and R. A. Weston, chairman.

CLASSIFICATION OF MATERIAL AND SUPPLIES

Way and Structures

1. Ballast.
2. Ties.
3. Rails.
4. Rail fastenings.
5. Special work.
6. Track tools, power and hand.
7. Building and paving materials.
8. Sand and gravel.
9. Track salt and sweeper rattan.
10. Lumber and timber for way and structures.
11. Castings and forgings—wrought and finished not otherwise specified for way and structures.
12. Foundry supplies.

Power Generation and Distribution

13. Fuel.
14. Boiler parts.
15. Engine and turbine parts.
16. Generator and rotary converter parts.
17. Switchboards and switchboard equipment.
18. Ash and coal handling machinery, hoists, derricks, cranes, etc.
19. Mechanical and electrical devices.
20. Storage battery parts.
21. Wire and cable for production, transmission and distribution of power.
22. Wire and cable line accessories.
23. Line poles.
24. Track bonds and accessories.
25. Signal, interlocking and telephone materials.

Equipment

26. Lumber and manufactured woodwork.
27. Car wheels.
28. Car axles.
29. Brake shoes.
30. Drawheads, automatic couplers and journal boxes complete.
31. Service car materials.
32. Iron and steel bars, sheets and shapes.
33. Pipe, conduit and tubing.
34. Metals.
35. Castings, brass and other non-ferrous metals.
36. Castings, malleable iron.
37. Castings, gray iron and steel.
38. Forgings.
39. Springs.
40. Bolts, nuts, nails, etc.
41. Pipe and conduit fittings.
42. Gears, pinions and gear cases for railway type motors.
43. Bearings.
44. Armature and field coils for railway type motors.
45. Railway type motor parts.
46. Controllers.
47. Contactors, reversers and relays.
48. Fuse boxes, resistances, electrical couplers, circuit-breakers, lightning arresters, and other power fixtures for cars.
49. Trolley and third-rail equipment.
50. Air-brake materials.
51. Door and step control devices.
52. Heaters.
53. Mechanical and electrical devices for cars.
54. Car trimmings.
55. Paints and varnishes.
56. Glass.
57. Wire and cable for cars and buildings.
58. Insulating materials.
59. Electrical supplies.
60. Machinery and repair parts.

General

61. Oil house materials, chemicals and compounds.
62. Automobile, garage and stable supplies.
63. Canvas, leather, rubber and paper supplies.
64. Brooms and brushes.
65. Hardware and tinware.
66. Tools, all kinds, except machine and track tools.
67. General supplies.
68. Stationery and printing.
69. Furniture and fixtures.
70. Material in process of manufacture.
71. Scrap—non-ferrous metals.
72. Scrap—ferrous metals.
73. Scrap—miscellaneous.
74. Containers.

Following the presentation of this report the program was interrupted so that the association could hear the address of Dwight N. Lewis, president National Association of Railway and Utility Commissioners. Mr. Lewis' paper appears elsewhere in this issue.

Returning to consideration of the report of the committee on stores accounting, a written discussion was presented by W. L. Davis, an abstract of which follows:

The value of a material classification is generally recognized. It not only furnishes the executive with valuable information in controlling purchases, but it also furnishes the storekeeper and the accounting department with an excellent medium for inter-departmental checking, particularly at the time of the annual inventory. A practical difficulty is involved in applying the classification to the stores accounts, in that the distributions, both debits and credits, are subject to clerical errors. Unless carefully watched, differences in distribution may exist to such an extent that the accuracy of the balances may be affected seriously. It is possible to take care of this by establishing a set of code numbers for the various items of material. If code numbers are not used the classification numbers may be applied at the time the material is ordered. It might also be well to suggest that a modified or abridged classification of stores accounts be prepared for the use of smaller companies or for any company which does not desire to use the very complete classification outlined by the committee.

It might be well to mention that the stock book suggested by the committee does not provide for the value of the material, and under those circumstances it is obviously necessary to establish another record for that purpose. The establishment of such a record and the methods to be used in keeping it up to date and in step with the stock book is a study in itself. Such a record appears to be necessary if physical inventories are to be compared accurately with the general books, as it is obvious that the most accurate comparisons can be obtained when the physical stock and the general books are known to be represented by the same elements. The committee has covered the matter of inventory in a complete and comprehensive manner and there seem to be very few comments in order.

There is no doubt that there is an unrecorded asset often represented by the value of material charged out prior to its use, said Mr. Davis, but in stating that such material should be taken into the inventory it might perhaps be possible to overstate the inventory to some degree. If material ordered for a specific purpose and charged to the job is not used for a few months, and an inventory is taken in the meantime, the propriety of changing the distribution is open to question. The fact remains that the material was purchased as a part of a piece of work, and the money paid for it represents a part of the cost. Under these circumstances it might be preferable to omit the material from the inventory. On the other hand, should a stock of material be bought for any of several purposes and the cost thereof not be chargeable to any one account, the value of such material should be included in stores, and under such circumstances the original charge should have been made to stores.

W. E. Jones stated that the classification given by the committee was quite thoroughly in accord with the classification with which he was familiar. It was moved that the committee be continued, and that the executive committee be requested to take the matter up with the Purchasing and Stores Association in order that any duplication of work may be eliminated.

Resolutions

Chairman MacRae of the committee on resolutions read the report of his committee. Appreciation was expressed for the work of the officers and the executive committee of the American Association in preparation for and during the 1923 convention. Appreciation was also expressed to President Nicholson and the other officers for the interest taken and the work done in preparing the program and securing papers and speakers. The thanks of the association were extended to members of the committees and to those persons who prepared and read papers. The ELECTRIC RAILWAY JOURNAL was thanked for its interest in having representatives at the meeting and in reporting proceedings in the various issues. Special appreciation was expressed for the presence at the meetings and remarks made by Messrs. Welsh, Dalrymple, Morgan and Tingley. Thanks were extended to O. H. Bernd for his work as secretary during the convention.

Nominations

The committee on nominations, M. W. Glover chairman, submitted the following for officers of the Accountants' Association for the ensuing year:

President, E. M. White, treasurer Binghamton Railway Company.

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First vice-president, Wallace L. Davis, auditor Lehigh Valley Transit Company, Allentown, Pa.

Second vice-president, J. J. Duck, general auditor Chicago Surface Lines.

Third vice-president, Walter Shroyer, secretary Union Traction Company of Indiana, Anderson, Ind.

Executive Committee: L. E. Lippitt, auditor Auburn & Syracuse Electric Railway, Auburn, N. Y.; T. B. MacRae, general auditor Chicago Elevated Railways; O. H. Bernd, secretary Des Moines City Railway; E. H. Reed, auditor Brooklyn City Railway.

These officers were duly elected.

President Nicholson turned the meeting over to President-elect E. M. White, who spoke a few words and then asked for expressions from the newly elected officers. These all indicated their desire to help Mr. White in every possible way and to further the interests of the association.

President White made the suggestion that a delegation among the accountants get together at one hotel in order to become better acquainted apart from the regular meeting. No formal action was taken on the matter.

Biographical Sketches of Newly Elected Officers

The New President of the Claims Association

STEP by step William H. Hyland, claims agent for the Fonda, Johnstown & Gloversville Railroad of Gloversville, New York, who was elected president of the Claims Association at Atlantic City, has climbed the ladder of railroad work. He broke into the railroad "game" some thirty-five years ago. This was when he secured employment as a brakeman on the Tioga branch of the Erie Railroad, a line handling a large part of the railroad traffic for northern Pennsylvania and southern New York State. He was twenty years of age at the time.

It is only a step from brakeman to conductor, but many men never make it. Mr. Hyland made the advance to freight conductor on the same branch in less than a year. The next step took a little longer. It was three years this time. Yardmaster for the Erie Railroad at Corning, N. Y., was the post to which Mr. Hyland advanced. There he remained for several years before being transferred to Buffalo, N. Y. He then left the services of the Erie Railroad and became connected with the West Shore Railroad as conductor on trains running between Newark and Frankford, N. Y. Two years later he entered the services of the Fonda, Johnstown & Gloversville Railroad.

To those who did not know Mr. Hyland well this change looked like a backward step, for he began his service with the Fonda, Johnstown & Gloversville Railroad in the capacity of passenger brakeman. But Mr. Hyland had not changed from one road to another just for the sake of change, no matter what the outward evidence might appear to be. It was opportunity for advancement that he sought, and as events have turned out it was opportunity that he found. Thus just a year after joining the Fonda, Johnstown & Gloversville Railroad he was advanced to freight conductor. Two years later he was again advanced, this time to passenger conductor, a position which he held until the Fonda, Johnstown & Gloversville Railroad started on the construction of its electric railway running between Gloversville and Schenectady. Mr. Hyland was then appointed trainmaster and put in charge of all steam trains engaged in the construction of the new road. He remained in this position until the road was completed in 1903, when he was advanced to claims agent, a position he holds until the present day. His service with this company covers a period of twenty years.

Mr. Hyland is well known in fraternal circles, not only in Gloversville and other cities where he was employed, but throughout the entire state of New York. He was exalted ruler of the Benevolent Protective Order of Elks of Gloversville for two consecutive terms and also held the office of first vice-president of the state of New York Order of Elks in 1916. No small part of the success of the Liberty Loan and other drives throughout his section of the country during the World War was due to his untiring efforts.

Elmer M. White

ASSOCIATION work is not new to Elmer M. White, just elected to be president of the American Electric Railway Accountants' Association. Ever since he entered the electric railway field many years ago Mr. White has contributed of his knowledge to the industry and to the association, and once before he was an active officer of the Accountants' Association, serving as secretary from the year 1904 to the year 1908.

Mr. White is one of the real old timers, in the sense that his connection with the industry dates back to 1885. In that year he entered the service of the Hartford & Wethersfield Horse Car Railway at Hartford, Conn., and remained with that company for a period of twenty years. For a short time, namely from 1905 to 1907, he was in the South as treasurer of the Birmingham Railway, Light & Power Company, but in 1907 he returned north to accept appointment to the Coney Island & Brooklyn Railroad as auditor. This road was then not included in the system of the Brooklyn Rapid Transit Company, but it embraced some of the key lines of the city, Smith Street, De Kalb Avenue and Franklin Avenue, then highly developed and doing a gross business per annum per mile of track that ranked it very high as both a gross and a net earner. After serving with the Brooklyn road for six years Mr. White was made treasurer of the Binghamton Railway, Binghamton, N. Y., where he has since been located. Mr. White knows accounting, knows association procedure, and knows accountants, and he enters upon the work of president of the association with the hearty co-operation of the electric railway accountants, personally expressed to him.

Meeting of New and Old Engineering Executive Committees

Old Engineering Executive Committee Meets

A MEETING of the executive committee of the American Electric Railway Engineering Association was held at the Marlborough-Blenheim Hotel, Atlantic City, N. J., Oct. 7. The members present were: L. C. Datz, H.A. Johnson, C. H. Clark, C. R. Harte, Daniel Durie and R. C. Cram. J. W. Welsh was present during a part of the meeting, and G. C. Hecker acted as secretary.

Mr. Harte, who had been appointed to revise the rules for the adoption of standards, stated that in his judgment the matter should be held in abeyance pending definite decision regarding the association's policy on relations with the American Engineering Standards Committee. The matter was laid on the table.

Mr. Johnson, who had been appointed to study and report on the future work of the heavy electric traction committee, reviewed the work of the committee from the beginning. He cited the opinions of various members on this subject and recommended that the committee on heavy electric traction be continued, and that it keep the association informed of the progress in electric traction as applied to steam railroads. This will include the revision and publication of the Bibliography of Heavy Electric Traction and Electrification Data. The desirability of revising this bibliography yearly may be decided later.

He also recommended that the committee be assigned subjects of vital interest to electric railroads operating subway, elevated and heavy interurban service and that the number of this class of subjects be increased after next year. The membership of the committee should include representatives of companies operating elevated, subway and heavy interurban service in addi-

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tion to representatives of electrified steam railroads and manufacturers. The executive committee approved these recommendations.

Mr. Scofield, who had been appointed to study and report on a policy to be pursued in assigning subjects to the power generation committee, recommended combining the power generation and power distribution committees into one committee to be called the power supply and distribution committee. There was a prolonged discussion, which resulted in the executive committee voting to maintain two committees, as follows:

(a) Power generation and conversion.

(b) Power transmission and distribution.

It was the sense of the executive committee that the co-operative work with other associations suggested by Mr. Scofield should be carried out by the first committee, so that the association members would receive the benefit of the studies conducted by N. E. L. A. and similar organizations.

Mr. Harte, who had been appointed to study and report on the advisability of forming a signal committee, stated that he believed the subject of signals could best be handled by a sub-committee of the power distribution committee. Mr. Cram stated that he was in favor of forming a standing committe on signals. The executive committee voted to assign the subject to the proposed committee on power transmission and distribution.

The secretary announced that H. H. Norris has accepted appointment as the association's representative on the sectional committee on preferred numbers of the American Engineering Standards Committee, and that R. C. Cram has accepted appointment as the association's representative on the sectional committee on the industrial sanitation code.

The invitation of Charles E. Heywood, standards department, Society of Automotive Engineers, to appoint a representative on the sectional committee on numbering of steel was accepted.

The invitation of Dr. G. K. Burgess, Director, United States Bureau of Standards, to appoint a representative on the sectional committee being organized to revise Parts 1 and 3 and Section 9 of the National Electrical Safety Code was also accepted.

The committee passed a resolution thanking President Datz for the photographs of past-presidents of the association, which he had framed and placed in the headquarters office.

The secretary announced that the recent letter ballot indicated the executive committee was in favor of the appointment of a representative on the joint committee of National Engineering Associations, to review the A.I.E.E. standards for synchronous converters.

A letter from H. H. George was read, recommending that the special committee on wood preservation be constituted a standing committee. It was voted that this be made a standing committee.

Meeting of New Engineering Executive Committee

THE first meeting of the 1923-24 executive committee of the Engineering Association was held at Atlantic City, Oct. 11. Members of the executive committee present were H. A. Johnson, C. H. Clark, R. C. Cram, C. R. Harte, Daniel Durie, R. H. Dalgleish, M. B. Rosevear and J. W. Welsh. Past-presidents F. R. Phillips, J. H. Hanna, H. H. Adams and L. C. Datz also attended. G. C. Hecker acted as secretary.

The report of the committee on subjects was approved with several amendments. The amended report as approved is published below.

Mr. Adams suggested the appointment of a committee of five to co-operate with the National Fire Protection Association in revising that part of the National Electrical Code dealing with rules for car wiring. Mr. Adams pointed out the opportunities for obtaining a reduction in insurance rates through proper wiring of cars to comply with the code and also pointed out the necessity for reasonable code requirements. The executive committee voted to appoint such a committee with the understanding that it did not conflict with the revision by the American Engineering Standards Committee.

The executive committee voted to appoint a special committee on individual membership in the Engineering Association. This committee is to be instructed to co-operate with the committee of the American Association on company section and individual membership. L. C. Datz was appointed chairman of this committee.

The executive committee voted in favor of the appointment of an alternate to the representative on the main committee of the American Engineering Standards Committee.

The executive committee voted in favor of the organization of a special committee on engineering symbols, to consist of a representative of each of the standing committees involved in the use of symbols. The committee is to be instructed to prepare its report in a suitable manner for inclusion in the Engineering Manual.

It was voted to request the American Society for Testing Materials to join with the association in submitting for approval as American standard, the specification for the manufacture of open-hearth steel girder rails of plain, grooved and guard type, Manual Section Wr 2d. This specification is understood to be in complete conformity with A.S.T.M. specification A2-21 as recently revised.

The suggestion of the committee on heavy electric traction that the bibliography be revised and simplified as suggested by Prof. R. B. Warner of Yale University and brought down to date was discussed. It was voted that the secretary take up the matter with Professor Warner and obtain an estimate of the cost of doing the work

It was decided to continue the special committee on automatic substations for another year.

The request of the committee on power transmission and distribution that it be permitted to erect a trolley wire over the proposed rotary service testing machine of the welded rail joint committee for the purpose of making comparative trolley wire wear tests was discussed. It was voted to defer action on this matter until the next meeting, at which time it was hoped that the status of the proposed testing machine would be more definitely established.

The suggestion of the committee on power transmission and distribution that the association employ a research engineer or found a research fellowship at some university to study trolley wire performance and specifications, was discussed. Mr. Dalgleish stated that he thought the United States Bureau of Standards might be able to assist in this research work. It was voted to defer action on this matter until the next meeting and Mr. Dalgleish was requested to take up this matter informally with Dr. Burgess, director of the Bureau of Standards.

It was voted to approve the recommendation of the committee on power transmission and distribution to request the A. E. S. C. to organize a sectional committee on specifications for high strength, low conductivity, trolley wire. It was also voted that the Engineering Association request the A.S.T.M. to join in making this request and also in undertaking jointly the sponsorship for such a sectional committee.

President Johnson appointed the following sponsors for standing and special committees for the year.

Power Transmission and Distribution: M. B. Rosevear.

Special Committee on Automatic Substations: E. H. Scofield.

Buildings and Structures: C. H. Clark.

Power Generation and Conversion: E. H. Scofield.

Purchases and Stores: R. H. Dalgleish.

Heavy Electric Traction: C. R. Harte.

Way Matters: R. C. Cram.

Engineering-Accounting: C. R. Harte.

Equipment: Daniel Durie.

Wood Preservation: M. B. Rosevear.

Special Committee on Engineering Symbols: R. C. Cram.

Subjects for Engineering Association

THE committee on subjects of the American Electric Railway Engineering Association submitted a list of assignments for this year's committees to the executive committee, which formally approved it at the meeting held Oct. 11 at Atlantic City. The list as prepared by the committee follows:

EQUIPMENT

1. Continue the study of helical gears, including long and short addendum teeth, web hole standardization and the whole subject of car gearing.

2. Continue the study of various devices for trolley contact and the effect

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upon trolley wire. This subject is to be studied in co-operation with the committee on power transmission and distribution.

3. Review of Manual sections on equipment under the heading "Miscellaneous Methods and Practices." These are to be revised with the idea of including in the Manual any which may have sufficient value to warrant it.

4. Continue the study of spring supports for railway motors with a view to the elimination of undesirable types, and the standardization of the more desirable ones, in so far as possible.

5. Study existing practices in the matter of inspection periods for car axles with a view to developing a practicable set of rules, for inclusion in the Manual under "Miscellaneous Methods and Practices."

6. Study air brake tests conducted under the auspices of the Central Electric Railway Association and present a digest of the salient features.

7. Review of existing standards, with particular reference to the following Manual sections:

(a) Section Et 18a and Em 3a to bring them into conformity with the new wheel contours adopted at the 1923 convention.

(b) Revise the tables in Section Et 7b to bring them into conformity with the new wheel contours adopted at the 1923 convention, and expand the tables to permit obtaining standard flanges and treads in all of the standard diameters shown in present Table 1.

(c) Revise Sections Et 9b, Et 14b and Et 15b in accordance with the recommendations of the 1923 committee on standards.

Wood Preservation

1. *Specifications for Open Tank Treatment of Wood Poles*—The subject of open tank pole treating plants for small operating companies should be studied and reported on.

2. *Specifications for Brush Treatment of Wood Poles*—The committee is instructed to continue the study of this subject and report on the desirability of preparing a specification for a suitable grade of creosote oil for brush work.

3. *Specifications for Pressure Treatment of Wood Poles*—The 1923 committee submitted five specifications for information only. This committee is instructed to make a further study of these specifications with a view to their inclusion in the Manual.

4. *Perforation Process for Timber Treatment*—The 1923 committee felt that this method of treatment of timber had not become sufficiently standardized to justify making definite recommendations. The committee is instructed to make a further study of this subject.

Engineering-Accounting

Continue the study of classification codes of items of work in construction and reconstruction so arranged that the I. C. C. account numbers may be readily adhered to. The purpose is to elaborate on the I. C. C. accounts so that at any time during the progress of or after the completion of a job the cost of any item may be determined.

Heavy Electric Traction

1. Revise and bring up to date the bibliography of heavy electric traction and electrification data: rearrange the bibliography as outlined in the report of the 1923 committee for publication in pamphlet form.

2. Collect and tabulate data on: (a) Branch line electrification; (b) self-propelled cars, such as gasoline, gasoline-electric and Diesel-electric, as well as storage battery cars; and storage battery locomotives for yard work.

3. Study train operation with particular reference to articulated trains. Review and present information on existing articulated trains.

4. Make a study of connections between cars used in train operation, reviewing those in use to date and suggesting improvements in all types, including electric, mechanical and air couplers.

5. Review of existing standards.

Buildings and Structures

1. Continue the study of Electric Railway Terminals for both City and Interurban service — (a) Passenger terminals; (b) freight terminals for city and interurban service; (c) combination terminal.

2. Study designs of buildings for proper storage and maintenance of buses.

3. Review of existing standards.

Power Generation and Conversion

1. Continue the study of a uniform scheme of recording failures of power apparatus and interruptions to service originating within the generating station and the substation.

2. Continue the study of existing practices in the design and operation of automatic substations. This study should include the subject of remote supervisory control.

3. Study ventilation systems for automatic substation.

4. Review of existing standards.

Purchases and Stores

1. Study and present information on a method of classification and sale of scrap materials to increase the revenue therefrom.

2. Study and report on the proper place for the purchasing and stores departments in a company's organization.

3. Review of existing standards.

Power Transmission and Distribution

1. Review the subject of concrete pole design and maintenance.

2. Study dimensions of approach ears of flexible tips with a view to standardization of the ruling dimensions.

3. Study dimensions of various types of suspensions, with a view to standardization, particularly of the ruling dimensions.

4. Review the work of the 1923 committee on catenary overhead construction, other than for steam railroad electrification.

5. Prepare specifications for catenary suspension materials.

6. Trolley wire wear and composition —(a) Continue the study of the composition and the wear of trolley wire; (b) continue the study of trolley wire breaks from causes other than wear; (c) continue the study of various devices for trolley contact and the effect upon trolley wire. This subject is to be studied in co-operation with the committee on equipment.

7. Continue the study of temporary connections to trolley wire.

8. Continue the study of overhead construction for trackless trolleys.

9. Review existing standards. Special attention is to be given the existing standards on block signals. The committee on power distribution should bring these specifications into conformity with the best known signal practice.

Way Matters

1. Continue the subject of standardization of frogs.

2. Continue the study of design of substitute ties in co-operation with American Railway Engineering Association.

3. Continue investigation of all forms of welded joints in co-operation with the committee on welded rail joints.

4. Study and submit design and specification covering solid manganese steel, electric over steam railroad crossings. This subject should be studied in co-operation with the track committee of the A.R.E.A.

5. Study the standardization of switches and mates.

6. Study and report on the need for and the desirability of adopting a narrow groove guard rail as standard.

7. Prepare design of standard hook head railroad spike.

8. Study surface hardening of rails in the mill and on the street.

9. Submit additional specifications covering design and manufacture of tie rods.

10. Review of existing standards. Special attention should be given to the following: (a) Ws 2a, "Rules for Determining the Gage of Track on Curves." This revision is necessary because of the adoption of new wheel flange contours as standard. (b) Wr 7a, specification for carbon steel rails of standard section. The committee should take up with the A.S.T.M. the matter of revising Section IV—Subsection 402—Page 6—so as to provide for the furnishing of standard section rails in 60-ft. lengths.

Unification of Car Design

Continue the subject of unification of car design.

Unit Method of Voting on Standards

The work of this committee is to be continued.

Air Reservoir Specifications

The work of this committee is to be continued.

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Association News & Discussions

Concluding Sessions of Safety Council

The Automobile Hazard and Community Co-operation in Safety Movements Principal Topics Discussed—J. P. Barnes of Louisville Elected Chairman of Section for Ensuing Year

THE electric railway section of the National Safety Council concluded a very successful three-day meeting in Buffalo on Oct. 4, when James P. Barnes, president Louisville Railway, was elected chairman of the section for the ensuing year. The report of the meeting on Oct. 2 was published in the ELECTRIC RAILWAY JOURNAL of Oct. 6, together with a copy of a paper read at the Oct. 4 meeting by D. E. Parsons, general manager East St. Louis & Suburban Railway. Lack of space in the issue of Oct. 13, because of the need for reporting the Atlantic City convention, precluded the publication of a report of the concluding sessions of the electric railway section of the National Safety Council.

THE AUTOMOBILE HAZARD

The session on Wednesday, Oct. 3, was a joint meeting of the electric railway and public utility sections and was devoted to the subjects of the automobile hazard and valuable sources of information on accident prevention not generally utilized. More than 250 attended this session of the congress, which was held in the Fillmore room of the Hotel Statler, which is furnished with furniture taken from the former home of the late President Millard Fillmore. A. O. Mitchell, adjuster of the Northern Indiana Gas & Electric Company, Hammond, Ind., was chairman of the public utilities section and he acted as co-chairman with Mr. Truett.

James P. Barnes, president Louisville (Ky.) Railway, was the first speaker, his subject being "The Automobile Hazard."

Mr. Barnes began by referring to some recent statistics on automobile accidents, published in the *Literary Digest*. According to that paper a person is killed in the United States every fifty minutes by automobiles, and the prediction was made that before 1923 was ended one person out of every ninety in the United States would have been so killed or injured. Statistically, Mr. Barnes said, that statement is almost incomprehensible, yet the casualties are increasing so rapidly there must be some deep underlying cause for it. On the other hand, the record of accomplishment by law in some places has been good. Thus the speaker noticed recently in Cleveland that traffic seemed to observe the speed limits carefully and people used great caution in crossing the streets. Inquiry disclosed that Cleveland had established the plan of impounding the cars of speed ordinance violators and the careless driver had to pay storage for his car through the length of time he was forbidden to drive. The contrast with this condition and that in Buffalo was most marked.

Safety campaigns, the speaker said, have some effect, and it is noteworthy to see the effect they have upon children. Children think more simply and directly than grownups, and once they have accepted the conclusion, once they have come to believe a certain thing is dangerous because they have seen it in practice or been told by their parents or teachers they are more apt to be guided by that than the adult who has learned "to take a chance." The only real remedy is a restoration of "common horse sense" and a spirit of human kindness behind the steering wheel. Each person has a responsibility to society and other individuals, and this cannot be put off by the question: "Am I my brother's keeper?" So we must continue our safety campaigns and try to impress individuals with the fact that their duty to society is not only self protection but protection to others. We must also constitute ourselves centers of energy in the distribution of propaganda that the laws must be observed, and this world must become a place where each man will feel in himself some definite measure of responsibility for his fellow-men.

R. R. Hadsell, superintendent of transportation New York State Railways, Rochester Lines, and president Rochester Safety Council, in discussing Mr. Barnes' address, pointed out that the cause of most automobile accidents was recklessness or thoughtlessness of the driver rather than imperfections in the machine. Of course, a steering knuckle may break at times or a tire come off when it is particularly dangerous to have such a thing happen, but accidents are more often attributable, in the speaker's opinion, to a desire to beat the other fellow to a crossing or into a lane of traffic or else to indifference to the rights of others. Thus, railroad crossing accidents are alarmingly frequent, even where warning signs are conspicuously placed and there is an unobstructed view of the crossing for a considerable distance. The speaker had been impressed in reading accounts of such accidents, with the fact that in the majority of cases the persons involved had foreign names. This had led him to believe that many of them do not know the traffic laws, do not carry insurance on their cars, and often are not financially responsible for the damage they do through their negligence. One method of reducing this danger is strictness in the issuance of licenses and in the assessment of penalties for reckless driving.

Mr. Barnes' address was also discussed by H. L. Mitchell, vice-president West Penn Railways of Pittsburgh.

The principal speaker on the second topic of the day was W. F. Canada, director of engineering National Electric Light Association. He urged the need of engineering methods and organization in safety work. One step along this line has been a drafting of codes for protection against the fire hazard and other codes are in the making. Another step is in the compilation and study of statistics of injuries to show the kinds of work and the kinds of location where injuries occur with greatest frequency and severity and the percentages of persons that are injured. By these statistics it is possible to arrange for different safety practice methods where they are most needed.

The meeting on Wednesday morning was followed by a luncheon, presided over by Charles B. Scott, general manager Bureau of Safety, Chicago. The speakers discussed electric safety problems and included R. M. Searle, president of the Rochester Gas & Electric Corporation, Rochester, N. Y., and R. Russell Bowen, vice-president of the Washington Railway & Electric Company, Washington, D. C.

FINAL SESSION AND ELECTION OF OFFICERS

At the closing session of the electric railway section, National Safety Council, on Thursday, Oct. 4, James P. Barnes, president of the Louisville (Ky.) Railway, was elected chairman for the ensuing year. Mr. Barnes succeeds J. H. Truett, chairman of the safety committee of the United Railways & Electric Company of Baltimore, Md. H. M. Keyser was elected vice-chairman. He is secretary and claims attorney for the Washington Railway & Electric Company, Washington, D. C. He succeeds G. T. Hellmuth, claims attorney for the Chicago, North Shore & Milwaukee Railway, Chicago. M. W. Bridges, safety engineer for the Chicago Elevated Railways, Chicago, was re-elected secretary of the section. The election of the three was unanimous.

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The Thursday session of the electric railway section of the congress opened with a round-table discussion on the topic "Co-operation of Electric Railways in Community Safety Activities." C. B. Scott of Chicago said that the electric interurban lines operating through a large number of small communities face a difficult problem because it is impossible to organize local safety councils in these towns and villages. He said, however, that it is not difficult to interest local citizens in safety work and that this volunteer service, while not expensive is often very effective.

Louis C. McBrayne, manager of the Massachusetts Safety Council, Boston, explained the activities of the safety work in his state through co-operation between electric railway lines and newspapers. He said that the big menace to electric railways is the motorist who shoots out at a side street and the auto driver who cuts in front of a car. He said that railways should encourage motormen to report careless auto drivers and said that in Massachusetts friendly letters are written to motorists thus reported by motormen, urging them to be more careful. He also urged electric lines to encourage their trainmen to become speakers on safety problems before local gatherings and added that if a general manager or railway executive spoke, the public would say, "he wants to save money for his road," but if a trainman did the speaking, it would be much more effective.

Mr. Barnes, president of the Louisville company, told the electric traction officials that not sufficient credit is given to platform men in the safety movement and that too much credit is taken by the executives who serve upon the safety committees. He told of a parade in Louisville where taxis were driven through the streets by twenty-four drivers who had not had an accident in from one to three years. The passengers in the cabs were trainmen in the employ of the Louisville company who also enjoyed non-accident records. He said the demonstration resulted in much good publicity and aided in the safety movement in that city.

After D. E. Parsons, general manager of the East St. Louis & Suburban Railway, St. Louis, presented his paper on "Safety Principles as Applied to the Individual Utility (see ELECTRIC RAILWAY JOURNAL, Oct. 6, page 568). There was a discussion, lead by A. J. VanBrunt, director of safety education for the Public Service Corporation, Newark, N. J. He said that too many electric railway executives pay little or no attention to safety work and he charged these officials with mismanagement and shortsightedness. He declared that safety work should not be spasmodic but should be carried on with systematic regularity. He said the saving due to safety work is greater than the outlay of money used to carry on such work and added that, "to cure is a voice of the past and to save is the voice of the future."

A. W. Koehler, director of safety New York State Railways, Rochester Lines, indorsed the position taken by Mr. Parsons and referred particularly to the need by the safety departments of sufficient funds and authority to carry on their work. Spasmodic effort or ill-advised propaganda, he said, is worse than useless, and while on large properties it is essential that accident prevention methods be supervised by some responsible person, every department and every individual must take an active part. The safety organization and meetings, however, do something more than result in accident reduction. By bringing employees and employers together in informal meetings, the old-time close relation between the two, which has been all but lost in these days of large companies and corporations, is brought back, and there is fostered a spirit of friendliness and helpfulness that is a tremendous asset to any public utility company. Organized safety also fosters a feeling of confidence in the management on the part of the public, as well as better public relations in the community in which the company operates.

The conference adjourned after a motion was made authorizing Mr. Barnes, the new chairman, to carry the message of safety to the claims officials at the Atlantic City convention and invite them to become members of the Electric Railway section of the National Safety Council. Mr. Truett, the retiring president, on behalf of himself and the other officers, thanked the section for the spirit of co-operation manifest during the year and commented upon the growth and importance of the Electric Railway section of the congress.

Unit Container and Demountable Body*

Conditions Are Outlined Favorable for Their Use—English Practice with Duralumin Containers Described—Advantages and Disadvantages of the Various Types of Containers Are Outlined

By F. C. HORNER
Consulting Engineer General Motors Corporation, New York

UNIT containers, which can be loaded and sealed by the shipper, transported to the consignee on truck chassis, freight car, boat or all three without disturbing the contents, offer great possibilities in the co-ordination of all transportation facilities. The outstanding instances of unit container use in this country are to be found at Cincinnati, Ohio, and on the New York Central Railroad lines.

The demountable body in various forms is in use to a limited degree in many parts of the country and is probably more adaptable for general purposes of motor truck cartage than the unit container. In other words, the unit container is commonly referred to in connection with traffic interchange between rail and road vehicles, whereas the demountable body is more often used simply for interchange between motor truck and loading platform. In one sense a unit container is a demountable body when used with a motor truck, and a demountable body can easily be used on an ordinary flat car on rail movement. The container car, however, is one fitted to accommodate a definite size of container and is not used with any other equipment.

The best and latest type of unit container with which I am acquainted is constructed of duralumin. Its unladen weight is only two-fifths that of an oak container of equal capacity; that is, assuming the weight of an oak van as 1 ton, the duralumin van would weigh 800 lb. only. It is made in England, and besides the advantage gained in the reduction of weight, the manufacturers claim a great reduction in the cost of maintenance, though of course, that has yet to be proved. If actually subjected to load tests, duralumin vans would carry three times the loads of the wooden ones, but the main idea has been to combine lightness, strength and durability, the last two relating to the power of the container to resist impact blows against railway trucks, ship hatchways and docksides. Vickers duralumin has a tensile strength and hardness equal to good quality mild steel.

In discussing these duralumin containers with Mr. Griffiths, the manager of motor vehicles for Lyons & Company, London, the first firm to use them, I was told that after one year of service the maintenance and repair cost was practically nothing, whereas the cost of repairs to the wooden containers was very high.

The New York Central type of container was designed primarily as a unit that would fit a special flat car, but of a weight and size easily adaptable to the conventional motor truck chassis equipped either with or without a body. I believe the latest type has a capacity of 7,000 lb., the unladen weight being about 3,000 lb.

The container used by the Cincinnati Motor Terminals Company has a capacity of 4½ tons, and is of wood construction, with doors on both sides and both ends, and its unladen weight averages about 4,000 lb. For a time the Terminals Company and one of the electric railway companies entering Cincinnati conducted an interchange container service for the movement of l.c.l. freight. But the Cincinnati plan is essentially a motor truck movement for the transfer of trap-car freight between various rail terminals in what are quite commonly called demountable bodies.

*Abstract of paper delivered before a gathering of electric railway executives at the office of E. J. Burdick, general manager Detroit United Railway, at Detroit, Mich., Sept. 13, 1923.

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Other types of unit containers are:

1. Glass-lined tanks, such as are used on the New York Central lines and adaptable for milk and other liquids that can be shipped in bulk.

2. Containers for household goods, tobacco products, confectionery, and other commodities carrying a high tariff are in use in various parts of this country and Europe in a very limited way.

Referring to the demountable body, we have wider variety of types to choose from than with unit containers. The simplest and most adaptable type that I know of is an English invention. The London & Southwestern Railway, through the use of these bodies, increased the tonnage moved per day per motor truck almost 40 per cent within six months. Demountable bodies and flats are also used in England by Carter Patterson, the big express carriers, by the furniture and household goods movers, and in the cotton industry around Manchester. In the latter case the flats are often interchanged between rail and road vehicles. For protection from the weather, a sheet or tarpaulin tied over the bolts of cloth is all that is necessary.

In this country we have not developed this class of equipment to as great an extent as has been done in England. However, more and more thought is being given to the question of reducing delays in loading and unloading. The American Manufacturing Company and the L. K. Liggett Company are among the most prominent companies that have been using demountable bodies for some time and effecting real economies.

Advantages of Each Type

The principal advantage of the unit container adaptable to the rail and road vehicles in the transportation of goods is the saving in labor costs by reduction in handling operations. According to a paper presented before the Society of Terminal Engineers by F. S. Gallagher, engineer of rolling stock, New York Central lines, the individual package in less-than-carload freight customarily is handled at least thirteen times in passing from the shipper to the consignee, whereas, with the unit container, much of this handling is done in bulk.

Other advantages of the unit container are the saving from loss and damage to goods, and the saving that can be made on many classes of goods in crating and packing. This in turn permits of very material reduction in floor space required, which makes expansion of the business possible without further outlay in rental or property.

The advantages of the demountable body or flat over conventional fixed-on types are principally savings in time, and savings in floor and street space.

For instance, the motor truck chassis standing time can be reduced to a minimum by the scientific use of demountable equipment. The best demonstration of this can be seen at Cincinnati, where 225 bodies are used with only fifteen motor truck chassis. The voluntary standing time of these trucks for fifteen trips in eight hours is only about 15 per cent of the total, an excellent showing.

A very good example of the possible saving in floor space can also be found at Cincinnati. But the demountable flat equipment holds out the greatest possibilities from the standpoint of floor space economy, because it can be arranged so that the flat—or tray, as it is often called—forms a part of the platform itself. This can be accomplished by sliding the flat direct from the motor truck chassis into a pocket in the loading platform. To go further still, the flat can be rolled to any position on the floor, and if proper capacity elevators are available, to any position on any one of all floors in a building. This, of course, can also be done with unit containers, but both classes of equipment must be designed to fit prevailing conditions.

In short, where the goods can be moved in open bodies, the flat is by far the most adaptable and economical equipment that can be used for road transport work. Reduction in weight is also a big factor to consider when these hauling problems are analyzed. The flat, or tray, with a sheet or tarpaulin covering affords ample protection to goods hauled comparatively short distances; moreover, it is possible to collect and deliver those goods at store doors in a much more efficient manner than can be done with a closed-in container or box body.

Another type of equipment which may be called detachable rather than demountable is the tractor semi-trailer, or six wheeler. This equipment, which can be used to great advantage for many motor truck haulage operations, has come into quite common use in this country within the past few years. English road transport operators are also taking up this invention with great interest, and good results—only, however, within the past two years. But as the semi-trailer is not made for transfer between railway car and road tractor, I will not go into the subject further here.

Referring to bodies and flats, I think the motor truck owners have failed to realize all of the possibilities of this kind of equipment, largely because they usually conclude that overhead cranes or tackle of some kind is necessary at loading platforms, in order to make the operation really effective. They have evidently lost sight of the fact that with properly designed equipment wherever platform and chassis are about at the same level no overhead cranes or special equipment are required. Furthermore, the bed or flat can remain on the chassis for any length of time desired but is adaptable for removal where conditions permit. And now that we have found a way to transfer a flat or body from the ground to either truck chassis or flat car on rails, with the power derived from the motor truck engine, another disadvantage has been overcome.

But going back to the unit container used for interchange between electric and steam railways, and road vehicles, we have another story. I have discussed this subject at some length with both railway and road-transport men abroad as well as in America and my conclusions are that, without radical departure from present-day practice, it is only for special classes of traffic that the unit container can be used to advantage. Every railway man knows that one of the principal difficulties of operation is the unbalanced nature of the traffic, and in these circumstances alone the universal use of containers would be costly and uneconomic. If the flow of traffic, into and out of every town in the country was equal and balanced itself, they would be in quite general use in a short time.

Where a balanced bulk load traffic in both directions can be had, unit container equipment holds out great possibilities for saving in time and labor and thus a more economical movement than is possible by conventional methods. For instance, under a properly coordinated plan, a merchant with stores in several cities might use unit containers to great advantage. But, unless the containers can be loaded in both directions, the ultimate net saving will be very little and the venture may even turn out to be unprofitable, because the cost of transporting the empty is strictly waste effort. A container of light construction such as the duralumin one mentioned is therefore highly desirable from this as well as other standpoints.

Finally, I would caution all those concerned with transportation problems not to jump to conclusions about these matters. Each case where containers and demountable bodies may be used should be carefully analyzed from every angle, because almost every case is a special one, involving perhaps complications that do not appear on the surface but that can be satisfactorily solved through close study by transportation experts.

Meeting of Management Association

THE second annual meeting of the American Management Association at the Hotel Astor, New York City, Oct. 29-30-31, which will be devoted to the problem of human relations in commerce and industry, promises to be notable both in program and in attendence. Owen D. Young of the General Electric Company, is chairman of the general convention committee, and Martin Dodge, manager of the Industrial Bureau of the Merchants' Association, is secretary.

Among the topics to be discussed in the three-day session are economics for employees, job description and man specifications, labor-saving office equipment, distributing and utilizing the product of the public schools, selection of supervisory forces, scope and management of medical departments and use of motion pictures in personnel work. At the annual dinner on Oct. 30 "Stabilizing Prosperity in America" is the topic.

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New England Street Railway Club to Meet Oct. 25

THE first of the season's meetings of the New England Street Railway Club will be held in the Swiss Room of the Copley Plaza Hotel, Boston, Mass., on Thursday, Oct. 25.

The afternoon meeting, called for 4 p.m., will be devoted to a series of fifteen-minute papers on the following subjects:

"The Lightweight Car," by J. C. Thirlwall, General Electric Company; "Air Brakes—Safety Devices as Applied to Light-Weight Cars," by E. W. Davis, Westinghouse Traction Brake Company; "Car Body Types as Applied to Light-Weight Cars," by Charles F. Johnson, the J. G. Brill Company; "Automatic Substation Equipment," by J. P. Alexander, Westinghouse Electric & Manufacturing Company; "Joints—Seam and Surface Welding," by C. H. Wood, C. N. Wood Company.

At the evening meeting a number of reports, with discussion, will be given upon vital matters developed at the A.E.R.A. convention, as follows:

"General Operation and Allied Matters," by Edward Dana, Boston Elevated Railway; "Cars and Equipment," by W. C. Bolt, Eastern Massachusetts Street Railway; "Track—New Appliances and Practice," by H. M. Steward, Boston Elevated Railway; "Safety Work," by Fred A. Cummings, Eastern Massachusetts Street Railway.

American Association News

The Association's Program for 1923-24

THE committee on subjects and meetings met at Atlantic City with Chairman J. N. Shannahan presiding, and drafted the following report, which was submitted to the incoming executive committee of the American Association at its first meeting:

The committee recommends that the association devote itself primarily during the coming year to a continuing study of the broad subject of the relation of the industry to the public on one hand and to the government on the other. To carry out these subjects the following special committees are recommended.

There has been an effort in certain quarters to depreciate the value and utility of the electric railway. A definite program of work should be pursued to offset this propaganda and to stimulate electric railway companies in the development and utilization of modern equipment and facilities and methods. To carry out this work practically, it is suggested that two committees be organized—one on city operation and the other on interurban operation. The presentations which have been made under the Charles A. Coffin Award by a group of seventeen companies are ample evidence of the progressive spirit of the industry.

Committee on Publicity

This committee should continue to co-operate with the committee of one hundred and with the special committee of manufacturers, and direct and advise the advertising section of the headquarters organization in conducting the general publicity program. Particular attention is called to the need for more public speaking by executives of member companies, both railway and manufacturers, and it is suggested that the committee promote work along these lines during the current year. One method by which this can be accomplished is through encouraging the closest possible co-operation between the headquarters organization and the various state committees on public utility information and the work which the latter are doing in securing public speakers in their local districts.

It is recommended that a special committee be appointed to study the subject of regulation as it exists in the various states, and to ascertain whether it is not feasible to prepare a general outline of the principles which should underly the regulatory laws controlling the industry in the various states. The purpose of this study is to secure if possible a greater degree of uniformity in both the control and regulation of all phases of the transportation industry, as well as to provide greater protection against unjust competition. This committee should co-operate with similar committees of the other utility associations in considering a possible uniform public utility law.

Committee on Special Taxes

This committee should be continued. The report this year set forth very clearly the elements of special taxes and other imposts levied upon electric railways. The next work of this committee should be to indicate the lines along which efforts should be directed to secure relief from such tax burdens.

It is also recommended that this committee investigate and report on the factors which electric railway companies should properly take into consideration in endeavoring to secure relief from the excess profits tax, which has been improperly placed upon companies in certain instances. This should cover a consideration of the rulings of the Income Tax Bureau regarding depreciation accounting on ways and structures and the question of entering up depreciation appropriations by electric railways under a ruling similar to that allowed in the case of national banks. It is further suggested that this committee study and report upon the general question of a taxation program for highways, particularly with reference to the correlation of taxes for this purpose with taxation of other transportation agencies. It is also suggested that this committee co-operate with the committee on national relations when any of these matters require a presentation to be made before a governmental body.

Committee on Valuation

It is recommended that this committee be continued. It should give further study to the question of the proper basis for valuations, with particular reference to the original cost basis and the reproduction cost basis. The committee should review current decisions of both courts and commissions for the purpose of following the trend, in view of the developments which are taking place in the legal interpretation of this subject.

The committee on education should be continued. It should give special consideration to the development of co-operative courses, both in electric railway operation as well as in electric railway economics with colleges, universities and technical schools. The extension departments of these institutions in many cases are in a position to conduct such courses for street railway employees. The committee should continue the work in this direction which was started by this year's committee.

It is recommended that the committee on insurance be continued and that it carry on the work of investigating the rates charged electric railway companies with a view to ascertaining whether a reduction cannot be secured. The committee may also consider such recommendations to member companies as will insure greater fire protection.

Trackless Transportation

The policy of the association with respect to the co-ordination of transportation service in each community has been well defined in the last two years. It is believed that the association may this year leave the matter in the hands of its affiliated associations with the recommendation that they study and report upon it from their respective operating standpoints.

It is recommended that a special committee be appointed to study the use of subways and elevated railways for city traffic.

It is recommended that a new committee be formed to study the elements of indeterminate franchises. It is generally believed that these have advantages over the usual fixed term franchise and all such facts should be considered in the report and recommendations of the committee.

It is recommended that a new committee on unification and co-ordination of all forms of local transportation be formed to consider the economics of transportation with respect to the needs of the community as a whole, having in mind both the electric railway and the motor bus. It should consider the economies to be effected by organizing all transportation facilities under one management.

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The News of the Industry

High-Speed Electric Line to Atlantic City Does Well

It is reported that the proposed lease of the West Jersey & Seashore Railroad by the Pennsylvania Railroad may be effected on a 5 per cent dividend basis after the declaration of a 25 per cent stock dividend. The committee representing the West Jersey's shareholders is understood to desire a 30 per cent dividend, while the Pennsylvania Railroad's representatives are of opinion that a 20 per cent stock dividend will cover the amount of earnings placed back in the property over a period of years.

The estimated property value of the West Jersey & Seashore Railroad, which operates a line from Camden to Atlantic City and Cape May, with several branches, 69 miles of which are operated electrically, is $31,000,000. Its funded debt is $7,000,000 first consolidated sinking fund 3½s and 4s, due July 1, 1936, of which $5,767,000 are outstanding, and $24,816 equipment trust obligations.

It has authorized $13,000,000 of $50 par value common stock and $104 000 special guaranteed $50 par value stock. There is outstanding $11,586,250 of the common stock and $88,400 special stock. The Pennsylvania Railroad owns $6,747,900 of the common stock and $45,350 of the special stock.

With the exception of 1906-07, when 6 per cent was paid, dividends on West Jersey common have never run higher than 5 per cent since 1896. Earnings on the issue, however, have gone as high as 11 per cent or more, the greater part of which was placed back in the property, thus enhancing the property value.

The road's earnings this year, based on reports published for the eight months ended Aug. 31, are expected to run above 12 per cent.

Republicans of New York Attack Governor Smith's Municipal Ownership Program

Formal announcement has been made through the Republican State Chairman of New York of the campaign plans to retain control of the 1924 Assembly. Theodore Roosevelt, assistant secretary of the navy; United States Senator James W. Wadsworth, Jr.; former State Senator Nathaniel A. Elsberg, and Speaker Machold will all camp on the trail of Governor Smith, who is calling upon the voters for a democratic Assembly so that his policies may be enacted. In opening in campaign for the democrats more than a week ago in Rochester the Governor assailed what he described as the policy of the Republican legislative leaders to hamstring his legislative program.

State Chairman Morris, in disclosing plans for the Republican campaign fight, assailed what he described as Tammany's efforts to seize the machinery of state government. He said:

> One would think that Governor Smith, who is supposed to know something about business, would go slow on the subject of municipal operation. The Republicans hold fast to the principle of state regulation of public utilities. The political history of the state shows that it was the Republicans long ago, under Governor Hughes, who stopped the corrupt bargaining between Tammany and the public service corporations. Tammany this year at Albany obstinately clung to its determination to have municipal ownership and operation and complete control of contract letting. With one it would supply an army of employees. With the other it would enrich its leaders.

Convention Party Returns by Motor Bus

For those who were fortunate enough to participate in it, an interesting and novel finish to the convention of the American Electric Railway Association was the trip from Atlantic City to New York City in the "Corinne," one of the six Safety Coaches exhibited by Frank R. Fageol, Oakland, Cal. This parlor car-observation coach, which is to be turned over to the Chicago, North Shore & Milwaukee Railroad on its arrival in Chicago, started from the Marlborough-Blenheim Friday, Oct. 12, with all seats taken but two. Mr. and Mrs. Fageol, who were aboard, had as their guests Mr. and Mrs. Robert B. Stearns, Boston; Mr. and Mrs. Edward Dana, Boston; Mr. and Mrs. W. E. Jones, Providence; Mr. and Mrs. S. H. Anderson, Los Angeles; Mrs. M. A. Philo, New York City; Mr. Claus Spreckels, Coronado; M. McCants, San Francisco; R. C. Smith, Los Angeles; J. H. Handlon, San Francisco; J. M. Yount, San Francisco; V. E. Keenan, Providence; Douglas W. Dodge, San Francisco; J. B. Daly, New York.

A stop was made at Biggett's—somewhere in New Jersey—for luncheon, and while it was being prepared Claus Spreckels was persuaded to play the piano and sing a few operatic selections. There was also dancing, at which J. H. Handlon proved to be a near rival of Nijinsky, and J. M. Yount at least an understudy for Maurice.

As the "Corinne" neared New York wagers were made on the miles traveled, on length of time it would take from the ferry to the Commodore, on the exact minute the coach would draw up in front of the hotel and come to a stop and on several other risks. Altogether it was a thoroughly delightful trip.

High-Speed Operation Out of Boston

A rapid transit line approximately 8 miles long from Harvard Square to Peabody Square, Dorchester, is assured by the decision of the trustees of the Boston Elevated Railway to revise plans for the absorption of the Shawmut branch and its incorporation in the Elevated system and run Dorchester Tunnel trains to Ashmont.

The Legislative act, authorizing the city of Boston to buy the Shawmut branch and lease it to the Boston Elevated Railway made no specific provision for service beyond Welles Avenue, save to decree that the Elevated must guarantee adequate service for the people of Milton. Originally, the Elevated had merely announced extension of the Dorchester Tunnel train service from Andrews Square to Fields Corner, with single-car service to Milton.

The Legislature, however, left the Boston Elevated Railway wide latitude in working out plans for service beyond Fields Corner, and the trustees have decided that for reasonable expenditure the rapid transit service can be extended to Peabody Square. Mayor Curley has urged that this be done.

The plans of the Elevated call for the depression of the Shawmut branch roadbed to eliminate five grade crossings. Elevated trains will run over the right-of-way of the Boston Division of the New Haven Road, paralleling the railroad tracks, beyond Andrew Square where the Shawmut branch begins.

Plan to Utilize Railroad as Part of City System Impracticable

The Committee of One Hundred has been told by George Le Boutillier, now president of the Long Island Railroad, that its program for improved transit service within the city limits of New York would cost about $250,000,000 and that it is impracticable in other respects. The committee has been working with the members of the Transit Committee of the Brooklyn Chamber of Commerce. Mr. Le Boutillier says that entirely aside from the economic impracticability of any such intracity development as is proposed, and the impossibility of securing charter and franchise rights, it would be futile for the Long Island Railroad to attempt to transform its railroad into a combination of a city rapid transit system and a non-rapid transit system, caring for suburban and long-distance passengers and the transportation of freight. The two kinds of business are fundamentally different. The facilities to serve them cannot be combined.

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Boston "L" Wages Advanced Nine Cents

Arbitration Board Award Retroactive to July 1 Will Cost Company $2,000,000 a Year—Request for Shorter Work Day on Sunday and Holidays Denied

An increase of 9 cents an hour over the present wages has been awarded to trainmen of the Boston Elevated Railway. This is the decision of the board of arbitration handed down on Oct. 15. The opinion of the board is that the circumstances justify a return to the rate fixed by the Doherty award of 1920. In consequence the maximum rate fixed for motormen and conductors of two-men surface cars is 70 cents an hour for an eight-hour day.

As for the differential above the rate of wages awarded to motormen and conductors of surface lines to be paid to operators of one-man cars and buses, the board has decided that it shall remain at the present rate of 8 cents an hour. On the request for a shorter work day on Sundays and holidays, the board has answered in the negative. The belief is expressed, however, that this matter should be the subject of further negotiations between the company and the men for the purpose of seeing if the desired object cannot be accomplished by the men making some concession and assuming at least a part of the burden. The board says it became evident at the hearing that the management of the road was in sympathy with the desire of the men for a shorter work-day on Sunday, but was prevented from granting it only because of the great expense it would throw upon the company.

The award is retroactive to July 1, 1923, and continues in force until July 1, 1924. The back pay is to be paid by the company by Dec. 15. Any questions that arise between the parties as to the meaning of any of the provisions of the award are to be referred to the board for determination. The rates established by the award are carried out through all the grades and classes of employment.

Still Greater Co-operation Necessary

Edward Dana, general manager of the Elevated, made the following statement concerning the award:

> The arbitration award means an increase in operating costs on the basis of present service and operating conditions in the vicinity of $2,000,000 annually.
>
> The estimated balance above the cost of service for the year ended June 30, 1924, amounted to $1,278,000 on the basis of existing wage rates, which amount would have been available for repayment to cities and towns.
>
> The award therefore means that, if present conditions are continued, such a repayment is prevented and the excess of several hundred thousand dollars must be met.
>
> This calls for large efforts, but the trustees will face the coming year in the belief that the members of the organization benefited by the award will do all in their power through increased efficiency and co-operation to meet the conditions imposed, and that by united efforts of men and management it may be possible to do so.

Although the arbitration agreement submitted five questions for decision, it became unnecessary to consider the fourth and fifth, and the first three only are dealt with in the report.

The first question was: "What rates of wages shall be paid to all of the employees of the company who are members of the Association?"

The parties agreed that in dealing with this question, the arbitrators needed only to determine the maximum basic wage to be paid to motormen and conductors of the two-men surface cars; and that when this was determined in the form of cents per hour, the parties themselves would be able, according to a rule of percentage or addition which they have adopted, to determine all the other rates of wages involved in the arbitration. The board adopted this suggestion.

Men Asked Thirty-Cent Increase

The maximum basic wage of motormen and conductors of two-men surface cars has been 61 cents an hour, for an eight-hour work day. This is not the highest rate the company has ever paid. From May 1, 1920, to June 30, 1921, the rate fixed by a majority of a board of arbitrators of which the late James L. Doherty was chairman, was 70 cents an hour. It was gradually reduced to the present rate by voluntary agreement between the company and union.

The men asked that this wage be increased 30 cents, or to a total of 91 cents an hour. In support of their claim they urged that the present trend of wages throughout the country was upward; that costs of living which fell off during the period of business depression were again advancing; that reasonable standards of living for laboring men were higher than they have ever been before; that the maintenance of this higher standard was wise as well as just; that they asked no more than others were receiving in comparable employments; and that the outlook for improved financial conditions justified their demand for more generous treatment.

The company, on the other hand, denied that the increase demanded by the men was reasonable or practicable. In support of its contention, the company urged that wages had more than kept pace with the increased cost of living; that the reductions of wages since 1920 had been proportionately much less than the falling off in living cost; that in many comparable occupations the wages paid were lower than these men are now receiving; that little dependence was to be put on theoretical budgets prepared to show cost of living; and that any large increase in the present wages would tend to throw an unfair burden upon those who ride on the cars and upon tax payers who, under the present law, must make up any deficit that results from the operation of the road.

The board said that both views were urged with great force and skill by the arbitrators who represented the company and the men, and there was so much of truth in each contention, that it was no easy task to find their proper resultant. The board said:

> It would probably be unfortunate for all concerned if we adopted a standard of wages that would necessitate an increase of fares beyond the present 10-cent rate. It is not believed that the increase granted in this award will have that result. On the other hand, there seems to be little justice in demanding an immediate return to old prices for transportation when every other product of human industry has increased in price. It seems clear also that the fixing of wages on a fair and somewhat permanent basis ought to precede, rather than follow, reductions in fares, in order that all the elements of the problem may be known when reductions are under consideration.
>
> One would be blind to the obvious tendencies of recent times, if he did not observe the marked disposition to treat labor with greater liberality. Labor is no longer regarded as a mere commodity, to be bought at the lowest competitive price. The old idea of an irrepressible conflict between labor and capital is losing its prestige, and giving way to more enlightened thought. It is to be hoped that the earnest study of economists may ultimately provide us with a rule that will settle all difficulties. Today every step that promotes harmony rather than discord, that encourages co-operation, that substitutes arbitration for the strike, ought to be met in a liberal spirit. Especially is this so when the employer is a public or quasi-public body.
>
> We wish to make it clear that the decision we have reached is not governed by any rule that requires a wage adjustment to meet a mere increase in the cost of living. In the opinion of a majority of the board such a rule would not justify the increase granted. It would be a misinterpretation of this decision, to attempt hereafter to say that the scale should move up or down according as the percentage of living cost should rise or fall. We have taken into consideration not merely the *cost*, but also the *standard* of living.
>
> The things that have had especial weight in this decision are (1) the scales of wages now paid by public bodies in comparable employments, such, for example, as police and fire departments, (2) the wages paid in comparable private occupations, particularly the building trades, (3) the most reliable studies of family budgets regarded by economists as tending to fix what is known as the American Standard of Living, and (4) the wages fixed for certain street railways in two of the largest cities in the country, Chicago and New York.

The chairman was of the opinion that in those cases where the operator must collect the fares, make change and issue transfers, the present differential of 8 cents an hour was inadequate; but both sides agreed that it would not be practicable to have two separate rates for one-man cars. It was testified that at the present time about 25 per cent of the runs was made by one-man cars, but in 80 per cent of the one-man car traffic, collection of fares on the car was not required. In view principally of the fact that the one-man car operator was given, in common with other car men, the increase of 9 cents an hour granted by the award, it did not seem to the board that it would be justified in raising the differential as to all the operators of one-man cars on the line.

Charles W. Mulcahy, for the company, joined in signing the award as he agreed with the decision of the second and third questions submitted to the board, namely, the differential to be paid to operators of one-man cars and the hours of labor on Sundays and holidays, but he dissented from the decision of the first question granting the increase in rates of wages.

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Want Service-at-Cost Amended in Toledo

Initial steps toward amending the Milner service-at-cost plan of electric railway operation at Toledo have been taken by the City Council. At a recent meeting a motion appointing a committee to confer with the city law director and the Doherty interests was passed. Councilman Emch, who fathered the idea, said the principal point to be considered was the increase in depreciation fund from 1½ per cent maximum limit to 5 or 5½ per cent of the invested capital, as suggested by Commissioner W. E. Cann. Mr. Emch would also establish a surplus fund from which minor improvements and additions could be financed instead of by means of additional 8 per cent preferred stock.

At the present time the depreciation fund is one in name only, setting up merely enough to cover a few changes, track removals, and such work. Maintenance funds are more elastic and cover a portion of the field usually allotted to depreciation.

It is doubtful whether much can be done to change the ordinance as the original intention of the business men who framed it was to provide for new capital through the issuance of preferred stock and not make a direct charge upon the car riders.

Texas Interurban Restrained Permanently

The Texas Interurban Company of Dallas has lost its fight in court against an injunction restraining the company from constructing tracks on Fairmount Avenue over which the connection with the Missouri, Kansas & Texas Railway is to be electrified between Dallas and Denton. A temporary injunction against the company, preventing it from laying tracks on Fairmount Avenue, was granted by Judge Louis Wilson several months ago, after the city of Dallas had granted a franchise authorizing the company to build the line on Fairmount Avenue.

The recent hearing before Judge Wilson was on a motion by the Texas Interurban Company, which will build the electrified Katy line to Denton, for dissolution of the temporary injunction. Judge Wilson declined to dissolve the injunction, but issued an order making it permanent. The interurban company gave notice of appeal, and in the meantime all work on the project of electrifying the Katy is being delayed pending final settlement of this controversy.

Since it appears probable that the interurban company will be permanently enjoined from building its line on Fairmount Avenue, it may be necessary to select some other route for the Denton interurban cars to enter the city. In this connection, W. M. Whitenton, in charge of operations of the Missouri, Kansas & Texas in Texas, announces that it would be agreeable for the interurban company to use the tracks of the Katy into the city. Although the newly proposed line of entry may not be regarded as favorably as the Fairmount Avenue, because it would not serve a district of the city now without street car facilities, this entry into the city could be made with far less expenditure than the proposed Fairmount Avenue line.

Working Out Details for Elimination of Grade Crossings in Los Angeles

In view of the many grade crossing accidents in Los Angeles County during the past eighteen months committees recently appointed by the California Railroad Commission, county engineers and engineers from city governments, together with officials and engineers of steam and electric railroads, have met to evolve plans for the separation and elimination of grade crossings in Los Angeles city and county.

It was found that cost of elimination would be from $25,000 to $250,000, but in a majority of cases the general average would be approximately $50,000 per grade crossing. It was pointed out that to the rapid real estate development in southern California there is attributed much of the evil of the grade crossing, whereas the Pacific Electric representatives cited figures to show at present the interurban company has 1,200 grade crossings with highways on its lines.

It is viewed that the cost of eliminating the grade crossings and the proportion thereof is to be borne by the railway companies, the state, the county of Los Angeles, the city of Los Angeles or the interested property owner involved. Methods of financing the cost of the proposed improvements are to to considered. The lessening of the cost of maintaining the crossing, the element of time saved by the railroads and the saving of outlay for damages, together with numerous other factors, would be used in determining the amount the railway companies should pay for the improvements. In the event there is a deadlock in determining the method of allocating the grade crossing elimination expense, it is left with the State Railroad Commission, as the governing body, to establish an equitable manner for proportioning the expense among all involved.

In order to determine the most dangerous grade crossings that should be eliminated each steam and electric line operating in Los Angeles County was requested to furnish a list of grade crossings that it maintains in the county, suggesting the five grade crossings which, in its judgment, are the most hazardous to the company itself and to vehicular traffic.

On Aug. 31 the full committee met and reviewed the list of twenty-three of the most dangerous grade crossings in Los Angeles and vicinity, specified by five railroads, whereby immediate steps are to be taken toward the elimination of ten of these.

South Jacksonville Knew What It Wanted, Then Went After It

The residents of South Jacksonville, Fla., have had the following puzzle to solve: "If a city is too small to support a street car company, and if it cannot grow unless it has the street cars, how can it get them?" The answer, as they see it, is to sell $100,000 of city bonds, buy four cars, have an experienced construction firm lay the tracks, and arrange for the company in the adjoining city to operate the cars economically.

South Jacksonville, just across the St. Johns River from Jacksonville, has 5,000 inhabitants, lots of ambition and a new county bridge across the river to its big sister city. When the bridge was built car tracks were included, in the hope that some day they would be used, but a study by E. J. Triay, receiver of the Jacksonville Traction Company, proved that an extension of track and service into South Jacksonville would at first be a money-losing proposition.

So the business men and officials got to work, sold $100,000 of municipal bonds voted for the purpose and were ready to buy what they needed—a street car system which they expect will bring profit to them and their city through increased population, higher property values and greater general activity.

An unusual feature of the plan is that although the new line will be municipally owned it will not be municipally built or operated. The construction contract has been placed with Stone & Webster, Inc., of Boston, and another contract has been signed with E. J. Triay, receiver of the Jacksonville Traction Company, to operate the cars and charge the city on a mileage basis. The negotiations to this end were referred to in the ELECTRIC RAILWAY JOURNAL for May 19, page 859.

Wages Advanced.—The Quincy Street Railway recently announced a pay increase effective Oct. 1. Under the plan new conductors and motormen will receive an increase of from 37½ cents to 40 cents an hour. Old conductors and motormen, with three years' service and over, a short time ago received a raise of from 42½ cents to 45 cents.

Will Seek Paving Relief.—The Legislature of Iowa will be asked to eliminate the paving tax on electric railway lines and to provide that the cost of paving fall on the property owners abutting or that it be paid out of a general fund, according to information from Davenport. This bill will be backed by all the street car companies in Iowa and will also have the backing of the general utility interests. The street car operators claim that the paving tax is now one of the big burdens which is steadily tending to break their financial backs. In Davenport, for instance, the Tri-City Railway claims that of every 8 cents which it receives in fares 1 cent must go to pay for paving or for the interest on depreciation of paving.

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New Location for McGraw-Hill Company of California

The offices of the McGraw-Hill Company of California in San Francisco will be moved on Nov. 1 to a new location in the Mohr Building, 883 Mission Street.

Competitive Five-Cent Fare a Failure

Uzal H. McCarter, a director of the Public Service Corporation of New Jersey, in a speech made on Oct. 16 said the 5-cent fare being charged for an experimental period on the local lines of the railway in the principal communities is a flat failure. He said the 5-cent fare with the railway and jitney service co-ordinated is the proper rate and would solve the transportation problem. Service has been fully restored by the railway since the strike, but the loss to the railway represented by the falling off in patronage over the pre-strike period is $10,000 a day. Mr. McCarter charges the present transportation difficulties to the failure of the city and state officials to enforce the laws regarding the operation of buses. He was afraid that the efforts at enforcement now being made would take too long to carry out.

John L. O'Toole, vice-president, speaking for the railway, said that the company was not ready to make public the figures regarding the new fare, which has been in force only since Oct. 1.

Commission Given New Power. — Governor Brandon of Alabama, recently approved a bill giving authority over utilities engaged in interstate commerce to the Alabama Public Service Commission. The commission had previously had jurisdiction only over utilities engaged in intrastate commerce.

Japanese Studying Transit Conditions.—Mitsuru Ishii, chief secretary, Municipal Electric Bureau of Tokyo, and K. Murakoshi, assistant secretary of the Japanese Government Railways, are studying the transit conditions in various cities throughout the United States and are looking into the field of motor transportation.

Votes Against Extension.—The public utilities committee of the Board of Supervisors of San Francisco recently voted down a resolution to prepare plans and specifications for the construction of a proposed extension of the Municipal Railways from Cole and Carl to the beach. A number of residents of the Sunset district were on hand to request the building of the new line.

Offices Moved.—The general offices of the receiver of the Long Island & Queens County Railways have been removed from 7-9 Borden Avenue, Long Island City, to 36 Twenty-fifth Street, Jackson Heights, Long Island. The offices of the New York & Queens County Railway also do the accounting and auditing of the Long Island Electric Railway and the New York & Long Island Traction Company.

Colonel Perkins Elected Officer of Veterans Body.—Col. Albert T. Perkins, manager of the United Railways Company, St. Louis, was elected junior vice-commander of the Military Order of the World War Veterans at the annual convention held in Washington, D. C., recently. During the war Colonel Perkins served as director of light combat railways for the army in the San Mihiel sector.

"Partners" Expands. — "Partners" now carries the monogram of the Texas Interurban Railway at its head, along with that of the Dallas Railway. Effective with the Sept. 20 issue, the Texas Interurban Company became associated with the Dallas property in the publication of this pamphlet. The editor of "Partners" is anxious to get news from the Interurban and has asked that the dispatchers serve as editors for this department.

Agree on Joint Arbitration.—Track employees of the Chicago Surface Lines returned to work on Oct. 8 after being on strike since Sept. 12. The men had insisted that the company agree to arbitrate with limitations which would have compared them with building laborers instead of track laborers. They finally agreed to the company's terms, namely, to go into the joint arbitration with the other unions without any limitations. The arbitration proceedings will start on Oct. 22 covering the various trades working in the shops and wreck wagons as well as the track men. About 1,200 track laborers were involved in the strike, which did not affect the company's service.

Company Wins Niles Fight.—Judge Cole sitting in Warren on Oct. 3 made permanent the temporary injunction restraining the city of Niles from further removing the tracks and held the Pennsylvania-Ohio had authority to relay the rails torn up at Cherry Street and at the switch in Robbins Avenue. In less than twelve hours after the decision had been given track gangs had repaired the tracks and through service was being given. In rendering the decision Judge Cole recommended that both parties take their fight before the Public Utilities Commission. The controversy between the city of Niles and the Pennsylvania-Ohio Electric Company began several months ago when the company refused to pay for repaving of Robbins Avenue, which according to the Niles officials it had contracted to do.

"Transportation News" Makes Début. —In order that employees of the New York State Railways may become better acquainted with one another and that each may know what the other is doing, the company has started the publication of "Transportation News." The first issue, under date of August, 1923, has been dedicated as a token of respect and esteem to James F. Hamilton, president. Hereafter the book will appear every month. In the first issue, Mr. Hamilton, in introducing the publication, says that he hopes in the pages answers will be found to questions that have been in the employees' minds, and that they will find subjects of interest in the magazine. The editor of the paper is A. W. Koehler, who is the director of safety of the New York State Railways.

Car Problem Subject of the Hour.—Interest is keen throughout Anderson, S. C., looking toward a solution of the car problem in that city. President Sullivan of the Chamber of Commerce has named a committee to discuss the car situation with the City Council. Manager H. A. Orr of the Southern Public Utilities Company, which operates the electric railway system in Anderson, was recently in receipt of a letter from James N. Pearman, a member of the South Carolina Railroad Commission, in which Mr. Pearman commended the manager of the company for taking up the matter with the citizens. He also expressed the hope that some arrangement could be made which would continue the service for the people of the city.

Has Adopted Bonus Plan.—The quarterly bonus plan which has been in operation for the past two years by the Wisconsin Public Service Corporation, Green Bay, has been adopted by the Menominee & Marinette Light & Traction Company. The plan to institute this policy in Marinette was made following the return of Green Bay trainmen who attended the safety meetings. The Green Bay bonus plan, which has attracted state-wide as well as nation-wide attention, is a constructive effort to secure "safety, courtesy and service" for the traveling public. Mother's Day is celebrated as "Dress Up Day" in Green Bay and theoretically the quarterly bonus, the additional individual bonus for D credits and the annual bonus permit each employee to purchase a new uniform for the amount that he can save through the regular daily practice of safety, courtesy and service to the street car riding public.

Reports on Santa Fé Electrification. —A survey of hydro-electric possibilities on the Colorado River has recently been undertaken and completed by engineers of the Santa Fé System. The study was made with a view of determining whether it is feasible to electrify the trans-continental lines in that section of the desert country on the Pacific Coast as traversed by the Santa Fé System. These facts were brought out recently in an address by W. B. Storey, president of the Santa Fé Lines, before the Chamber of Commerce at Pasadena. Mr. Storey said that the officials of the Santa Fé had been following the progress of the Chicago, Milwaukee & St. Paul Railroad in electrification of its northern lines with perhaps more interest than any other road. He stated that his company had limited resources for hydro-electric power, which meant cheap power, but that his engineers had completed a survey of the possibilities in that direction on the Colorado River, and while there were no definite plans at this moment concerning electrification, the question might come up in the near future.

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Foreign News

Increased Fares May Continue in Britain

There are in existence two post-war emergency acts of Parliament permitting tramway undertakings in Great Britain to charge higher fares than the previous statutory maximum of a penny a mile. These are the statutory undertakings (temporary increase of charges) act, 1918, and the tramways (temporary increase of charges) act, 1920, and they expire on Dec. 31, 1924. The Ministry of Transport has, however, intimated that it is the intention of the government to include the former act so far as it relates to tramways and also the latter act in that schedule of the expiring laws continuance bill of 1924. This will have the effect of continuing the operation of the two acts for another year. When the time comes, should the course appear desirable, the government will be prepared favorably to consider the inclusion of the two acts also in the expiring laws continuance bill of 1925.

Tramcar vs. Bus in England

H. Mattison, general maanger of the Manchester Corporation Tramways, has presented to the tramways committee of the city a long report on the respective merits of the tramcar, the petrol bus and the trackless trolley bus, more especially in the conditions prevailing in large cities. The conclusions at which he arrives are to the following effect:

1. The motor bus is the best and most economical vehicle for any service not requiring a greater frequency than four vehicles per hour, operating on the basis of fares of three quarters of a mile for 1d.

2. The trackless trolley bus is the most economical for services of from four to six vehicles per hour, carrying seventeen passengers per mile at a fare of 1d. per mile and operating sixteen hours per day.

3. The tramcar is undoubtedly the most generally satisfactory vehicle for services of six or more cars per hour and when it can operate for eighteen hours per day, carrying an average load of twenty-five passengers per mile, and at fares based on 1 mile for 1d.

The tramways committee, after considering the report, stated that it was satisfied that the policy hitherto pursued had been fully vindicated. That policy has been to develop to the fullest extent the tramway system of the city and surrounding districts and to utilize the motor bus as a feeder to the tramways. Terminals already established will reduce the tramway traffic in the central area. In the opinion of the committee the motor bus cannot be considered either as a practical or financial substitute for the tramcar for passenger transportation either for the city and districts or for the central area only.

The City Council has approved these reports.

Accidents in London Streets

A return issued by the London Metropolitan Police shows that during the three months April, May and June of this year no fewer than 171 persons were killed in street accidents in London, and the total number of accidents was 18,028. The following table shows the details in regard to each kind of vehicle concerned:

Type of Vehicle	Persons Killed	Accidents
Mechanically propelled:		
Omnibuses	18	1,391
Tramcars	6	1,086
Cabs	5	1,001
Private motor cars	51	4,445
Motorcycles	13	1,638
Trade and commercial	60	3,391
Traction engines	...	10
Horse drawn:		
Omnibuses	...	1
Cabs	...	15
Broughams	...	66
Trade and commercial	10	2,159
Pedal cycles	7	2,784
Horses ridden or lead	1	41
Totals	171	18,028

Style in Station Buildings

The London Electric Railway is doing everything possible in connection with its rural extension line now under construction from Golden's Green to Edgware not only to secure efficiency but to minister to the comfort and the taste of the public. In the latter direction an example is found in Brent Station, the first one on the extension, which is approaching completion. It is designed in Georgian style and will harmonize well with its rural surroundings. Approached by a broad macadam forecourt, the station consists primarily of a booking hall 50 ft. square, entrance being effected through a Portland stone portico formed of coupled Doric columns. A touch of color will be given by the use of sand-faced bricks of varying tones of red and purple which will contrast pleasantly with the white stone of the portico. The roof is covered with Italian tiles and has wide projecting eaves. The booking hall floor is covered with large black and white non-slip tiles, and the walls are also tiled out in panels to provide neat spaces for advertisements, thus preventing the disfigurement of the station by the haphazard posting of bills.

The platforms being about 15 ft. above the level of the roadway, the trains are approached from the station through a short subway under the viaduct and then up a flight of stairs on to the platforms.

The booking hall will be equipped with three of the latest pattern passimeter booking booths constructed in oak and harmonizing with the booking hall.

Consolidated Paris Surface Car Lines Are Improving Their Facilities

What is known as the "Transports in Common of the Paris District" has combined all surface lines of passenger transport and the flyboats on the Seine between the stations above Paris to those just below the fortifications. The last two privately owned surface lines to be absorbed are the Bois de Boulogne Railway and the Paris-Arpajon Suburban Railway. In conformity with a decree of July 8, 1922, and another of Nov. 20, 1922, this brings all passenger transport within the Paris limits and that of the Department of the Seine under one general control.

By an intensive utilization of rolling stock the traffic has developed considerably during the past fiscal year. Passengers carried were 917,723,233, an increase of 5.1 per cent as compared with 1921 and receipts were superior to the extent of 10.8 per cent, reaching the figure of 297,128,574 francs.

Operating expenses are being reduced where possible by an increased car-kilometrage and the best possible utilization of the traveling personnel, which is not to say that wages are likely to be reduced or the force reduced in numbers, simply a more efficient application of man and car power being called for.

During the past year car lines starting from central points in Paris have been greatly modified as to their itineraries and in many cases prolonged to the fortifications and in some cases beyond, whereas formerly they stopped at the octroi barriers. Upkeep and construction have kept pace with the new demands, under control of government inspectors. A new program of amelioration and extension is in progress which will call for the expenditure of 367,000,000 francs, of which 100,000,000 francs is already engaged.

Track has been put into good condition over 147 km. of trolley overhead lines and there have been laid 3.4 km. of track with underground electrical contact with 13 km. of new overhead trolley constructed.

During the past year there were built forty-one motor cars, 100 trailers, sixty-two motor buses of four wheels and fifty auto buses of six wheels. A new and lighter electric motor has been adopted which permits an economy of electrical energy and 250 cars of this type have been ordered.

The flyboats on the Seine, which were taken over during the war from a company which had been in existence many years, number thirty-four as having been reconditioned, with eight others ultimately to be put in service. These flyboats serve twenty-eight pontoons or wharves and fifteen others are to be added as circumstances permit.

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Berlin Recasts Its Municipally-Owned Railways

When a city of two and one-quarter million population actually shuts down its municipally owned street railways, as Berlin did for a short time last month, because no possible rate of fare makes the business pay, the American operator is entitled to a more convincing explanation than the easy hypothesis that politics must be at the bottom of it all. The real politics in the case is the downfall and practical annihilation of the German mark. There was some overstaffing of the municipalized street railway following the war because of unemployment among veterans, but more fundamental causes were the uneconomical rolling stock, the competition of the government railways in fares and of the direct-routed subways in service, and, worst of all, the wasteful routing taken over from the original private operators.

In seeking a remedy, the suggestion was made to follow other German systems by bringing private capital and management into partnership. It does not seem, however, that the coal and iron millionaires (gold, not paper marks) are anxious to fill a bottomless pit. What the city system did, therefore, in making its snap suspension of service on Sept. 7, was to place the affairs of the railway in the hands of a limited company or board of trustees composed of eleven city officials and one expert adviser. This board was given the authority to take the most drastic measures necessary. What has it done?

The board has no money for modern rolling stock and train operation of sufficient capacity to make the item of platform expense approach the more efficient ratio of the steam and electric rapid transit lines. The latest motor car seats only twenty-three passengers! It has, however, extended the use of one-man cars to at least nine light-traffic routes and no doubt will go further. Far more important than this has been a plan which is not so much a rerouting as an actual recasting of the entire system. One way of judging its thoroughness is to state that the first act of the trustees was to discharge the force of 11,000 men on two weeks' notice and to rehire only 4,000. Most of the others have been placed elsewhere by the city. The working day was lengthened by one and one-half hours and payment was based on platform time, with no allowance for waits between swings. The next step was to cut down to 100,000 car-km. (62,500 car-miles) a day to care for a traffic of 750,000 passengers a day on the basis of fifteen-minute normal and seven and one-half-minute rush-hour headways. This means that the railway expects only 275,000,000 riders a year, which is but one-half of pre-war times, not to mention the maximum of 900,000,000 riders in 1918-1919. Until the last year or so, the surface railways carried about one-half of the total traffic, so the significance of this fall can be appreciated.

In explaining the rerouting—the most important question of all—it is necessary to go back to the policy of the predecessor private company. Berlin was one of the few large cities in Europe built upon an American flat fare basis. But unlike American systems, the Berlin management was determined by all means to avoid the transfer. To make good its boast that a single fare would take the rider without a change of cars to any part of town (except in some western suburbs), the company had to adopt routings which became more and more circuitous as the city expanded. Aside from this, it was practically Gospel that every route must traverse the congested center.

Thus there came about a fearful and wonderful array of overlapping, roundabout and partially duplicating routes. The earlier efforts of the municipal railway, as the after-war pressure began to hurt, were confined to cuts in service and abandonment of the poorest lines. The present scheme is entirely different. All the available track was envisaged as a whole and then thirty-one routes were laid out on the entirely new basis of carrying the rider the shortest possible way to his destination whether he requires one car or two. Thus it has come to pass that the most important fare in Berlin is now the fare receipt providing for a one-time transfer privilege. On Sept. 11 the price of this fare with transfer was a mere 400,000 marks, while the single fare cost 350,000 marks. In other figures, the transfer costs some 15 per cent extra. The abandonment of weekly cards and other prepaid transportation will be understood when it is mentioned that no longer ago than November, 1922, the Berlin single fare was 30 marks and the fare with transfer 45 marks. Truly, it is an amazing and pathetic situation.

Electrification of Austrian Railways

There were 256 km. of the Austrian Railways already electrified and in operation on Aug. 1, 1923; 217 km. were being electrified, and it was proposed to electrify 408 additional kilometers. Approximately 17 per cent of the present total railway mileage of Austria is either electrified, under course of electrification or proposed to be electrified. In all it totals 881 km.

"Safety-First Mirrors"

Twenty Metropolitan Electric Tramway Company (London) cars have been experimentally fitted with mirrors to enable alighting passengers to see any vehicle which may be coming up behind them. In alighting, passengers have their backs to oncoming traffic, and these mirrors should therefore be of considerable assistance in minimizing the dangers of the road. If the experiment proves successful, all cars will be similarly equipped.

French Feeder Lines Being Electrified

Suburban traffic of railroads as it is known in the United States is practically non-existent in France. The same is true of interurban surface lines to a great extent. The electrification plans which were started in France a couple of years ago have not yet come into being with respect to the main line railways and only on the Orleans line out of Paris and on the State railway to Versailles is there anything which suggests that France is thinking about electrification.

The Paris, Lyons & Mediterranean Railway and the Midi Railway are in the forefront of electrification schemes. The former has just applied for a concession for establishing a hydro-electric power plant which shall furnish power for the mid-France line 100 km. in length, running through a mountainous country from Langogne to Alais.

More nearly completed is its international section from Culoz to Modane on the Italian frontier, which is the first to be operated by electricity, the company being assured the necessary power by arrangement with the Société d'Electro Chimie, d'Electro Metallurgie et des Aciéries Electriques d'Ugine in the high Alps. Primarily the latter company was an outgrowth of an electric steel plant which by the foresight of its directors anticipated the future possibilities of electric power generated by the water power of the Alps, and today sees the reward of its enterprise by being able to sell its unlimited current to one of the most important and the lengthiest of railways being operated in France.

The same company is laying out the system which shall ultimately furnish the current for the branch lines from Carnoules to Grasse, Cannes, Nice and Vintimille on the French Riviera, a district which one would think, because of the very nature of its traffic, would be the first to be electrified. A beginning has been made, but since it has all come into being since the war, at a period when French public and private finance has been at the lowest ebb ever known, it is perhaps not surprising that more has not been accomplished. Speeding up the installation will bring about immense economies, and if the $40,000,000 which was recently borrowed in the United States be so invested, there is no question but that return on the capital will be more earned.

Another project of this company is the building of an electric line between Avignon and Les Arcs on the main line to Vintimille and the Italian frontier, saving thus some eighty-odd kilometers over the present route. It is bound to come, but since it leaves Marseilles off to one side, 50 miles distant, powerful local interests there are against the project. Such is tradition in France, often a damper, always a hamper, against the adoption of something which in the long run will pay dividends above what might be foreseen by the most optimistic.

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Financial and Corporate

Reorganization Planned

$48,000,000 Cut in Capital Liabilities of New York Railways — Charges and Rentals Cut $1,720,000

A committee appointed by Judge Mayer of United States Circuit Court at New York has presented a tentative plan for the reorganization of the New York Railways. The proposal as made by the committee contemplates the discharge of the receiver by Jan. 1, 1924, reorganization as a system of properties now operated by the receiver, and formation of a new company to acquire through foreclosure all assets and operating properties of the New York Railways, operating 71 miles of surface lines, mostly in Manhattan Borough. The new company will pay for the properties acquired by the issue of new securities directly to holders of the several issues of bonds of New York Railways, and its predecessor companies, and to creditors of New York Railways in exchange for their bonds and claims. The court has ordered the committee to hold hearings during the week of Oct. 22 and to report back during the week of Oct. 29.

It seemed plain to the committee that the reorganization must provide:

1. For a great decrease in fixed charges.
2. For a great decrease of the total capitalization.
3. For the elimination of all interest of the present stockholders of the company.

Proceeding on this basis the committee for one thing would wipe out entirely the $17,495,060 of stock previously oustanding. It is proposed that the company's fixed charges be reduced by approximately $720,000, the annual contingent charges by $650,000, and the fixed rentals previously paid by the New York Railways upon leased lines by $350,000. Beyond the cost of operation there will be practically no fixed charges remaining, except the interest to be paid upon a limited amount of underlying bonds that have never been defaulted, and the charges to be paid upon the new capital of $5,000,000. Returns upon all other security issues in the very much reduced list are to be paid only out of the actual earnings from year to year.

In short, the basic principles recommended by the committee are:

1. The system now operated by the New York Railways should be reorganized substantially as a system as now operated but with greatly reduced capitalization and annual charges.
2. No bonds bearing a fixed annual interest charge whatsoever should be issued by the new company, except for new cash actually contributed to the new company.
3. The only bonds to be left undisturbed should be those of leased lines on which no default has been made and on which the interest has been apparently earned during the receivership.
4. Other obligations now in default and now bearing a fixed charge should be replaced by income bonds on which no income will be payable unless actually earned.
5. These income bonds should be offered to the various units composing the system, but limited to the amount of the earnings actually shown to be contributed under present conditions to the system by these various units.
6. Various units which do not receive the principal or par amount of their present obligations in income bonds because the earnings are insufficient should receive the balance due to them in preferred stock of no par value, but no unit should receive more than the principal or par amount of its present existing obligations.
7. No new securities should be issued for arrears of interest or rent which has not actually been earned during the receivership.
8. The existing capital stock of $17,500,000 par value should be eliminated in the reorganization.

The result is a large reduction in fixed charges and capitalization:

Thus the fixed charge bonds are reduced by	$18,000,000
Income bonds are reduced by	13,000,000
Total reduction in obligations	$31,000,000
The fixed charges are reduced by	720,000
The annual contingent charges are reduced by	650,000
Fixed rentals are eliminated by	350,000

COMMON STOCK FOR CASH CONTRIBUTORS

The first mortgage 5 per cent bonds of the Broadway Surface Railroad of 1924 in principal amount of $1,500,000, and $350,000 South Ferry Railroad first 5s of 1919 are to remain undisturbed but are to be offered the right of conversion into an equal face amount of Broadway Consolidated mortgage bonds. The plan provides that $250,000 Central Crosstown Railroad first 6s of 1922 are to be extended but not otherwise disturbed.

To furnish adequate working capital for the company the plan recommends the use of $5,000,000 prior lien bonds to be issued in reorganization. The cash required must come from the liquidation of non-operative assets which go chiefly to holders of New York Railways first and refunding bonds unless arrangements are made for obtaining additional capital from other sources. The persons contributing the cash, according to the plan, will receive all common stock of new company, together with new prior lien bonds, at such prices as may be determined against cash advanced.

In the interest of closer co-operation of the company and the public, it is proposed that the board of directors shall contain representation of the public named by public authority.

In a statement which he issued commenting on the plan George McAneny, chairman of the New York Transit Commission, said:

> Great credit must be given Judge Mayer for the part he has continued to play in bringing these demoralized railway properties back to an orderly condition, and in everything that it has done touching any of the property affected the commission has been able to work in close co-operation with him. It has been a matter of teamwork throughout, in which the wise and constructive use of the powers of the court by Judge Mayer has been a dominant factor in the progress that has been made.

The members of the committee who signed the report were Bronson Winthrop, Joseph P. Cotton, Charles P. Howland and Henry V. Poor.

Frank D. Pavey, a member of the reorganization committee, will file a

NEW COMPANY CAPITALIZATION

	Principal	Annual Interest
Undisturbed bonds	$15,350,000	$765,500
New fixed charge bonds, say	5,000,000	250,000
New income bonds, say	17,500,000	875,000
New Preferred stock, no par	120,000 shares*	
Common stock, no par	1,000 shares	

COMPARISON WITH FORMER CAPITALIZATION (approximately)

Reduction of face amount of fixed charge bonds (after providing reorganization capital) (approx.)	$18,000,000
With reduction of an annual fixed charge of (approx.)	720,000
Reduction of income bonds (approx.)	13,000,000
With reduction of an annual contingent charge of (approx.)	650,000
Elimination of fixed rentals (payable on outstanding minority stock interests) per annum of	349,066
Elimination of old capital stock	17,495,060

* This includes an allotment of .25 of a share of preferred stock for each $100 face value of general claims against New York Railways. The amount of such general claims is estimated at the present time at about $5,000,000.

SECURITIES TO REMAIN UNDISTURBED

	Principal	Annual Interest
Broadway and Seventh Ave. 1st Cons. Mortgage 5%, due Dec. 1, 1943	$8,150,000	$407,500
Broadway and Seventh 1st Mortgage 5%, due June 1, 1904	1,500,000	75,000
34th St. Crosstown Railway Co. 1st Mortgage 5%, due April 1, 1996	1,000,000	50,000
Bleeker St. and Fulton Ferry Railroad 1st Mortgage 4%, due Jan. 1, 1950	700,000	28,000
23rd St. Railway:		
Improvement and Refunding Mortgage 5%, due Jan. 1, 1962	1,500,000	75,000
1st Mortgage 6%, due Jan. 1, 1909	250,000	15,000
Debentures 5%, due Jan. 1, 1906	150,000	7,500
Total	$13,250,000	$658,000

SECURITIES TO BE EXCHANGED FOR NEW INCOME BONDS OR PREFERRED STOCK

	Principal	Annual Interest
New York Railways:		
Thirty-year first real estate and refunding mortgage 4% gold bonds, dated Jan. 1, 1912	$18,061,289	$722,451
Convertible scrip 4%	2,250	90
Thirty-year adjustment mortgage 5% income bonds, dated Jan. 1, 1912	30,609,487	(Income Bonds)
Lexington Ave. & Pavonia Ferry Railroad first mortgage 5% bonds, due Sept. 1, 1933	5,000,000	250,000
Sixth Ave. Railroad capital stock, par value	2,000,000	.....

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minority report probably in time for the hearing.

Other members of the committee explained the paragraph in their report which read: "Each member of this committee who represents a class of security holders has expressed the view that the plan does not sufficiently protect the interests of his clients," as being merely a formal statement and having no significance.

Abandonment Approved

The Public Service Commission of Pennsylvania has authorized the Pennsylvania-New Jersey Railway to abandon and discontinue its service between Bristol and Doylestown, Pa. The application was made by the company on Feb. 15 last and several hearings were held on the matter. No date has been set for the abandonment.

The property consists of 26 miles of track. The road was built thirty years ago. Gaylord Thompson, general manager, says that the corporation lost $25,000 during 1922 on that branch. It is believed that buses will replace the railway.

Increased Fare Results in Profit for Seattle

The Seattle Municipal Railway earned a net profit of $4,655 in August, according to the monthly financial statement sent to the City Council by Superintendent D. W. Henderson. The gross profit was $74,905 before deduction of a charge of $70,250 for redemption of bonds. Revenues for the month totaled $531,134 and operating expenses were $389,774, with interest charges of $66,455 in addition. July, the first full month under the restored 8½-cent fare, showed a net profit, due to economies effected, Superintendent Henderson states, but the railway has a deficit accumulated under the 5-cent fare.

August Net in Detroit Low—September Net Estimated at $45,000

The total revenue of the Detroit Street Railway for the month of August was $1,754,349, against $1,606,833 for August, 1922. The total operating expenses were $1,314,975 against $1,097,270 for the month of August a year ago. This means that revenue from railway operations was $439,375 compared with $509,564 a year ago. The net income for August of this year was $7,940, a considerable falling off in comparison with August, 1922, when the net income was $114,801. The total number of passengers carried in August of this year was 41,308,449 and in August, 1922, the passenger traffic was 37,372,148. Due to the increase in fares from 5 cents to 6 cents the net income for the first fifteen days of September showed an increase of $38,000 over the month of August. It is estimated that the net for the month will be about $45,000.

Foreclosure Action Started in St. Louis

A foreclosure suit in behalf of the Northern Trust Company, Chicago, trustee for $1,640,000 of the $2,000,000 bond issue of the Cass Avenue line of the United Railways, of St. Louis, has been filed in the United States District Court in St. Louis.

The petition asked that the court issue an order making Receiver Rolla Wells a party defendant to the suit. This request was granted by Judge Faris.

This is the second foreclosure action pending against the United Railways since Judge Faris declined to permit Receiver Wells to liquidate outsanding indebtedness against the railway by issuing additional receiver's certificates.

Morton Jourdan filed the suit for the Northern Trust Company. He is also counsel for the North American Company, which controls the common stock and most of the general 4 per cent bonds of the United Railways.

The bondholders' protective committee representing the holders of the United Railways general mortgage has recently authorized its attorneys to notify the trustee under the mortgage, the St. Louis Union Trust Company, to notify the company that the bonds are in default.

The directors of the United Railways at their meeting on Oct. 9 authorized the appointment of a committee representing the various financial interests in the company and probably the public as well to take steps looking to a quick re-financing and re-organization of the property.

The notice to the St. Louis Union Trust Company is the first legal step looking to a foreclosure suit on the entire property of the United Railways.

Preferred Stock Offered in Toledo

In order to promote community interest in the traction lines of the Community Traction Company, Toledo, a block of $43,140 of the 8 per cent preferred stock of the company, issued under the Milner ordinance to finance new construction work in Spencer Street, has been offered to the public in $10 shares.

Henry L. Doherty, chairman of the board of the company, has notified President B. C. Adams that in order to complete the work immediately he will take all of the stock, but that he will offer it at par to citizens of Toledo without profit to himself. The stock has been sold over the counter at the traction company office.

Under the ordinance the city has acquired $476,000 of the common stock of the company issued to it upon retirement of a like amount of the 6 per cent first mortgage bonds through the working of a sinking fund.

Car cards, posters and newspaper advertising have been used to bring the offering to the attention of the public.

It is quite probable that floating debt incurred under the provisions of the ordinance for improvements will be funded later through additional issues of preferred stock. However, at no time can the securities of the company exceed actual value of the property. Operations of the sinking fund tend to improve the relative position of the preferred stock.

Exchange Offer Announced

An offer to take up the stock of the Tri-City Railway & Light Company and to give in its place stock in the United Light & Railways Company, has been made by the latter corporation, the big holding company which controls the Davenport utilities. This offer holds good until Nov. 1, according to formal announcements which have been mailed all the holders of the Tri-City Railway & Light Company preferred stock. The conversion offer provides for the giving of 6 per cent preferred stock of the United Light in return for the 6 per cent preferred of the Tri-City issue.

The basis of exchange is one share of Tri-City for one share of the United Light and $8 in cash, or ten shares of Tri-City for eleven shares of United Light. It is stated in the offer that in the first six months of 1923 the dividend of the United Light 6 per cent preferred stock was earned three and a third times. The United Light already owns all the common stock and some bond of the Tri-City.

Seeks to Abandon Lines

The San Diego Electric Railway has applied to the State Railroad Commission for permission to abandon its line from Logan Avenue along Thirty-second Street to the United States destroyer fleet repair base. Stub service is operated on the line to connect with the Logan Avenue cars, and the line is patronized almost exclusively by employees of the repair base. According to Claus Speckels, general manager, the shipping board has failed to keep its agreement dating from the time the line was built in 1918. The shipping board advanced $46,000 toward construction of the line, which was not to be returned until the shipping board had constructed as many as eight ships at the yards. Only two ships were ever built, consequently Mr. Speckels holds that the shipping board failed to carry out its agreement. The shipping board has made a demand for the return of its money. Mr. Speckels contends that the company cannot operate the line on present patronage if the shipping board's money is to be returned, and hence he has asked for permission to abandon service. Manager Speckels says he offered to rebuild the line if the shipping board would permit the company to keep the money advanced, but the offer was rejected. The line is about one-half mile, single track.

Buys Interest.—A controlling interest in the Wapsie Power Company has been purchased by the Iowa Railway & Light Company. The Wapsie company's headquarters are at Mount Vernon.

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Trustees of Eastern Massachusetts Company Say Dividends Unwarranted

The Eastern Maccachusetts Street Railway and its trustees, Boston, Mass., have filed their answer to the suit brought by L. Sherman Adams and others to compel a larger disbursement of dividends on adjustment shares. It is denied that any dividends have been wrongfully withheld or that any had accrued in February, 1923. On the other hand, it is asserted that no dividends on any class of stock were to be paid unless fully earned and that the financial condition of the company does not warrant the payment of additional dividends.

The trustees claim that when control of the company passed to them in January, 1919, the property had been operated for a year and a half by receivers at a loss of $1,295,291 and they were obliged by a decision of the War Labor Board to pay additional wages aggregating $941,733 annually. A 10-cent fare was established and every economy practiced. In spite of this the company failed to earn the cost of service in 1919 by $589,920. During 1919 and 1920 124.1 miles of line were discontinued as non-paying, but owing to higher operating costs and another wage advance another deficit resulted. In 1921 conditions improved, but at the end of that year arrearage of unpaid accumulated dividends and sinking funds, aggregating $2,633,457 on Feb. 1, 1922, could not be met except through a financial readjustment which was finally effected.

The trustees have felt that the earnings and the financial condition do not warrant payment of any dividends other than those that have been paid, particularly in view of the fact that wages were again advanced, effective May 1, 1923.

Robert R. Landis Appointed Receiver of Ohio Property

Following a conference of attorneys representing both sides in the foreclosure and receivership suit of the First Wisconsin Trust Company, Milwaukee, against the Dayton, Springfield & Xenia Southern Railway, with United States District Judge Smith Hickenlooper at Cincinnati on Oct. 13, Robert R. Landis, Dayton attorney, was named by Judge Hickenlooper as receiver of the traction company's assets with directions to continue operations of the system in and out of Dayton.

Judge Hickenlooper fixed Mr. Landis' bond at $30,000, which was given simultaneously with his appointment. Mr. Landis was named by the court as a result of the failure of the parties to the action to agree upon a person to be appointed receiver. The complainant desired the appointment of A. H. Elfner, former general manager of the Cincinnati, Georgetown & Portsmouth Railway, while the defendant sought the appointment of A. L. Ferneding, of Dayton, present general manager of the defendant company.

The bill of complaint of the First Wisconsin Trust Company was filed in the Federal Court at Dayton Oct. 2. In the suit, it was alleged that the traction company had defaulted interest due on outstanding bonds, of a bond issue of $500,000 secured by mortgage to the trust company. The matter was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 13.

Valuation Hearing at Minneapolis Under Way

The valuation hearing of the Twin City Rapid Transit Company, operating in Minneapolis and St. Paul, has started before the Railroad & Warehouse Commission. A. M. Robertson, the first witness on Oct. 10, did not reveal the amounts to be claimed as investments. More than a year ago the commission authorized an increase from the 6-cent fare to a 7-cent fare, but this was held up by court injunction.

Master Recommends Pittsburgh Receivership Be Lifted

The final report of Special Master Henry G. Wasson in the Pittsburgh Railways case has been filed with the United States District Court. Mr. Wasson recommends the termination of the receivership of the railway, which has been in receiver's hands for the last five and a half years. Should the court approve the report, as expected, the company will pass out of the receiver's hands by Jan. 1, 1924.

Application to lift the receivership was made on Feb. 15, 1923, by President A. W. Thompson of the Philadelphia Company, which controls it. The city of Pittsburgh had joined with the company in a reorganization plan, the joint agreement including the creation of a traction conference board composed of company officials, members of the City Council and representative from each of the municipalities served by the railway.

No reduction in rate of fare from the present fare of three tokens for a quarter is probable, as the master's report states this fare is necessary if the road is to continue operations on an equitable basis.

As has been detailed previously in the ELECTRIC RAILWAY JOURNAL the capitalization under the reorganization plan was scaled down from $156,290,750 to $62,500,000 and under agreement with the city, the company will be entitled to receive a net return after charges and depreciation of $3,750,000 annually.

Twelfth Annual Report Submitted

According to the twelfth annual report of the Toronto Hydro-electric System, the gross income for the year ended Dec. 31, 1922, was $4,404,754. The cost of electric current and expense of operation and management, including repairs and maintenance, was $3,053,110. After consideration of the interest, depreciation, exchange, taxes, etc., the excess of income over expenditure at existing rates amounted to $232,041.

Temporary Injunction Against Chicago Sale

A temporary injunction was issued on Oct. 9 restraining the Illinois Merchants Trust Company from selling $14,000,000 securities of the Chicago Elevated Lines. The petition for the injunction against the sale was filed by preferred stockholders of the elevated lines through their attorney. They charge that the sale of these securities is part of a conspiracy.

Attorney Frank H. McCullough, representing the Illinois Merchants Trust Company, opposed granting of the injunction. He said no interest has been paid on the $14,000,000 gold notes held by his clients since 1919 and said the noteholders were entitled to their interest at least. Therefore, collateral security notes should be sold.

The restraining order was granted by Circuit Judge Hugo M. Friend. The court in granting this restraining order said:

> In view of the allegations of the complainants in which they charge that the trustees had caused the default in interest payments by making unauthorized loans and had otherwise diverted funds of the trust without authority, it is necessary, in the absence of denials, to issue the injunction.
>
> If the sale, scheduled to be held on Oct. 15, is consummated the complainants in this suit will be powerless to recover any losses they may consequently have sustained. On the other other hand, this sale has been delayed since 1919, when the first interest payments were defaulted, and further delay can work no injustice on the gold note holders.

Judge Friend advised Attorney Henry S. Robbins, representing the holders of the gold notes, to file an immediate answer to the bill. If the gold note holders can make positive denials of the bill's charges and support them with competent evidence, the injunction would be dissolved, he said.

Sale of $2,496,557 of Bonds Authorized

The Public Utilities Commission of the District of Columbia has authorized the Washington Railway & Electric Company to:

1. Place a general mortgage of $10,000,000 on its property, subject to prior liens.
2. Issue and sell $2,496,557, face value, of its general and refunding 6 per cent ten-year gold bonds secured by the general mortgage.
3. Issue and pledge with the United States Housing Corporation $150,000, face value, of its general and refunding mortgage 6 per cent ten-year gold bonds dated Nov. 1, 1923, in lieu of a like amount of its general mortgage 6 per cent five-year gold bonds, the latter bonds to be retired and cancelled.

The issue and sale of the bonds were authorized upon the conditions that follow:

1. That the company sell the bonds at the highest obtainable price.
2. That all discounts, commissions and expenses in connection with the approval and issuance of the bonds be amortized out of the income of the company during the life of the bonds.
3. That the general mortgage 6 per cent five-year gold bonds due Dec. 1, 1923, be paid off, retired and cancelled.
4. That the company show the receipt and application in detail of the proceeds of the sale of the bonds and on or before the fifteenth day of January and the fifteenth day of July make verified reports to the commission until the bonds shall have been sold and all of the proceeds expended.

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West End May Suspend

The West End Traction Company, a subsidiary of the Pennsylvania-Ohio Electric Company, has filed a petition with the Ohio Public Utilities Commission asking permission to abandon its service. The hearing has been set for Nov. 16 at Columbus.

The West End Traction Company operates 24 miles of track. The principal route is a 15-mile interurban line connecting Youngstown and Girard, Niles and Warren. In addition there are short suburban lines from Niles to Mineral Ridge and from Warren to Leavittsburg. There are also approximately 5 miles of city track operated in Warren. All the trackage is in Trumbull County, Ohio.

In its petition the West End Company points out that in meeting operating costs, including taxes, it sustained the following losses: $108,845 in 1920, $129,602 in 1921, $71,449 in 1922 and $31,829 in the first seven months of 1923, or a total of $341,725 for the period. Without material relief in the form of increased rates, it is pointed out there is no hope of operating, excepting at continued heavy losses.

Receiver Appointed in Owensboro

W. A. Carson of Evansville, Ind., has been appointed receiver for the Owensboro City Railroad, Owensboro, Ky., by Federal Judge Walter Evans of Louisville. The action was taken on a petition of the American Savings Bank & Trust Company, trustee for the bondholders, against the company, seeking to foreclose a mortgage securing $200,000 of bonds. It was set forth in the petition that 71 per cent of the bondholders joined in the petition for the appointment of a receiver.

The system will continue to be operated under Receiver Carson until a decree of some kind is entered in federal court. The system will probably be ordered sold. The bonded indebtedness is $400,000, half being first mortgage bonds and half second mortgage bonds. The company has been unable to pay the interest on the bonds for the last six years, the money intended for the bondholders going for the upkeep of the system.

Court Rejects Plea

Supreme Court Justice Irving Lehman on Oct. 13 declined to give judgment on the pleadings to Stephen and Nina H. Peabody, Manhattan Railway stockholders, in a suit against the Interborough Rapid Transit Company, New York, to compel the payment of 7 per cent per annum dividends to Manhattan stockholders, under the 999 years' lease of the Manhattan's elevated lines to the Interborough.

The Peabodys began suit in 1921, when the 7 per cent payments were discontinued and proceedings instituted to arrange for a lower rate of dividends. The plaintiffs asserted that the defendant company had guaranteed the payment of 7 per cent on Manhattan stock. Justice Lehman holds that the Interborough's agreement was with the Manhattan Railway and not with its individual stockholders; that the 7 per cent was to be paid as rent; that the amount of rent to be paid may be changed, by agreement between the two companies, under changing conditions, and that the promise to pay 7 per cent "could not survive a valid revocation or modification of the lease by the parties to the lease."

The scaling down of the Manhattan dividend payments was one of the considerations agreed upon by the great bulk of the stockholders of that company as part of the recent readjustment of Interborough finances.

Auction Sales in New York.—At the public auction rooms in New York on Oct. 17 there were sold $1,000 of Southern Indiana Gas & Electric Company 6 per cent bonds, due 1947; 90 per cent.

Will Redeem Notes.—All of the outstanding $3,600,000 five-year 7 per cent secured gold notes of the Milwaukee Electric & Light Company, known as series A-1, will be redeemed Oct. 31, 1923, at par and interest. The bonds are due Nov. 1, 1923.

Financing of Electrification Arranged.—The Illinois Central Railroad has applied to the Interstate Commerce Commission for authority to issue and sell $12,022,450 of 6 per cent preferred stock, the proceeds to be used for the electrification of the company's lines within the city of Chicago. It also asked permission to issue a like amount of common which is to be issued from time to time in exchange for and retirement of the preferred, share for share.

Wants Property Auctioned. — An order was entered in Circuit Court on Oct. 12 directing the master commissioner to offer for sale at auction the property of the Henderson Traction Company on Oct. 29. The city of Henderson was awarded a judgment of $4,548.35 with 6 per cent interest from July 28 last which is a prior lien on the property for street oiling tax. The railway ceased operation July 15, when it defaulted payment of interest.

Highest Net Since 1913.—The returns of the United Railways, St. Louis, during the year ended July 31, 1923, exceeded the earnings for each calendar year from 1913 to 1922, according to figures just issued by Receiver Rollo Wells. The gross earnings for the year totaled $20,648,831, and after expenses and depreciation charges had been paid the net income for the period was $3,720,133. The previous high record was established in 1920, when the income was $3,701,442.

Requests Deposits.—The bondholders' protective committee for the first mortgage sinking fund gold 5s. of the Waterloo, Cedar Falls & Northern Railway has announced that it has decided to limit the time for the deposit with the committee of further bonds under the bondholders' agreement of Nov. 15, 1922 to Nov. 1, 1923. After this date no additional bonds may be deposited under the protective agreement except at the discretion of the committee.

Another Hearing on Carhouse Sale.—Adjourned hearing of the argument on the application of the Broadway & Seventh Avenue Railway, New York, to cancel a lease held by the New York Railways on the carhouse block, Broadway, Sixth Avenue, Fiftieth and Fifty-first Streets, will be held on Oct. 22 in the Federal District Court. This is preliminary to the sale of the block for $5,000,000, to a syndicate headed by Tex Rickard, which plans to build an athletic sports' center.

Hearing on Allocation Case Oct. 27.—Hearings on the suit of the city against Detroit United Railway over the proper allocation of the Detroit United Railway's consolidated mortgage to lines purchased by the city have been postponed to Oct. 27, at which time briefs will be submitted. The lines acquired by the city for $19,000,000 are covered by a consolidated mortgage of $25,000,000 given by the Detroit United Railway on its interurban lines and its former city lines now owned by the city of Detroit.

Earnings Behind in Youngstown in August.—According to an announcement by Street Railway Commissioner Engel, the revenue from the combined railway and bus lines of Youngstown, during the month of August, failed by $17,853 to pay the cost of operation. This sum will be added to the previous deficit of more than $1,000,000. Mr. Engel's statement says that the earnings were $136,124, and the cost of operating $154,738. The total number of car miles furnished in August was 416,847. The service cost per car mile was 37.15 cents. The cost per car-hour was $3.23.

Fails to Pay Cost of Service in August. — During August the Boston Elevated Railway failed to pay for the cost of service by $319,516. The deficit was larger in August this year than it was in August, 1922, when the road went behind $217,128. The total number of revenue passengers during the month was 28,086,112, against 26,877,682 in August a year ago. The percentage of passengers paying a 5-cent fare to the total number paying had increased in the year from 22.33 per cent to 25.50 per cent. The average rate of fare was reduced from 8.883 cents in August, 1922 to 8.713 cents in August, 1923.

Offer Made for Exchange of Tri-City Shares.—The stockholders of the Tri-City Railway & Light Company, Davenport, Iowa., a subsidiary of the United Light & Railways, Grand Rapids, Mich., have received an offer from the latter company to exchange the 6 per cent first preferred stock of United Light & Railways, for the 6 per cent preferred of the Tri-City Railway & Light Company on the following basis: Each ten shares par value $100 of the 6 per cent preferred of the Tri-City may be exchanged for eleven shares (par value $100) of the United Light & Railways 6 per cent preferred. The offer is good until Nov. 1.

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Traffic and Transportation

Decrease in Fare Opposed

President Ham of Washington Railway & Electric Company Says Fair Return Is Not Being Earned

Opposing the request of the Federation of Citizens' Associations that the District of Columbia Public Utilities Commission order the railways of Washington to sell three tokens for 20 cents, William F. Ham, president of the Washington Railway & Electric Company, testified before the commission on Oct. 15 that he estimated such an order would cost that company $104,207 loss of revenue per annum. Mr. Ham also declared that compliance with the order would slow the service, as it would increase the number of token sales conductors would be obliged to make.

The fare in Washington is 8 cents, cash, with six tokens for 40 cents. The Citizens' Federation petitioned for three tokens for 20 cents, on the ground that many passengers did not find it convenient to buy six tokens at a time and hence were forced into paying the cash fare of 8 cents. At the hearing on Oct. 15, William McK. Clayton, attorney for the Federation, suggested that if the commission did not consider it wise to order three tokens for 20 cents, the cash fare should be reduced to 7 cents.

Figures were presented by President Ham to show that of the present pay passengers carried by the Washington Railway & Electric Company, 20.33 per cent rode on cash fares and 79.67 on tokens. He estimated that if the suggested plan of selling three tokens for 20 cents were adopted only 10 per cent of the present passengers would pay the 8-cents cash fare in the future, thus bringing the $104,207 annual loss to the company. He expressed the opinion that most cash fares are paid by visitors in Washington, or casual riders, and that no benefit would accrue to the regular passengers.

Statements were introduced by Mr. Ham showing that in the twelve months ended Aug. 31, last, the gross revenues from operations within the District of Columbia were $5,576,995, a decrease of $77,609 compared with the preceding twelve months. During this period, operating expenses, taxes, etc., were $4,825,824, an increase of $37,955. This left $751,170 available for return upon investment for the year ended Aug. 31, 1923, or a decrease of $115,564 compared with the previous twelve months.

Mr. Ham showed that the fair value of the properties, as fixed by the commission, is $17,871,366, making the present return upon the investment 4.2, compared with 4.94 for the preceding year.

Statements also were introduced by Mr. Ham showing that during the same periods, the operating revenues of the Washington Railway & Electric Company and the Capital Traction Company, combined, had decreased $305,375 and that the operating expenses, combined, had increased $61,835, making a decrease in operating income of both companies of $367,210.

From these statements, Mr. Ham computed that during the year ended Aug. 31, 1923, the Washington Railway & Electric Company earned only 4.2 per cent upon its fair value as fixed by the commission, while the Capital Traction Company had earned 7.66 per cent upon its valuation, and both companies combined had earned 5.87 per cent upon their joint fair value. The Washington company had failed by $499,824 to earn a 7 per cent return and the Capital Traction Company earned $109,769 more than a 7 per cent return, his statement showed, while both companies combined had earned $390,054 less than a 7 per cent return.

Mr. Ham further showed that traffic in the District of Columbia has fallen continuously since 1919, the peak year. In 1919, he testified, both companies had carried 166,113,350 pay passengers, whereas during the year ended Sept. 30, 1923, the combined traffic of both companies had fallen to 143,398,130, a loss of 22,715,220 passengers, of which about one-third had been sustained by his company and two-thirds by the Capital Traction Company. This tendency was not abating, he said.

Trackless Trolleys Start in Philadelphia

Philadelphia had its first experience with trackless trolleys on Oct. 14 when the first vehicle of this type of transportation traversed Oregon Avenue and east to its terminus at the Tidewater Docks at Delaware Avenue. In the car were J. W. Hall, superintendent of instruction; instructor John Holland, division superintendent Worlin and assistant superintendent Van Horn of the Sixteenth and Jackson Streets carhouse. It took exactly thirty-five minutes for the car to arrive at its starting point.

This line of trackless trolleys is run over Oregon Avenue in order that service may be promptly supplied to the 2,000 men now employed at the Tidewater Docks, and to the growing population south of Snyder Avenue, who would otherwise be without car service for some considebale time to come.

The company has announced through Thomas E. Mitten, chairman of the executive committee, that just as soon as the trackless trolley operation on this route has passed its experimental stage the company will be glad to consider the advisability of extending the service westerly over Passyunk Avenue and Sixty-third Street to Woodland Avenue.

Will Advance Shreveport Fare Case

The United States Supreme Court on Oct. 15 granted the motion of the Louisiana Public Service Commission to advance argument on its appeal from the ruling of the District Court in granting an interlocutory injunction to the Shreveport Railways restraining the commission from interfering with collection of a 7-cent fare in Shreveport, La. The case was set for Jan. 7.

It is three years since the fare controversy started in Shreveport. In 1920 by a vote of the people, the railway company was allowed an increase from 5 cents to 6 cents. The election was contested by Huey P. Long, chairman of the Louisiana Railway Commission, acting as a citizen of Shreveport. The State Supreme Court upheld it. In 1921 when the state Constitutional Convention changed the name of the railway commission to the Public Service Commission it gave the Public Service Commission authority to fix rates. In April, 1922, the commission issued an order without a hearing, fixing the car fare in Shreveport at 5 cents.

After an appraisal of the property had been made by valuation engineers, the Public Service Commission granted a hearing on the application of the company for an increase in fare at which evidence was submitted on both sides on the question, but the commission failed to make a decision. The company then appealed to the United States District Court and secured a temporary injunction against the commission restraining that body from interfering with the company's collecting a 7-cent fare. Huey P. Long, chairman of the commission, then sought and was granted an appeal to the United States Supreme Court. He based his appeal on the plea that the Federal District Court was without jurisdiction.

Ban Put on One-Man Cars in Oakland

An ordinance was passed to print on Oct. 8 by the City Council of Oakland, Cal., which prohibits the operation of one-man cars in the city. The Council adopted the measure without comment, the ordinance to become effective within eight days. The action by the Council was initiated by Mayor Davie. In urging that body to legislate on the matter the Mayor said in part:

> The San Francisco-Oakland Terminal Railway has recently placed in service a new type of car, capable of accommodating more than forty passengers, which is so constructed that it may be operated by a crew of two men or as a one-man car.
>
> I do not believe that the company should be permitted to operate these new large cars with only one man in charge in the downtown traffic. I feel that public safety and welfare demand that street cars be in charge of two men if they are to be operated through those sections of the city where there is a heavy volume of general traffic.
>
> This company is still charging our people war-time rates for transportation, at the same time endeavoring to reduce the car operating personnel at the expense of public safety.

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Crosstown Bus Service to Be Started by Utah Light & Traction

The Public Utilities Commission of Utah has granted permission for the Utah Light & Traction Company to operate a crosstown bus line to connect with its street car line at State and Thirty-third South Streets and to run east to the community known as East Mill Creek. The bus fare has been fixed at 10 cents and special rates for school children are to be put into effect.

The matter came before the commission originally on the petition of the Blue & Gray Bus Line, which proposed to continue the service from East Mill Creek to reach the business center of Salt Lake City, in competition with the traction company. To that petition the railway protested, and finally introduced a petition in intervention, asking the privilege of starting, in place of the proposed service to Second South Street, a "feeder" service which would connect with its lines on the Holliday and Nibley Park routes and on the several routes running south on State Street.

The Blue & Gray Bus Line did not care, it was set forth, to operate buses as feeders to the traction company's lines without giving also the through service to the business center.

In rendering its decision the commission stated that a certain sum of money is necessary to carry on the street railway business, which money must be collected in the form of fares from the traveling public. It said that to deplete the revenues of the railway by authorizing a competitive bus service would only restrict still further the company's ability to give service, and, if the competition were carried to its logical conclusion, would utterly destroy the service so necessary to many. The necessities of the general traveling public must be considered, rather than the convenience of the few.

Trackless Trolley Ready in Rochester

The Rochester Railways Coordinated Bus Lines, Inc., a subsidiary of the New York State Railways, awaits only the sanction of the State Public Service Commission to begin the operation of trolley buses over a crosstown route through the northeast end of Rochester, N. Y. Two of the trackless cars have already been received and the other three are in transit, according to officials of the railways.

The state commission held a public hearing on the application of the company for permission to operate the line in Rochester on Oct. 15. The decision of the commission is expected at an early date. Poles and wire have been strung and all is in readiness for the new line, which is regarded as a decided step forward in Rochester transportation facilities.

The trolley buses will operate over Driving Park Avenue bridge and will serve a fast growing industrial and residential district.

Auxiliary motor bus service will be operated from the end of the Dewey Avenue car line to Latta road, in Greece. This line will begin operations on the arrival of equipment, which is expected within a few days.

Weekly Ticket in Effect.—The Wisconsin Traction, Light, Heat & Power Company, put into effect on Oct. 1, a weekly ticket plan.

Petition Tabled.—The City Council of Youngstown has laid on the table the request of the Pennsylvania-Ohio Electric Company to establish an additional rate of fare on the Youngstown Municipal Railway lines.

Will Operate One-Man Cars. — The Milford & Uxbridge Street Railway, Milford, Mass., is preparing to put one-man cars in operation by Nov. 1, on the Grafton and Upton electrified line. It will be the first time that one-man car service has been operated on any of the lines of the company.

Will Apply for Bus License.—James F. Jackson, chairman of the board of trustees of the Boston Elevated Railway, has notified those interested in car service on Hanover Street, recently discontinued, that the trustees will apply to the City Council for a license to operate buses to and from Haymarket Square as a substitute for the former service.

Commission Approves Fare Plan.—Final approval has been given by the Wisconsin Railroad Commission to the agreement recently reached by Superior City officials and the Duluth Street Railway. The plan referred to in the ELECTRIC RAILWAY JOURNAL, issue of Sept. 15, provides for a 10-cent cash fare in Superior with five tickets for 30 cents.

Weekly Edition Appears.—The Spokane United Railways, besides publishing its regular edition of "Trolley Topics," has introduced a supplement, published weekly, which is now appearing in the Spokane daily newspapers every Thursday. The supplement will report news regarding operation of the Spokane United Railways as well as important developments in the street railway industry of the country.

Jitneys Allowed.—The new ordinance at El Paso, Tex., barring buses and motor vehicles carrying passengers for hire from certain streets has been held void by Judge Stewart Berkshire of the Corporation Court. Approximately forty jitneys that had stopped operation when the ordinance was first enacted immediately resumed operations.

Joint Five-Cent Fare and Transfer Confiscatory.—Federal Judge John C. Knox, at New York has confirmed conclusions of former Judge E. Henry Lacombe that a joint 5-cent fare and transfer on the Belt Line Railway, New York, would be confiscatory. Judge Lacombe rendered his decision in 1912 against the former Public Service Commission. A temporary injunction was obtained by the Belt Line Railway Corporation and that has held until now, and will by this decision be made permanent.

School Tickets on Sale.—The Northport Traction Company, Northport, N. Y., now has on sale tickets in strips of ten for 50 cents, each ticket having the face value of 8 cents, for the transportation of children of five years of age and under sixteen years who are regularly attending public or private schools. The tickets are good on school-days only and between the hours of 8 a.m. and 5 p.m. This new order approved by the commission became effective Oct. 10.

San Diego Merchants Give Weekly Pass as Premium. — From voluntary mention in their advertisements that patrons should shop often with no extra cost via weekly pass, several San Diego merchants have gone a step further. A half-page advertisement of "The White House" in the San Diego *Union* for Sept. 23 announces the first of a series of Monday weekly pass special events. With every $10 purchase on Monday, the concern will give a dollar pass to San Diego city customers or a $1.25 pass to Coronado customers.

Eight-Cent Fare Suspended. — The Public Service Commission has suspended the 8-cent fare which the International Railway, Buffalo, had planned to put into effect on the local lines on Oct. 8. The fare has been suspended for a period of four months or at least until the determination of the rate case now being held before the commission. The International has not presented all of its evidence in the rate case and the municipal authorities have presented practically no proof in the proceeding. The appeal of the city from decisions of the Public Service Commission authorizing the company to charge a fare higher than 5 cents will be argued by George Clinton, special counsel for the city, before the United States Supreme Court at Washington sometime before next February.

Jitney-Car Situation Acute.—On orders of Safety Director Hamilton all jitneys were ousted from Central Square in Youngstown on Sept. 26. A still further development in the story of the jitneys in that city was the passing by the Council of a new ordinance shoving the jitneys further away from Central Square and their established parking places. The ordinance was prepared by Street Railway Commissioner Engle. At the same time the Council tabled indefinitely an ordinance fathered by Ross Raymond, head of the jitney men, which would have permitted the jitneys to park in their regular place in Central Square. The Council, also tabled the ordinance giving the safety director full jurisdiction over traffic regulations in the congested district. It is understood with the new restrictions in force that a well-defined plan is under way to bring the jitney-car controversy before the citizens at a special election. The new ordinance is an attempt by the Council to correct provisions in a previous ordinance held by the court to be worthless.

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Personal Items

George Le Boutillier, President of the Long Island

George Le Boutillier has been named president of the Long Island Railroad to fill the vacancy caused by the death of Ralph Peters. It was on Jan. 18 of this year at a meeting of the board of directors that Mr. Le Boutillier was elected an additional vice-president to assist the president in the general control of affairs of the company, and in the absence or disability of the president to exercise and perform all the powers belonging to the latter. Mr. Le Boutillier is only forty-eight years old. He has consecutively held the positions of assistant engineer, division engineer, engineer maintenance of way, division superintendent and general superintendent of the Pennsylvania Railroad, which he served in various capacities for twenty-seven years. He was general superintendent of that company at Harrisburg up quite recently.

Col. W. J. Wilgus and Prof. Burr Consultants to the New York Transit Commission

Col. William J. Wilgus and Prof. William H. Burr have been appointed consulting engineers by the New York Transit Commission to assist and advise the commission's technical staff upon the many engineering problems which will come up in the building of the new lines. Messrs Wilgus and Burr will begin at once a study of the basic plans made by the commission's engineers, and will hereafter work with them in developing the details and deciding upon methods of construction.

Both men are prominent in the engineering world. Colonel Wilgus was formerly chief engineer of the New York Central Railroad, and had charge of the enlargement of terminals, including the now Grand Central Station, and also the change of motive power from steam to electricity. During the war Colonel Wilgus served as deputy director of general transportation of the American Expeditionary Forces in France, with the rank of Colonel in the Army. He did very brilliant work in this connection and was awarded the D.S.M. and made an officer of the Legion of Honor.

Professor Burr has for many years held a leading place among the civil engineers of America. He was consulting engineer for the city of New York in the building of docks and the construction of the new water system. By appointment of President McKinley, he served as a member of the Isthmian Canal Commission to report upon the most feasible route for an inter-oceanic canal, and was reappointed by President Roosevelt. Under Governor Dix, he was appointed a member of the Advisory Board of Engineers for the construction of the New York State Barge Canal. In 1900 he was awarded first place in the national competition for the proposed memorial bridge across the Potomac River at Washington. For several years he was professor of civil engineering at Harvard and Columbia Universities.

Mr. Kressler in Saginaw

New Head of Saginaw Properties Sounds Public Attitude Before Entering Upon His Duties

Charles S. Kressler, president and general manager of the Saginaw Transit Company, which will operate street cars and buses in Saginaw under a franchise granted on June 25, has had twenty-five years' experience in public utility operation. He started with the Detroit United Railway in the power and overhead departments, where he was employed for more than ten years. Mr. Kressler next became connected with the Allis-Chalmers Company, but in 1909, when Alex J. Groesbeck, now Michigan's Governor, and his associates had control of the Saginaw & Flint interurban, he was superintendent of power and overhead. Later when the Michigan Railroad took over the property Mr. Kressler continued with the line as superintendent of overhead.

C. S. Kressler

On Oct. 1, 1913, he went to Manistee as general manager of the electric, gas and street car lines that later were taken over by the Consumers Power Company. Two years ago, however, the railway service there was withdrawn because of the constant loss in revenue. Mr. Kressler remained with the properties at Manistee until the recent organization of Saginaw Transit Company. He was elected president and general manager of the company and is in complete control.

Mr. Kressler knows that he is facing a tough job in Saginaw. Street cars have not been operated there since Aug. 11, 1921, and while the public have come in the meantime to a keen realization of the value of the railway, it is only human to expect that they will be inclined to be critical of the little things. Fully realizing this Mr. Kressler acted accordingly on taking up his duties. He did not fight shy of the local journalists, but he did put them off for a few days on their requests for a portrait of him. This was all part of the man's plan for learning things for himself at first hand, for before his picture appeared in the local press Mr. Kressler traveled over the city incognito visiting all sections to learn at first hand the reaction of the public to the incoming railway administration and to gain some knowledge of where, in the opinion of the public, the previous railway administration had been guilty of either sins of omission or of commission that had worked against it with the public.

Just as soon as he had completed this personal survey Mr. Kressler released his portrait for publication. In not a few instances it was at once recognized by many as that of the man who had interviewed them on one phase or another of the local transportation problem, but nowhere was there any evidence of resentment over the fact that Mr. Kressler had not previously disclosed his identity.

Mr. Kressler says: "You must sell yourself and service to the public. Since I have been in Saginaw I have been studying conditions and I believe I know first hand what the people want and I am going to give them what they want if it is possible to do so."

Fred E. Mathews has replaced J. L. Hale as chief dispatcher of the Winona Interurban Railway, Warsaw, Ind. Mr. Hale's unfortunate death was referred to in the ELECTRIC RAILWAY JOURNAL of Sept. 15, 1923.

E. A. Aspnes, president, general manager and purchasing agent of the Waupaca Electric Service Company, has severed his connections with that company. James Richardson has been appointed in the capacity of vice-president and general manager.

William M. Quackenbush, general superintendent of the Rapid Railway System, Port Huron, Mich., has resigned after twenty-seven years with the system. He started in a minor capacity and rose through intervening posts until he became superintendent twelve years ago.

Paul Shoup, vice-president of the Southern Pacific Company; president of the Pacific Electric Railway, Los Angeles, and an officer in many other companies under Southern Pacific control, has been made a director of the Anglo & London-Paris National Bank, San Francisco.

Clark R. Jackson, former State Tax Commissioner, has been appointed by Mayor E. J. Brown superintendent of Public Utilities of Seattle, Wash. The appointment has been approved by the City Council. Mayor Brown states that

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he expects the new superintendent, aside from running his own department, to make a survey of the light, railway and water departments looking toward a valuation of the properties.

James Dalrymple, general manager Glasgow Corporation Tramways, who has been in this country on an extended visit, planned to return on Oct. 20. After attending the Atlantic City convention Mr. Dalrymple spent the last week of his visit in New York. Just before leaving he said that the electric railways as a whole have made great advances since he had visited America in 1913 and that he had found much to interest him on his trip.

Enrich G. Elg has resigned from the Chicago Surface Lines to become office and sales engineer on copperweld wire and other products of the Copper Clad Steel Company for the Steel Sales Corporation, Chicago. While with the Chicago Surface Lines, Mr. Elg had charge of tests in the shops and equipment division and was associated in new car construction. Previous to this, he was operating engineer of the Decatur Railway & Light Company, an Illinois Traction property. Mr. Elg is a graduate of the school of electrical engineering, University of Illinois.

Alvin Coffman, formerly claim agent of the Chicago & West Towns Railway, Oak Park, Ill., resigned this position on Sept. 15. Mr. Coffman became identified with electric railway work in Roanoke, Va., where he served as superintendent of transportation and claims agent for a number of years of the Roanoke Railway & Electric Company. Later he conducted a joint claim adjusting bureau in Dayton for the City Railway, the People's Railway and the Oakwood Street Railway. It was from the service of these companies in Dayton that he resigned to engage in war work. He is a native of Philadelphia.

Obituary

Benjamin B. Foss, retired superintendent of the Lynn division of the Eastern Massachusetts Street Railway, died recently at his home in Lynn. He was born in East Parsonfield, Me., fifty-eight years ago. He entered into the employ of the Boston & Lynn Street Railway as a motorman in the year 1898.

William L. Cosgrove, Atlanta, for many years prominently identified with the Georgia Railway & Power Company as an engineer, and at one time president of the Atlanta Gas Light Company, a subsidiary organization of the power company, died Oct. 8 in a hospital at Kent, England, according to cable information received in Atlanta. Mr Cosgrove, with his wife, had been traveling in Europe for the past two years, and about a month prior to his death he was stricken with apoplexy. He was sixty-four years of age. He retired from active business life about five years ago.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Japan Will Spend Several Million Dollars for Electrical Equipment

Although it is impossible at the present time to obtain complete information concerning the extent of the destruction of electric railway property in Japan, nevertheless from inquiries received by manufacturers in the United States it is evident that much material will be needed to restore them to their former operating efficiency. Inquiries have been received for about 300 trucks and underframes for single-truck cars. It has been the practice in the past for Japan to import trucks and motors largely from the United States and to build the car bodies locally in Japan. This method will presumably be followed in replacing the cars destroyed by the recent disaster. Inquiries for upward of 500 electric motors for railway service have also been received. These, together with the trucks already mentioned, will constitute the essential equipment for several hundred cars. It is thought, however, that the total number destroyed will be found larger than that and apparently this is only the first step in the program of restoration.

The Westinghouse Electric International Company has already received orders for electrical apparatus to be used in reconstruction work in Japan totaling more than $1,000,000. Other orders in course of negotiation will bring the total amount to approximately $2,000,000. According to the latest information the power plants in the earthquake zone were not seriously damaged, but the distribution systems were practically destroyed.

Improvement Noted in G. E. Orders

The General Electric Company received orders amounting to $65,483,549 during the quarter ended Sept. 30, according to a recent announcement of the company. This compares with $58,914,620 in the corresponding three months of 1922. Orders for the first nine months of this year were $229,747,304, compared with $176,171,194 in the same period of 1922.

Gas Manufacturers to Co-operate with Welding Schools

The Gas Products Association, whose headquarters are at 140 South Dearborn Street, Chicago, Ill., recently appointed an educational committee to co-operate with trade and technical schools in supplying a practical and standard course in welding procedure. Many users of oxyacetylene welding equipment have not been entirely satisfied with the work done in the past by welding school graduates. At the same time the application for the welding processes has been extended to so many new fields that the demand for skilled operators is constantly increasing. It is thought therefore that by making a thorough investigation of the needs of the industry and then making recommendations to welding school instructors, the instruction programs can be revised and standardized so as to more fully meet the requirements of the employers.

Steel Prices Are Steady

According to information recently published by the Department of Commerce there has been little change in the price of iron and steel during the past three months. The present figures are somewhat higher than in the latter part of 1921 and in 1922, but far below those of 1919 and 1920. The weekly average price of iron and steel composite for the past five years was as follows:

	Per Ton
1919—Weekly average	$50.37
1920—Weekly average	65.60
1921	
First quarter, weekly average	48.72
Second quarter, weekly average	43.01
Third quarter, weekly average	36.49
Fourth quarter, weekly average	34.72
1922	
First quarter, weekly average	33.09
Second quarter, weekly average	36.00
Third quarter, weekly average	40.32
Fourth quarter, weekly average	42.19
1923	
First quarter, weekly average	42.90
Second quarter, weekly average	46.90
Third quarter, weekly average	44.85
Week ending	
July 7	45.49
July 14	45.26
July 21	45.09
July 28	44.97
Aug. 4	44.88
Aug. 11	44.84
Aug. 18	44.84
Aug. 25	44.84
Sept. 1	44.68
Sept. 8	44.72
Sept. 15	44.70
Sept. 22	44.47
Sept. 29	44.23

Metal, Coal and Material Prices

Metals—New York	Oct. 16, 1923
Copper, electrolytic, cents per lb.	12.875
Copper wire base, cents per lb.	15.25
Lead, cents per lb.	6.85
Zinc, cents per lb.	6.625
Tin, Straits, cents per lb.	41.375
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.675
Somerset mine run, Boston, net tons	2.375
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons	1.35
Central, Ill., screenings, Chicago, net tons	.825
Kansas screenings, Kansas City, net tons	2.25
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.60
Weatherproof wire base, N. Y., cents per lb.	18.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal.	$0.98
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	11.25
Turpentine, (bbl. lots), N. Y., per gal.	$1.01

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Rolling Stock

Princeton Power Company, Princeton, W. Va., has purchased four all-steel cars.

Detroit United Railway has ordered from the St. Louis Car Company ten all steel passenger interurban cars. The cars are of the same type as the ten ordered by the Indiana Service Corporation.

Tygarts Valley Traction Company, Grafton, W. Va., will receive two cars from J. G. Brill Company of Philadelphia. The secretary of state of West Virginia authorized the leasing of the cars to the company for an initial payment of $3,245 and the payment of three like sums within the next ninety days.

Illinois Power & Light Corporation, Chicago, Ill., has completed plans for building six new 80 ton, all steel, electric locomotives, 1,000 hp. each, at the Decatur, Ill., shops of the Illinois Traction System. The cost of the new equipment will be approximately $180,000. It will be used for hauling freight cars and bring the total number of electric locomotives of the system up to thirty-six.

Track and Line

Georgia Railway & Power Company, Atlanta, Ga., has been granted permission by the City Council to extend its tracks on Highland Avenue, a distance of more than 2¼ miles from the present terminus at Virginia Avenue.

New York, N. Y.—The Transit Commission recently announced that it had awarded the contract for the extension of the Fourth Avenue subway, Brooklyn, from its present terminus at Eighty-sixth Street to Ninety-sixth Street, Fort Hamilton, to the T. A. Gillespie Company, at the figure of $1,725,884. Bids were received by the commission on Oct. 2. The Gillespie Company was the lowest of six bidders.

Princeton Power Company, Princeton, W. Va., is planning the construction of a sidetrack on Princeton Avenue, just west of the intersection of Black Street for the operation of cars from Graham, Va., to the Bluefield fair grounds without the necessity of transfer. Another switch is to be constructed between Hale's crossing and the state line. The company is considering the question of looping both Bluefield and Graham with a belt line.

Power Houses, Shops and Buildings

Northern Ohio Traction & Light Company, Akron Ohio. expects to link up with the super-power lines of the Cleveland Electric Illuminating Company. Work on the connection is progressing rapidly and it is expected that the new supply will be available within the next few months.

Chicago, North Shore & Milwaukee Railroad, Milwaukee, is arranging to erect an addition to its present freight station which it now operates in conjunction with its street railway terminal at Sixth and Sycamore Streets. The cost of this new addition will be $16,800.

Boston Elevated Railway is demolishing the remaining portions of its carhouse at Neponset which was damaged by fire months ago. The trustees of the company propose to build no more carhouses at present. The company will, however, build some inspection sheds large enough to cover hundreds of cars should it be found necessary. With this idea of outside or field storage of cars in view the Elevated officials are making substantial progress at Lotus Place in providing a modern yard layout to care for cars now using Jamaica Plain and old Lotus Place (Forest Hills) carhouse. There are now 177 cars at these stations and the new layout will care for 290. Jamaica Plain station is to be abolished. The land will be sold. Work is underway on the development of a modern yard at Salem Street, Medford station. The carhouse there is rapidly being demolished. Rapid progress is also being made at the Everett repair shops. The contract calls for the completion of the new shops on Oct. 26. The Boston Elevated expended $1,027,614 on this unit up to June. The development comprises twenty-five acres.

Trade Notes

L. B. Breedlove will act as consulting engineer to the bond department of the Chicago Trust Company. He will advise in the analysis of public utilities and industrial properties in the financing of which the bank is interested.

Western Electric Company, New York, N. Y., announces that the general sales offices of its supply department is located in the Pershing Square Building, 100 East Forty-second Street. Herbert Metz has been appointed advertising manager.

Detroit Stoker Company announces the appointment of E. L. Beckwith as district manager in charge of the Chicago office, address Illinois Merchants Bank Building, 230 South Clark Street. Mr. Beckwith is an engineer with many years experience in stoker sales work.

Newhall Company of Ohio has filed a certificate of incorporation in the office of the Secretary of State. The corporation, capitalized at $50,000, will engage in railroad construction work. Samuel B. Botsford, 925 Fidelity Building, Buffalo, is named as agent. R. M. Morgan of 1306 Williamson Building, Cleveland, is attorney.

P. W. Wood has moved his office to 1003 Carondelet Building, New Orleans. Mr. Wood is the Southern agent for the Buda Company, Railway Track Work Company, American Cable Company, and has recently been appointed agent for the Witherow Steel Company. In addition to handling these accounts, he also does a general business in track material of all kinds.

Link-Belt Company, Chicago, announces the purchase of the Meese & Gottfried Company, San Francisco, Los Angeles, Seattle and Portland. The improvement in distributing facilities effected by the consolidation, and the additional manufacturing facilities acquired should give the rapidly-growing industries of the Pacific Coast highly economical and efficient service. It is the intention of the new owners to add to the facilities and enlarge present stocks, so that prompter service to its customers will be insured. The new organization will be known as the Link-Belt Meese & Gottfried Company with headquarters at San Francisco. The officials include Charles Piez(chairman of the board; B. A. Bayman, president; Harold H. Clark, vice-president and sales manager; Leslie W. Shirley, treasurer, and Richard W. Yerkes, secretary.

New Advertising Literature

Johns-Pratt Company, Hartford, Conn., has recently issued new catalogs on the Noark service boxes and the Noark universal service switches.

Reliance Electric & Engineering Company, Cleveland, Ohio, has issued bulletin No. 2014, descriptive of Type T Reliance motors for direct-current circuits.

Heine Boiler Company, St. Louis, Mo., has issued a circular describing the two boilers installed within the past two years in the plant of the Cambridge Electric Light & Power Company at Cambridge.

Hisey-Wolf Machine Company, Cincinnati, Ohio, has issued bulletin No. 1305, with illustrations, describing in detail the company's full line of new and improved two-wheel floor and bench grinders.

Combustion Engineering Corporation, New York City, has issued bulletin CB2, describing the Coxe traveling grate stoker. Typical evaporative tests of this stoker with various types of boiler are tabulated.

Mitchell Rand Manufacturing Company, New York, N. Y., has published a handbook called "Everything in Insulation." This book, of 160 pages, is printed on beautifully calendered paper, well illustrated, sewed and bound in a cover of flexible Spanish leather. It is written in words that the man in the shop can understand and put into practice in his daily work. Among the subjects treated are the selection of insulation varnishes, paper and wood as insulators, electrical insulating paints, etc. Compounds of every description for waterproofing, insulating, electrotyping, impregnating, filling, sealing, etc., are described in detail.

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New York, Saturday, October 27, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 17

Efficient Arrangement of Machine Tools Goes Hand in Hand with Modern Machines

WHEN costs of turning steel wheels are compared, as in this issue, in the second survey article on wheel, gear and axle practice, a great variation is found. This is because the time required to turn a pair of steel wheels and the resulting cost of the operation depend on several factors. These include the skill or efficiency of the workman, the adequacy of the wheel lathe, condition of the cutting tools, the handling devices provided for getting the wheels to and into the lathe, the arrangement of the shop, layout of machines, convenience of storage space, and finally the condition of the wheels to be turned.

In general, the machine tool equipment for wheel and axle work is good only here and there in electric railway shops. A few railways have installed new wheel lathes or boring mills. Others have overhauled old tools and rearranged their shops to increase output. In all of these shops a marked improvement has resulted. By installing a new wheel lathe, using high-speed tool steel, and increasing the cutting speed, one road is taking care of wheel turning with two men where nine were used previously. The saving in labor alone will pay for the initial investment in two years.

Another shop had an excellent wheel lathe of late type, but the handling devices were entirely inadequate. The space for bringing wheels to and taking them away from the lathe was so cramped that one operation interfered with the other. Wheels were allowed to accumulate around the lathe to such an extent that the work of getting wheels into and out of the lathe was hindered. Furthermore, very little attention was being given to the quality and condition of the cutting tools, so that the lathe was operated at a slow speed. At this shop one machinist and a helper turn from eight to ten pairs of wheels in an eight-and-one-half-hour day, while at another shop, equipped with the same type of wheel lathe, but where particular attention has been given to handling devices, machine location and cutting tools, a man and a helper turn from sixteen to eighteen pairs of wheels in nine hours.

Railway shopmen are anxious to make a good record, and they work to that end when sufficient attention is given to the matter of tools and working conveniences, and to training of the men in modern shop methods. In the case just given, the output obtained from a $22,000 investment was only 50 per cent of what it might have been with proper handling equipment and sufficient space for doing the work, which could have been provided for an additional investment of less than $2,000.

Better cutting tools will prove a good investment. There is little use in spending money for an up-to-date wheel lathe unless the tools used on it will allow the machine to be operated at its full capacity. Tool grinders were found in most of the shops visited in making this survey, but there was a wide variation in the way tools were ground. Even in the same shop, different machinists had different ideas of the angle, clearances and rake to be given tools, and they insisted on the tools they used being ground in accordance with their own ideas. By determining the best practice and making this uniform, much can be gained.

Modern machine tools applied to railway shop work are capable of economies that managements should know about. Improvements in present machines and their location in an effective plan should be considered, for in many cases good savings can be effected by this means, although this may be considered a substitute for a better plan, namely, new tools.

The Engineer in the Equipment Department

IN THE recent Annual Convention Number of the JOURNAL reference was made to the necessity for properly trained engineering organizations in the equipment departments of electric railways. It was pointed out that such an organization is necessary for the formulation and maintenance of company standards, and that through such work it can effect large economies by cutting down repair part stocks and eliminating costly maintenance delays.

Even on the larger electric railways there are very few instances where such engineering organizations have been developed to a degree warranted by the importance of the work to be done. On many properties the engineer in the rolling stock organization is entirely engaged in the work of preparing drawings for either new car construction or repair work. On other properties he is entirely occupied in experimental work. His work is frequently looked on as of a rather minor nature and he is frequently a comparatively young and inexperienced man who is willing to accept the compensation offered in order to broaden his experience.

Even these initial steps in the formation of an engineering division are to be commended, for there are too many instances on properties of considerable size where all development as well as routine maintenance is carried out entirely by shop foremen or mechanics under only the general supervision of the department head. In the interest of what is considered economy, very few drawings of any kind are prepared by the railway and new parts are made or ordered largely from samples or manufacturers' description. This limits the source of supplies, as many manufacturers cannot compete for the business because of incomplete information on the requirements.

It is time that the place of the engineer of equipment in the operating organization of the electric railway be recognized. In no branch of the industry is there an opportunity for greater direct economies from the appli-

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cation of engineering methods of study and analysis than in the rolling stock and shops department.

The engineering division, in addition to carrying out the work of standardization which was discussed in the convention issue, should also include under one head all experimental work, all preparation of drawings and the studies of manufacturing and maintenance practices. To do this effectively the engineer of equipment should not be submerged in the maintenance organization but should be a member of the staff of the department head.

Most important of all, perhaps, in summing up the reasons why railways should maintain an equipment engineering division is the stimulus that this would supply in the general development of the electric rail vehicle. With all these engineers relieved of the burdens of routine maintenance and constantly thinking individually and collectively along lines of how to obtain better designs and more suitable materials, the cumulative effect in the industry would produce a much more rapid rate of development than has prevailed during the past ten years or so, during which the bulk of development work has been that done by the manufacturers due largely to competition.

What Is a Good Superintendent of Equipment Worth?

ON JULY 1 of a recent year a certain large railway company owned 633 cars, out of which only 360 were in service. This means that 273 cars were either in bad order or stored as obsolete. The number of pull-ins per day was averaging ninety, or 25 per cent of the cars in service, and the cost of conducting the mechanical department was $1,300,000 a year.

With this as the situation, a new superintendent of equipment took charge. During his first year the expense of operating the mechanical department dropped to $970,000, though ninety-five new cars were purchased whose maintenance was added to the work of the department. At the end of two years, with 728 cars total owned, the company had actually scheduled 690 cars. Only thirty-five cars were being held out for everything—wrecks, bad order, painting and general overhaul. The number of pull-ins per day was running from twenty-five to thirty, which is about 4 per cent of the cars in service, and the annual expense of the mechanical department had been cut to $820,000. For completeness, this record of accomplishment should include a notation that of the motors which had to be maintained about half were from twelve to twenty years old.

How was it done? One of the first steps taken by this new superintendent of equipment was to install a system which enabled him to know his costs. He organized the shops for maintenance work and got some new machine tools and employed some first-class mechanics. The investment in the new shop tools was quickly gotten back out of the savings resulting in labor and the more rapid production. The old motors were put in shape and a systematic overhaul program inaugurated. The whole difficulty in the past had been deferred maintenance and a careless planning of work.

What is a superintendent of equipment of these abilities worth? He made a saving of nearly half a million dollars in two years time in the annual cost of operating the mechanical department. But even more important than that, he increased the number of cars available for service, and therefore improved the company's ability to earn revenue, from 360 cars to 690 cars.

But what was this man paid? His annual salary was about 1 per cent of the saving he had been able to make, and it was only 0.6 per cent of the reduced annual expenditure of the mechanical department. He left the company after two years to accept a more lucrative position offered him in the manufacturing field.

When a man of this ability has demonstrated his worth, one would think that a railway company would not permit any one to deprive it of his services. The need for skill in railway maintenance work and the opportunity existing for making large savings are very great. Ability applied here should be paid for just as well as anywhere else.

Wood Preservation Means Forest Conservation

FOREST conservation is an extremely important national problem in this country, as this paper has pointed out at various times. Likewise it is one of growing seriousness as the timber is cut and not replaced. The situation is well expressed in the words of the late Joyce Kilmer:

> "Poems are made by fools like me,
> But only God can make a tree."

Even this does not tell the whole story because it does not tell how long it takes God to do the work. The rapidly disappearing forest is not a myth. It is a fact only too well understood by our Forest Service but unfortunately not yet appreciated by a great number of the larger consumers of timber.

There is, however, a method of conserving timber which is open and available to every one; that is, the preservation of it by certain well-known methods of treatment. The wood preservation committee of the American Electric Railway Engineering Association, which functioned for the first time this year, gave a great deal of information in its report as to how treatment of wood for railway purposes may be accomplished. The methods of treatment which are discussed in the report are such as are available to practically every user of timber. Their application will increase the life of the timber a great deal, the better methods making the life more or less indefinite. In fact, mechanical wear is the cause of most failure of timber thus treated. The results to be obtained from the various methods of preservation are fairly well known and guesswork has been practically eliminated.

Despite the work that has been done in the preservation of wood, the use of preservatives is not spreading as rapidly as would be desirable for the good of our forests. Figures presented elsewhere in this issue show that the amount of wood being treated at the present time is but little in excess of the amount being treated ten years ago. While this is due to some extent to policies of retrenchment that have been in force, still a great deal of untreated wood is used where proper preservative methods should be applied. The work of the wood preservation committee should bear practical fruit if its efforts result in a greater attention to treatment of timber.

It takes many years to reap the benefit of reforestation, but the benefits of wood preservation are available at once, and its immediate adoption would greatly lighten the burden on our already overtaxed forests. Wood preservation is an economic necessity which must sooner or later be recognized by every industry using wood for structural purposes.

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Wheel, Gear and Axle Practice—II

Efficient Arrangement of Machine Tools with Ample Provision for Placing Material Into and Taking It Out of Machines Reduces Cost and Time Necessary for Wheel and Axle Work—Storing Both Rough Material and Finished Products Adjacent to Machines Where Work Is Done Has Advantages—Savings Possible with Modern Machine Tools

The first article on this subject was published in the ELECTRIC RAILWAY JOURNAL *for Aug. 18, 1923. It contained information of the mileage obtained and costs resulting from the operation of cast iron and steel wheels, together with a discussion of some conditions that limit the life obtained from wheels and the expedients used to increase mileage of wheels in service. In this, the second article of the survey, methods, equipment and shop arrangement used in maintaining wheels and axles are treated.*

IN CONSIDERING the various shop layouts of the sixty railways visited in making this survey it was found that in most cases the machines for wheel and axle work were grouped in one section of the shop. This proves particularly effective in reducing the number of times that wheels and axles must be handled and it also reduces the amount of handling equipment needed. Where railways have several shops at which inspection and overhauling are done, wheel and axle work is quite generally centralized at one shop. On most of the larger railways the system is organized into divisions, and wheel and axle work for the different divisions is done at the shop most centrally located. Wheels and axles requiring maintenance work for the different divisions are sent into and returned from the wheel and axle department on supply cars. These supply cars are usually provided with a derrick for quick handling. The larger systems have a definite schedule for the operation of such supply cars and by this arrangement a single car and crew can take care of the entire distribution. On one system the supply car was said to average only 180 miles per six-day week. This shows how great a saving in mileage can be made by bringing car equipment to the places where the cars are housed rather than by running the individual cars to a distant shop for every change in wheels or axles.

The equipment in the wheel and axle departments will vary, of course, with the number of cars and the variety of wheels used. Where steel wheels are used the wheel and axle department will ordinarily have a wheel press, boring mill, wheel lathe and axle lathe. In addition some shops have an axle straightener, welding machine for building up flanges and axles, and a few have a milling machine for cutting key ways. Railways using cast iron wheels in most cases have a wheel-grinding machine of some form, either pit type or floor type.

The wheel presses used for electric railway service run from 250 to 400 tons capacity, with a large majority using the 300-ton size. Wheel lathes and boring mills are used in sizes from 34 in. to 48 in., with a majority of roads favoring the use of the 42-in. size. Axle lathes are used in sizes from 20 in. to 36 in. Jib cranes are quite universally used for serving the individual machines, with some provisions for moving the wheels and axles about the department, or to and from storage by either overhead traveling cranes, traveling trolley hoists or wheel and axle wagons.

A convenient and well arranged wheel storage is a great time and labor saver. A very satisfactory arrangement is used at the Chattanooga shops of the Tennessee Electric Power Company. A concrete platform has been constructed at the sides of the shop on the same level as the shop floor. One of the yard tracks runs alongside the platform so that wheels can be loaded readily on and

Boring Mill in Boston Elevated Railway Shop, Equipped with 15-Hp. Motor and with 1,000-Lb. Air Hoist

The tool spindle of this boring mill has provision for three tools, one for making the rough cuts, one for the finishing cuts and one for the fillet cuts. The various cuts can be made without changing the position of the wheel on the bed.

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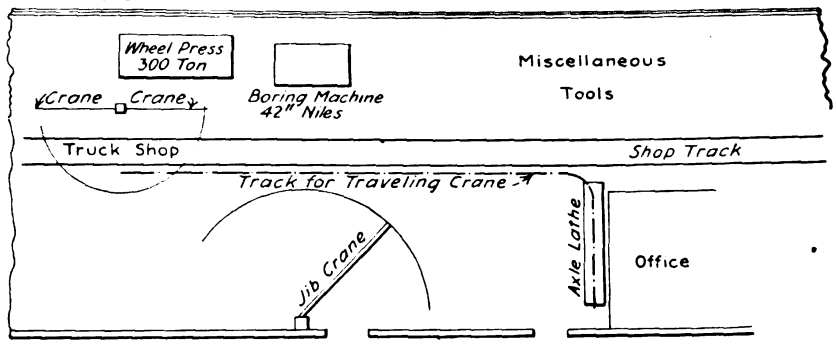


Platform for Wheel Storage

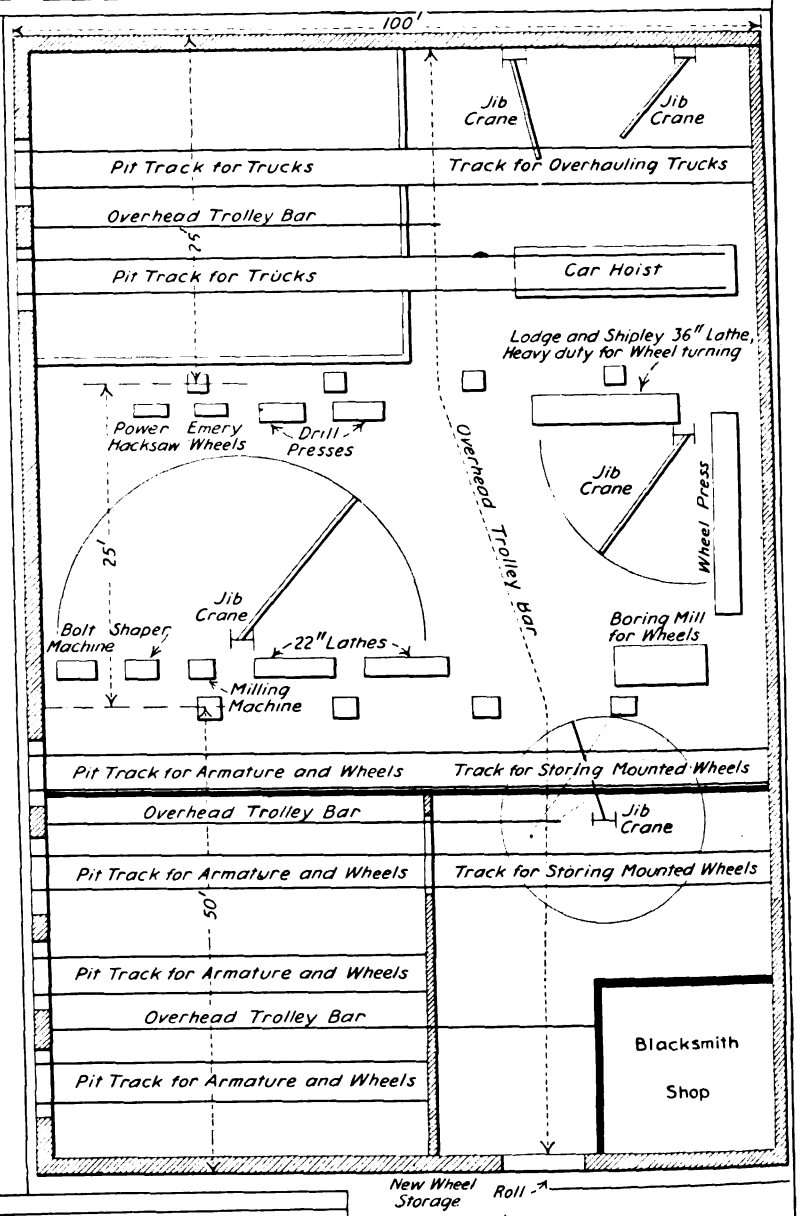
Wheel and Axle Work at Terre Haute, Norfolk and Chattanooga

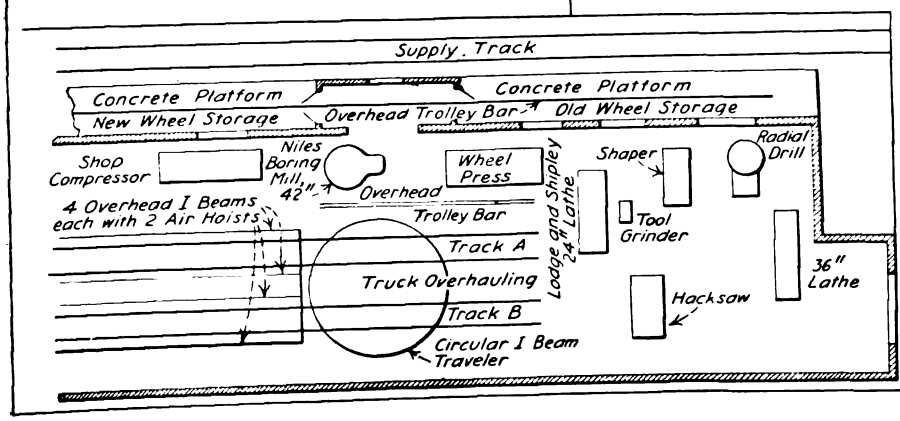
In the shops of the Terre Haute Traction & Light Company, shown in the top plan, a wheel press, boring mill and axle lathe are all located adjacent to the truck overhauling track. Three jib cranes and an overhead traveling hoist are used for handling the wheels and axles. Wheels that require removal are taken to the wheel press and axles that require turning to the axle lathe by the overhead traveling hoist. New wheels are stored on a platform just outside the shops. After rolling in through an adjacent doorway, they are handled by a jib crane and the overhead traveler to the boring mill for boring. After finishing, they are sent to the wheel press for mounting. From here the wheels are rolled and handled by the crane to storage, which is on shop tracks outside the shop. Wheels are turned by the use of an oxy-acetylene torch as described in the ELECTRIC RAILWAY JOURNAL for July 21, page 104, and as a result a wheel lathe is considered unnecessary.

Handling Wheels and Axles at Norfolk— The wheel and axle department of the Virginia Railway & Power Company, Norfolk, Va., shown at the right, is located at the end of the shop between tracks used for truck overhauling and for general inspection work.

Wheels that have reached their limit of wear are handled direct from the truck overhauling track to the wheel press by means of an overhead trolley hoist. A jib crane is also conveniently located to serve both the wheel press and wheel lathe. New wheels are stored on a concrete platform outside of the shop. They are rolled from this storage to a doorway and from that point are handled to the boring mill by the same overhead traveling hoist which runs entirely across the shop. After finishing and mounting, the wheels are stored on two tracks adjacent to the boring mill. Axle work is done on two lathes adjacent to the wheel boring mill. This arrangement of jib cranes and overhead traveling hoists is particularly effective for handling various equipment parts.

Arrangement of Wheel Work in Shop of the Tennessee Electric Power Company— The wheel and axle department of the company in Chattanooga, shown in the lower plan, is adjacent to the shop overhauling tracks. Supplies are delivered to a concrete platform along the side of the building and are handled from this storage to machines. A circular I-beam traveler reaches across the two truck overhauling tracks, as described in the ELECTRIC RAILWAY JOURNAL for July 21, 1923. The front end of the overhauling track is equipped with four overhead I-beams, each with two air hoists for convenience in lifting car bodies. Wheels that have reached their limit of wear are taken from the truck and handled by an overhead trolley to the wheel press. From the boring mill, wheels are handled to the wheel press by the overhead trolley bar.





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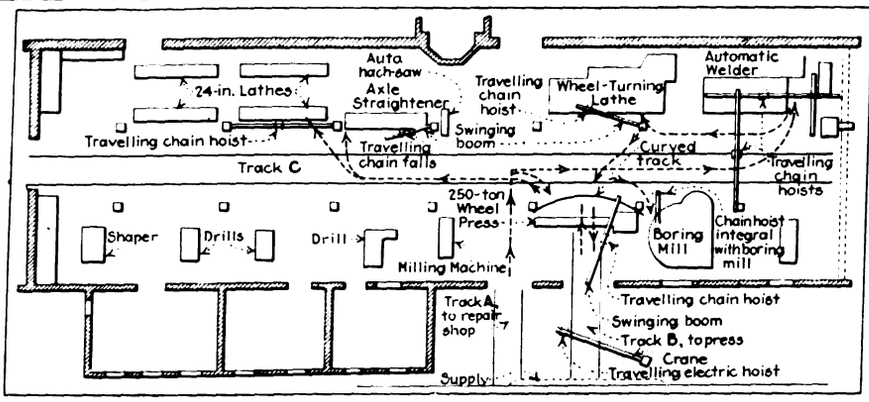
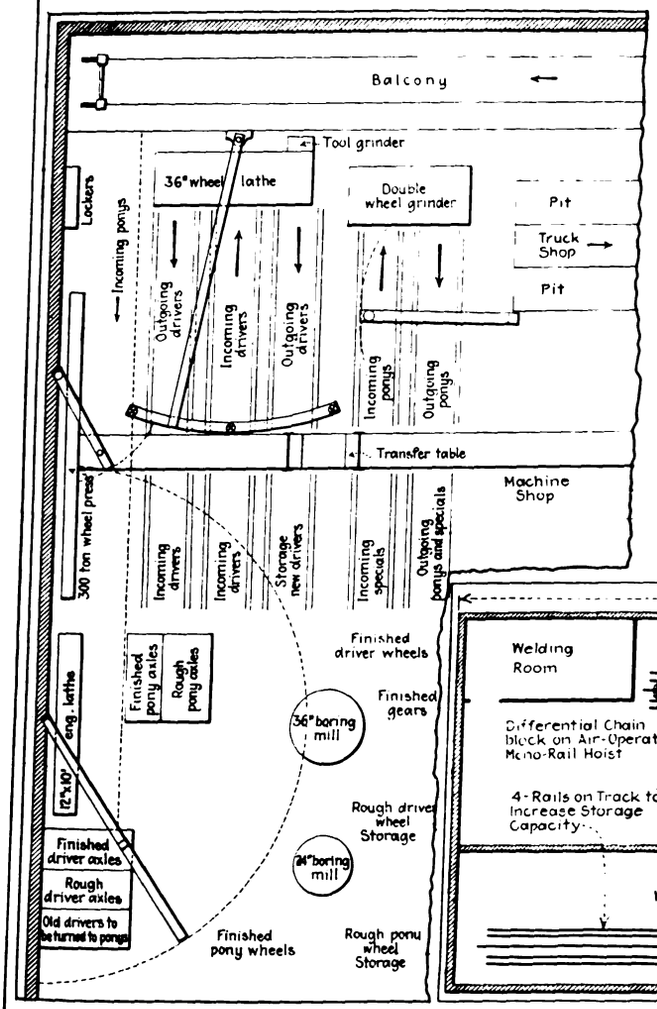
Eastern Massachusetts, Third Avenue and Puget Sound Companies' Practice

The Chelsea Shops, shown at the right, handle all wheel and axle work for the Eastern Massachusetts Street Railway System. A supply car picks up the wheels and axles requiring repairs and brings them in. The wheels are unloaded by a crane and placed on tracks A and B. Wheels with worn flanges are placed on track A and are then rolled into the main-aisle track C. A telpher removes the wheels from this track and places them in position in the automatic welder, where worn flanges are built up. After this operation the wheels are again removed by the same telpher system and by a swinging post derrick which serves the wheel lathe. After turning wheels are placed on the outgoing track B for delivery to the supply car.



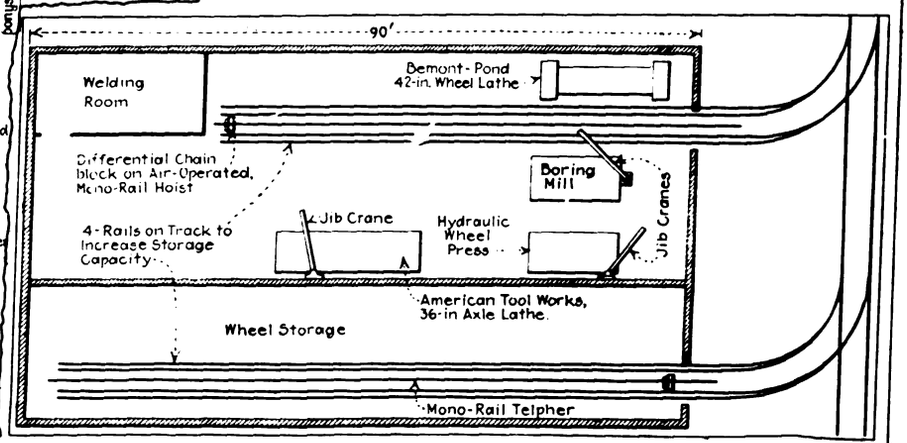
Wheels which have reached their limit of wear are delivered by the car to track B, from which they are rolled to the wheel press, where they are removed. New wheels are taken from storage directly under the electric derrick and are installed. The electric derrick also serves the boring mill, to which new wheels are taken in quantities of twenty. Here they are bored to their respective dimensions and then laid aside for mounting. Axle work is done by the machines at the left in the upper illustration.

Speedy Routing a Feature of Third Avenue Shops—The wheel and axle department of the Third Avenue Railways, New York, shown in the plan at the left, presents an orderly and compact arrangement. Wheels and axles are received either from cars which run into the shop on the balcony, or from the truck overhauling shop, adjacent to the wheel and axle department. Both of these, together with other departments, are served by a large overhead traveling crane, which delivers the incoming material to the particular track or location designated for receiving it. After inspection the units are routed in three ways: First to the wheel press for dismounting, if any part is to be scrapped, or should an axle need to be turned or straightened; second to the grinder, for cast-iron wheels, and, third, to the lathe for turning steel wheels.



Wheels and axles are finished in the boring mills and axle lathes and then stored in their particular section. They are handled from these storage points to the wheel press by means of a large jib crane. After the units have been assembled they are routed either direct to the wheel lathe or grinder, if work by these tools is required, or to the outgoing tracks for inspection.

The wheel press is served from the floor by the transfer table and by a 1-ton air hoist mounted on a 10-ft. jib crane. The wheel lathe is served by a 1-ton electric hoist, mounted on a 22-ft. radial roller crane. The wheel grinder is served by a 1-ton air hoist mounted on a 10-ft. jib crane, and a 20-ft. jib crane equipped with a 1-ton chain hoist takes care of the axle lathe and the boring mills.



Equipment for Wheel Repair in Shop at Tacoma, Wash.—Wheel and axle work for the Puget Sound Electric Railway, the Tacoma Railway & Power Company and the Pacific Traction Company is taken care of at the Tacoma shops, shown above. A large wheel storage space is provided adjacent to the general machine shop. This has four rails on the track in order to increase the storage capacity and is served by an overhead traveling telpher. Wheels and axles that require machining are delivered on the track in the general machine shop. Where wheels are to be scrapped or axles turned or straightened, these are delivered to the hydraulic press. Wheels that require re-turning are routed to the wheel lathe. New wheels are bored out in the boring mill and axles are turned in a 36-in. lathe. All these machines are served by jib cranes, and in addition a differential chain block on an air-operated monorail overhead hoist runs the length of the shop over the track. The welding room forms one corner of the shop and flanges are built up where warranted.

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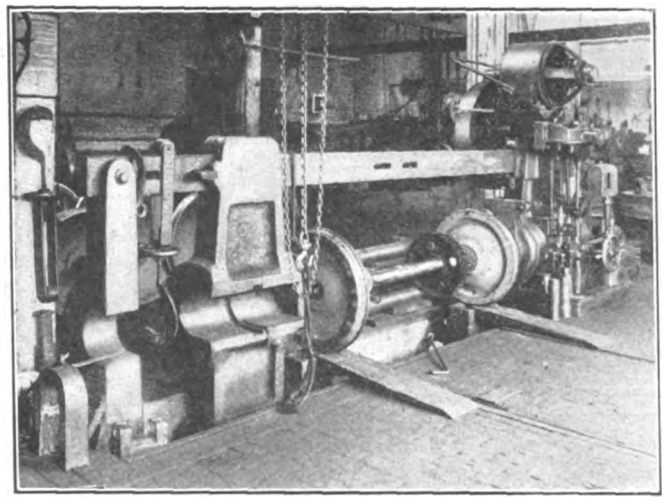


Motor-Driven 250-Ton Hydraulic Wheel Press in Chelsea Shops of the Eastern Massachusetts Street Railway

This press is equipped with triple pumps and has hydraulograph attachment.

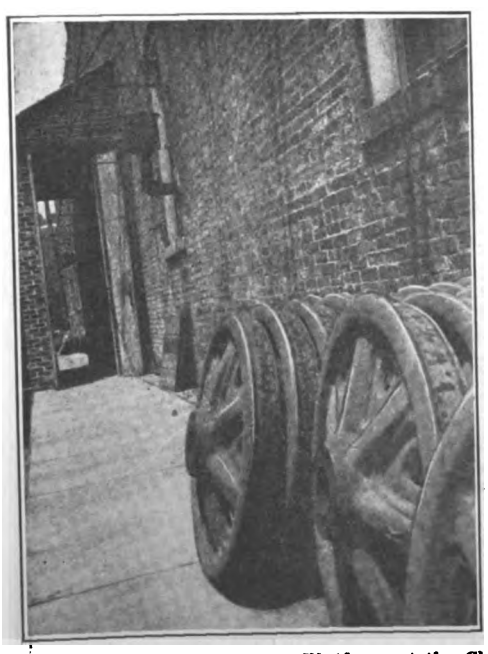
off the storage platform from a car run alongside. The center part of the platform is taken up by a bay projecting out from the shop. Folding metal-covered doors are provided at each side of the projection. An overhead hoist travels the entire length of the platform and the overhead track on which it runs extends through the shop projection. With this layout wheels can be picked up by the hoist and handled into the shop and placed right at the machines. Scrap wheels are taken out and placed in position for loading in the same manner. This system involves but one handling in either case. New and scrap wheels are kept separate by using one end of the platform for new material and the opposite end for scrap. Accompanying illustrations show the platform and the interior arrangement of the shop, with wheel press and 42-in. boring mill located right at the projecting bay. Several other railways have found a great advantage in having storage space for rough material in the immediate vicinity of the tools on which the work is done, rather than in a general storeroom.

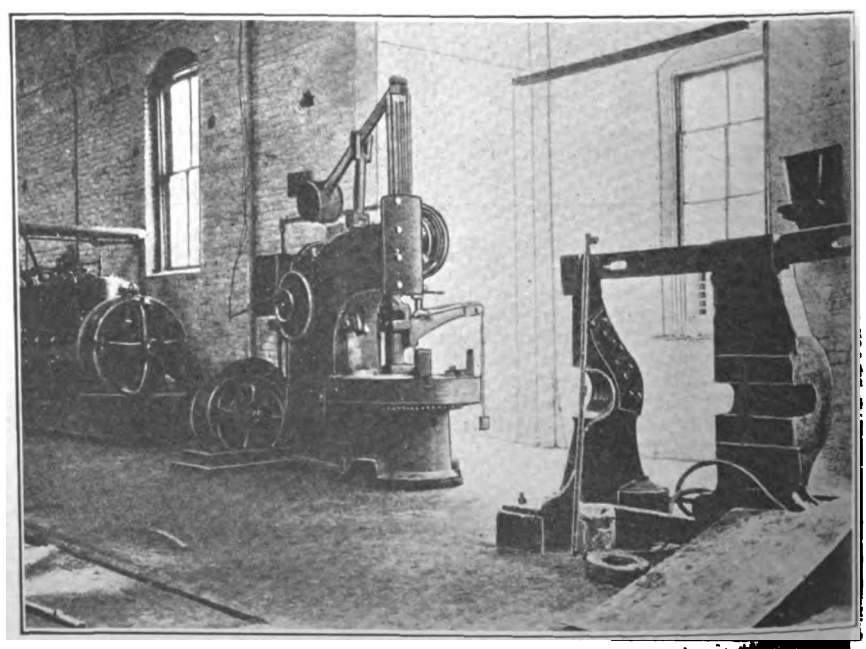
The storage of wheels, after they are mounted on axles, usually is taken care of in a space with tracks and the wheels are placed on the tracks. In order to economize on space several railways have provided this storage with gauntlet tracks, one rail being placed between the rails of the adjacent track. Wheels when stored are then staggered so as to fit inside those on either side. This arrangement is of particular advantage where mounted wheels are stored inside the shop adjacent to the wheel and axle department. It has been successful in the Sixty-fifth Street shops of the Third Avenue Railway, New York City, and in the Tacoma shops of the Puget Sound Electric Railway.

A number of layouts of the wheel and axle departments for different railways are shown in accompanying illustrations, and where a particular routing is followed for the work this is given. In most smaller railway shops, however, very little attention is given to routing the work to the different machines. Of course it is not such an important factor here because wheels and axles are taken out of trucks for some special attention and they go directly to the machine where the work is to be performed and when finished are often either returned to the same trucks or taken to storage. On the larger railway properties more attention has been given to the location of the various machines so that the work can be handled from one operation to the next without interference and with the least labor.

Shop Rearrangement Increased Output 50 per Cent

An accompanying illustration shows the recently rearranged wheel and axle department of the Third Avenue Railway, New York City. Particular attention was given to routing the wheels and axles and an orderly and compact arrangement resulted. Incoming and outgoing material are kept entirely separate. As a result of the rearrangement, production of pairs of wheels necessary for delivery to the truck overhauling shop and to the various carhouses was increased 50 per cent and at the same time the cost per pair of wheels handled was reduced 20 per cent. By providing ample labor saving devices for handling, not only were costs reduced and production increased, but inspection of the





Left—Wheel Storage Platform at the Chattanooga Shops of the Tennessee Electric Power Company. Right—Extension of Shop Over Platform Facilitates Bringing Wheels Into the Shops for Machining

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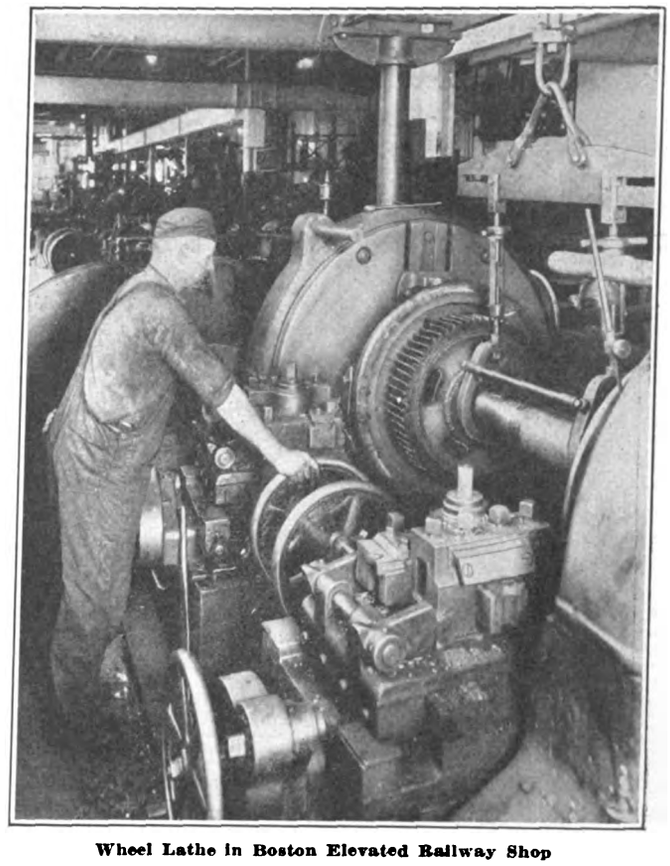
finished material is made in a more thorough and orderly manner. This is of particular advantage in this shop, due to the piece work system employed.

Old Tools Can Be Partly Modernized

Along with the rearrangement of machine tools, two railways report changes in the machines themselves in order to provide for increased duty. In Brooklyn two wheel lathes had their 15-hp. motors replaced by motors of 40-hp. capacity. New spool castings with heavier face plates, new drivers and pneumatic tool clamps were also installed. The rugged construction of the lathes made it possible to take advantage of high-speed operation so that the output of each machine was increased 100 per cent.

A 36-in. wheel lathe in the Sixty-fifth Street shops of the Third Avenue Railway was provided with two new tool posts. Additional parts for the old ones were also purchased so that these are held in reserve. A double wheel grinding machine was overhauled and the driving rigging was improved. A new exhaust system was also installed.

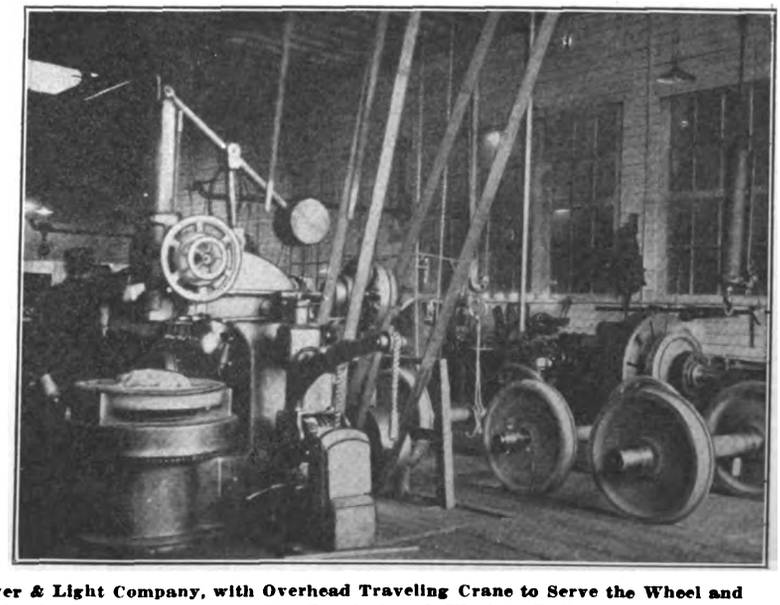
Several railways have increased the efficiency of wheel and axle departments by installing new machines and replacing hand-operated chain hoists by a motor or pneumatically operated type. Several of the new type boring mills used by electric railways are equipped with air hoists integral with the machine and with provision for several tools on the tool spindle. The various cuts necessary in finishing a wheel can thus be made without changing the position of the wheel on the bed. This convenience together with better facilities for handling has enabled a 34-in. wheel to be bored in fifteen minutes, whereas with older equipment seven pairs in an eight-hour day was the limit.



Wheel Lathe in Boston Elevated Railway Shop

This lathe has repeatedly turned a pair of steel wheels in fifteen minutes. It is driven by a 50-hp. motor and has two tool posts, both wheels of a pair being turned simultaneously. The tailstock is driven by a 6-hp. motor and an air hoist above the lathe handles the work. The lathe has a 42-in. swing.

A late type of wheel press is used in the Thirty-sixth Street inspection and overhauling shop of the Brooklyn-Manhattan Transit Corporation and in the Morris Park shops of the Long Island Railroad. These have provision for four tools in each of the two turret toolposts. The tools used are a roughing tool for the wheel tread, a flange roughing tool, a combined tread and flange finishing tool and a chamfering tool. This is a 42-in. lathe on which a ⅜-in. cut can be made at high speed. An average of two pairs of wheels per hour is being turned out in the Thirty-sixth Street shops. Through the use of the efficient clamping arrangement provided, wheels can be removed and new ones put in place for turning in two minutes. One man and a helper are used in operating this wheel lathe, and they are turning out as much work as was previously done by nine men and several older type machines.



Left—Huntington, W. Va., Shop of the Consolidated Power & Light Company, with Overhead Traveling Crane to Serve the Wheel and Axle Department. Right—Boring a Wheel in the Tacoma Shops of the Puget Sound Electric Railway. A Portion of the Wheel Lathe Is Seen in the Background at the Right

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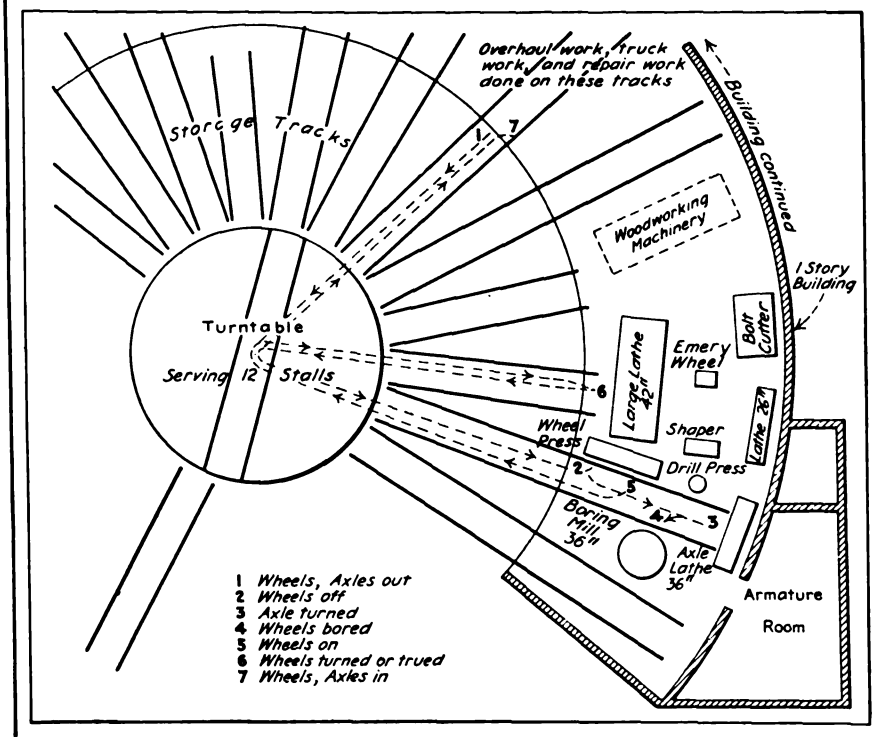


Work at Shops of Waterloo, Cedar Falls & Northern Railway

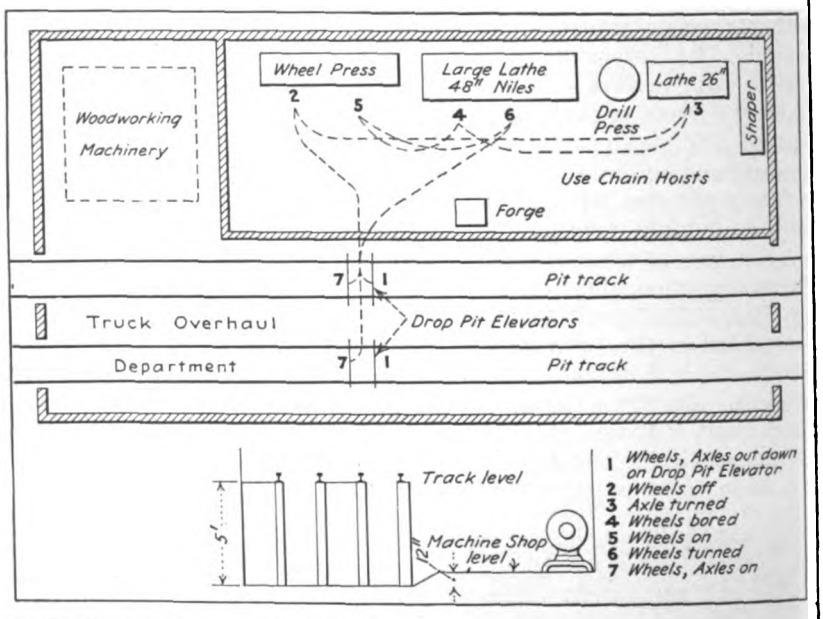
A round house serves as a shop for the Waterloo, Cedar Falls & Northern Railway. Wheels and axles are removed from trucks on the tracks used for truck overhauling work. An electric crane mounted on a small car transports the wheels and axles from the dismounting track to the turntable and then to the machine on which the repair work is to be done. The shop is equipped with two axle lathes.

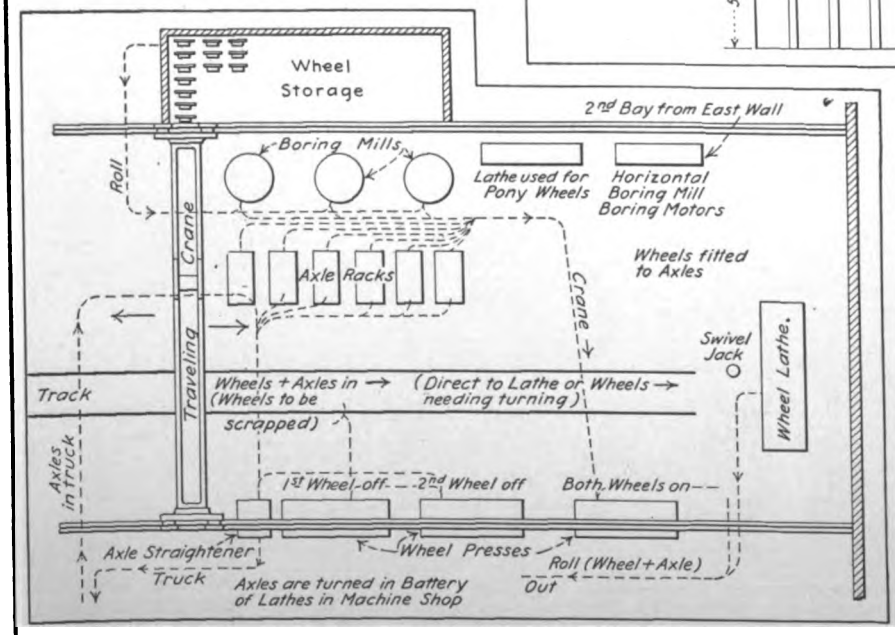
The track serving the 36-in. axle lathe also serves the 36-in. boring mill and wheel press, so that the wheels requiring removal are brought in on this track to the wheel press, and if the flanges and treads require turning they are handled on the adjacent track direct from the crane car to the wheel lathe.

New wheels can be brought in on a track adjacent to the boring mill and after being bored can be stored alongside. When they are required for mounting, they are handled from this position to the wheel press.

Shop of the Iowa Railway & Light Company, Cedar Rapids, Iowa

The floor level of the wheel and axle department in this shop is approximately 4 ft. below that of the pit track. Drop pit elevators are used for removing the wheels and axles from cars, and they are thus delivered to the wheel and axle department. Where wheels require renewing they first go to the wheel press and the axle then is delivered, if re-turning is necessary, to a 26-in. lathe by means of a chain hoist. After turning, it is again delivered to the wheel press. Wheels are turned in a 48-in. lathe, and after drilling to proper size are also delivered to the wheel press for mounting. The location of the wheel and axle department adjacent to the truck overhauling department is found particularly convenient.





West Shops of Chicago Surface Lines

A track leads direct to the wheel lathe for turning wheels with sharp flanges. Where wheels are worn to the limit, they are handled from this track to the wheel presses. Three wheel presses mounted in a row are used as indicated for wheel removal and mounting, and an axle straightener is conveniently located at one end. On new work, wheels are taken from the wheel storage and rolled to three boring mills. Wheels are thus bored out to fit the various axles on which they are to be pressed and are then handled by cranes to the wheel press used for installing wheels. Axles are turned in a battery of lathes in the machine shop, adjacent to the wheel and axle department.

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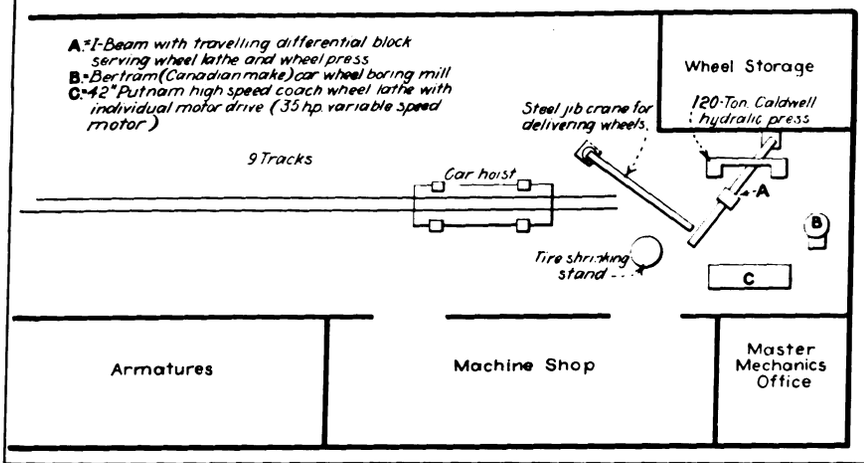
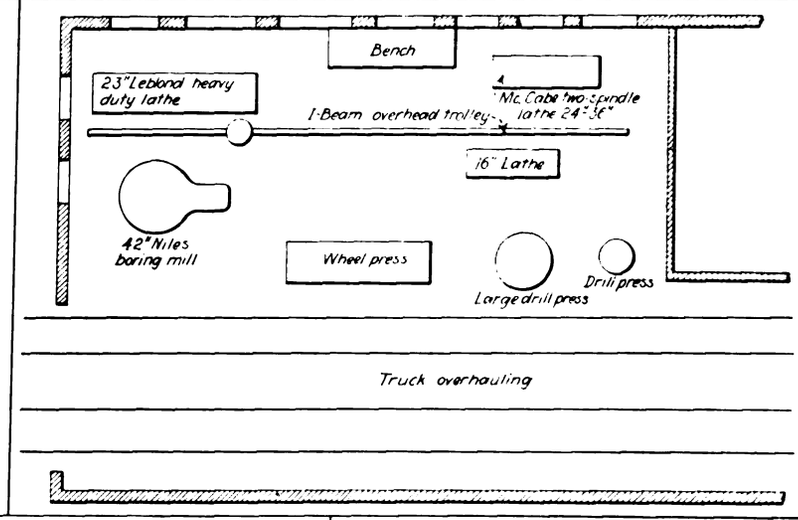


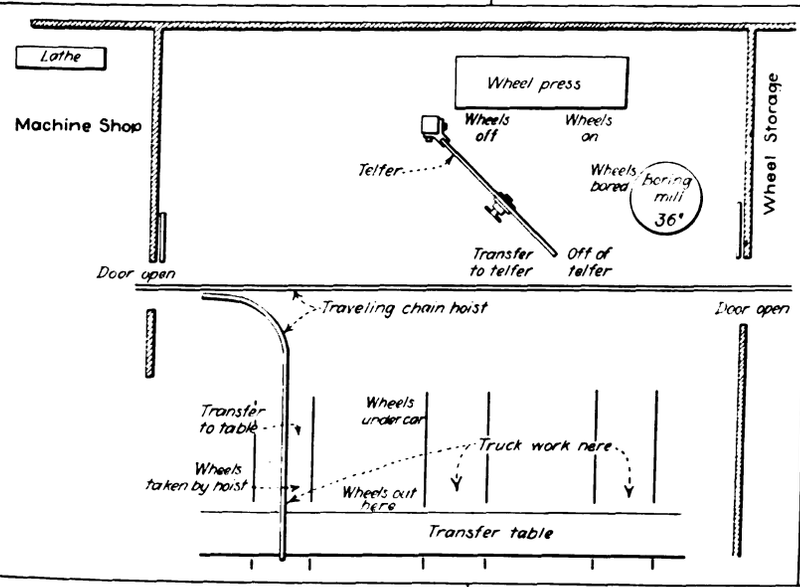
Wheel and Axle Equipment of the British Columbia Electric Railway

Wheel work in Vancouver, B. C., is done in a section just to the rear of the overhauling shop. A high-speed wheel lathe, 120-ton hydraulic press, wheel boring mill and tire-shrinking stand form the equipment. These are served by two jib cranes. Wheel storage is provided just back of the wheel press, and axle work is done in the machine shop, adjacent to the wheel department. Tires are also bored on a boring mill in the machine shop. The tire-shrinking stand has a concrete base with central hole and steel blocks to hold the wheels.

Wheel and Axle Department Adjacent to Truck Overhauling Track in Knoxville

Wheels requiring removal can be handled directly from the overhauling tracks to the wheel press in the shop of the Knoxville Power & Light Company. A 23-in. heavy duty lathe located in the corner is used for turning steel wheels, but as both cast iron and steel wheels are used on the system, this machine is required infrequently for this work, but it is also used for turning axles. A 42-in. boring mill with a five-jaw universal chuck is used for boring out wheels and gears. Two other lathes, one 16 in., the other double-spindle motor driven, are used. An I-beam overhead traveler serves this department. The shop floor is made of wood blocks.



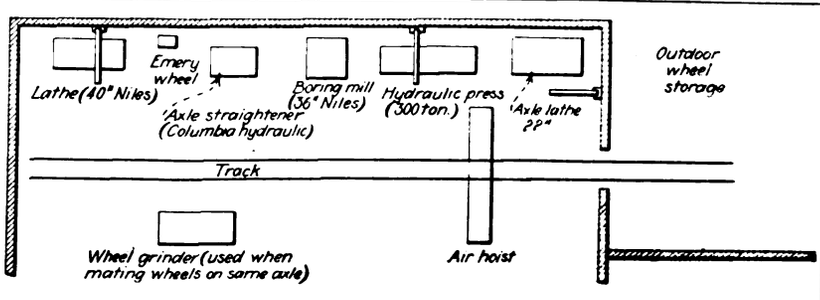


Wheel and Axle Practice of the Tri-City Railway, Rock Island, Ill.

No provision is made for grinding or turning wheels in the wheel and axle department of the Tri-City Railway at its Rock Island shop, as interurban steel wheels are sent out for turning and wheel-truing brake shoes are used for grinding cast wheels. The wheel and axle department is at the rear of the truck overhauling tracks. After removal, wheels are placed on the transfer table and from this are picked up by a traveling chain hoist. This overhead traveler serves the wheel and axle department and the machine shop. Axle work is done in a lathe in the machine shop. Wheel storage is provided at the side of the shop adjacent to the wheel and axle department, and a door opening is provided so that wheels can be handled from storage by the overhead traveler.

Portland Railway, Light & Power Company

The wheel department of this company in Portland, Ore., has a concrete floor and is traversed by one track. Wheels come in from the various divisions on flat cars and are unloaded by an overhead air hoist. They are rolled about the floor by hand, and the various machines have jib cranes. Outdoor wheel storage is provided at the entrance.



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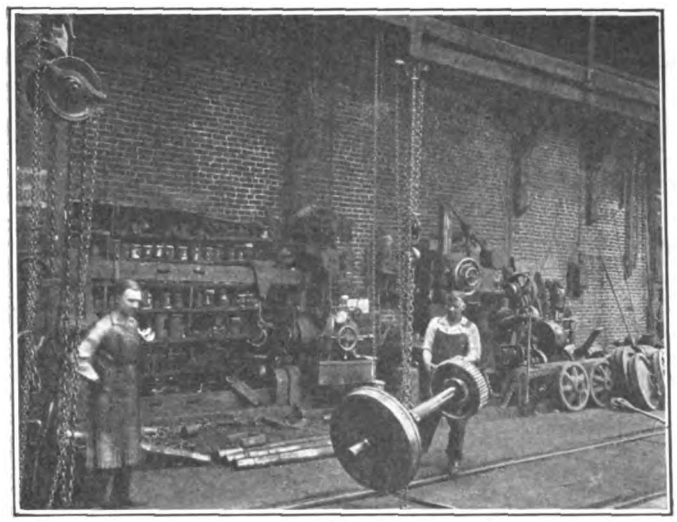

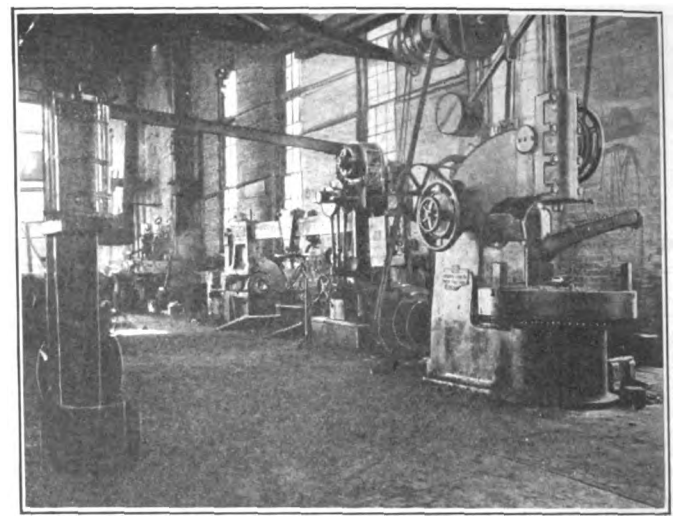

Left—Handling an Axle After One Wheel Had Been Removed in the Shops of the Terre Haute Traction & Light Company. Right—A 42-In. Boring Mill with Hoist Attachment Is Used for Wheels in the Shop of the Indianapolis Street Railway

The wheels are brought into and taken away from the wheel press on two tracks, one above the other—one on the floor level and the other elevated above this a distance of about 4 ft. Wheels requiring turning are brought in on the upper level and the finished wheels go out on the floor level. This arrangement is convenient for locations where space does not permit having two tracks on the same level.

Great Variation in Costs of Turning Wheels

In analyzing costs for turning steel wheels a considerable variation was found. This is explained by the great difference allowed in the wear of wheels on different properties by the varying facilities for handling, and whether or not the machine tools used are modern or out of date. Some roads remove wheels for turning at quite frequent intervals and do not allow flanges to become very sharp, while others allow a large amount of flange wear. Some high-speed interurban railways feel they would be taking a chance of having accidents if flanges were allowed to become sharp. Some others find flanges wear more rapidly after they are partly worn and while continuing them in service watch them very carefully during the latter period of use. When the flange wear appears excessive the wheels are removed and turned.

The amount of metal which must be turned off the tread, of course, depends on the condition of the flange, varying from $\frac{1}{8}$ in. to $\frac{5}{8}$ in. Very few roads keep a record of the amount of metal turned off, so it is impossible to give a comparison of costs per inch depth of tread metal removed. Costs reported for turning a pair of steel wheels range from 35 cents to $2, with an average of about $1.25. Several large railways are obtaining excellent results from the piece-work plan of payment for wheel turning. The Interborough Rapid Transit Company, New York City, has used the piece work system since 1912, and some interesting figures of the results obtained in turning steel wheels were published in the ELECTRIC RAILWAY JORURNAL for March 17, 1923. By using the latest improved machinery, high-speed tool steel and the piece-work plan the output in this company's shop has been increased to twenty-five pairs of wheels per day per man. It should be mentioned, however, in this connection that the Interborough company does not allow its wheel flanges to become excessively worn, so that the amount of tread metal removed per turning is less than that for most electric railways.

Tool grinding machines are also very important adjuncts to a wheel and axle department. In most railway shops grinders are located either in or close to the tool room. In comparing the amount of work turned out by similar machine tools, the importance of close attention to cutting tools was very apparent.

Tower Wagon in Shanghai, China

COOLIE labor is very cheap in Shanghai, China, and as a result it is used as the motive power for various maintenance of way and line vehicles. The accompanying illustration shows a trolley inspection and repair wagon in position for making repairs. Without pressure on the handle a support is in contact with the roadway and this, together with the wheels, gives a firm foundation. By pushing down on the handles the tower balances over the wheels and can be readily transported by the Chinese coolie. While coolie labor is used for truck vehicles, it is quite evident from the accompanying illustration that automobiles are quite generously used for passenger riding. The trolley lines are also reported as being very liberally patronized by the Chinese residents of Shanghai, who are very fond of riding on the street cars and other conveyances.

Making Overhead Repairs in China

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Putting Overhaul on a Production Basis

Many Methods Developed by Manufacturers Can Be Applied to the Railway Repair Shop—Scheduling All Work Can Be Done and Non-Productive Time Cut Down—Labor-Saving Devices Are Advantageous

*By Henry S. Day**
Railway Department Westinghouse Electric & Manufacturing Company

ALL successful manufacturing plants turn out their product on very definite schedules built up for the necessary processes and operations required to turn the raw material into a finished product. The one aim sought is to keep the workers continuously performing their allotted tasks without interruption caused by shortage of raw materials, non-progressive movement of work in process and shutdowns of machines due to plant failures.

To accomplish this a manufacturing program is planned months ahead of time. The first thing done is to obtain the raw material. Careful studies are made of the various machine tools needed in the process, and the capacity is figured to get daily output of each machine. Each lot of parts, then, is routed and timed to progress without blocking other lots, or keeping machine tools idle waiting for work, or overloading them, thereby keeping operatives idle waiting for parts.

Planning to Cut Down Non-Productive Time

Two of the greatest difficulties are to cut down non-productive hours and time required to handle or move material, either raw or in process of manufacture. Unless this planning is incorporated, serious losses will result. For many years little thought was given either to this feature or to the arrangement of buildings, machinery or facilities; but at present a new manufacturing plant has incorporated in the initial plans all of the physical arrangements that will make possible concentration of departments, progressive movement of raw materials, and work in process. Even the make-up of the organization that will operate it is provided for.

While this has been true in the case of leading manufacturers, it has not been applied to the same extent by the electric railways in the big shops they must operate to maintain their rolling stock. These shops employ large forces of men and use great amounts of material. While the operations do not duplicate those in a manufacturing establishment, unquestionably many of the money-saving methods and facilities of the latter can be applied to the car repair shop.

A schedule in the electric repair shop reduces to concrete values the work to be done, and makes possible the planning that bridges over the time between purchase of the materials and when the car actually enters the shop for overhaul.

The first and greatest problem in succesfully overhauling cars is to carry in stock at all times the right kind and quality of materials and supplies to meet the production schedule of a definite number of cars overhauled per day, and to make it possible to order in a car on a predetermined date and turn it out exactly on another predetermined date. The effectiveness of any production schedule is lost if this is not done, and it cannot be done unless material is available.

Co-operation between the shop and the stores department must exist to the highest extent. Unless the purchasing agent and storekeeper are working months in advance of shop schedules they cannot be expected to supply the demands. Cars running long over the shopping time planned not only demoralize the shop schedule, but hold rolling stock out of revenue service. A definite schedule, closely followed, also supplies the only means whereby the master mechanic can aid constructively the storekeeper in properly ordering stores.

In speaking of a production schedule, it is not sufficient to figure how many cars will have to be overhauled each year from the number owned and the total miles operated. It is very simple, for instance, to figure that for a road operating 1,000 cars averaging 3,000 miles per month, an overhauling period of 50,000 miles will require each car to be shopped approximately every 16½ months; and that to do this, working 300 days per year, it would be necessary to put through the shop 2.4 cars per day. This is but the beginning. Besides the regular overhaul a certain number of wrecked cars have to be expected, and there are a good many heavy repair jobs on bodies and trucks, besides a certain number of motor and wheel changes. The number per year of the latter cannot be figured accurately, but averages can be approximated and made a closely adjusted part of the shop program.

Using the number of cars that must be overhauled per day, with the wrecks and other repair jobs arranged and classified as a daily output, it is necessary to work back into each department of the shop and figure out the number of repair jobs or amount of daily production that the department can turn out. Sufficient parts are needed to supply the demands of the cars scheduled out. The individual departments have, further, to be enough in advance of the cars due out to allow time for installation of the parts on the car.

To keep these departments working with a minimum of men and well-balanced production—that is, not overloaded one week and slack the next—a fair amount of extra or spare parts and apparatus is needed for a working surplus. To allow a department to become slack and temporarily to transfer men to some other department is inefficient and accomplishes little. With a properly figured out schedule there should not be any departments that could transfer men.

Repair Work Is Made Up of Repetitions

Overhauling consists of dismantling, repairing, and replacing worn parts with new parts ready manufactured, and assembling. It cannot be placed on the basis of a manufacturing plant turning out a given product in which a given number of operations are merely repetitions. Yet with a comparatively few exceptions, operations in a repair shop are also repetitions. The difficulty of grouping these lies in changing from one job to another, but by building the schedule on the process

*Formerly superintendent of equipment Kansas City Railways.

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required a very accurate shop program can be arranged. Such a schedule will place each department on a given performance and will indicate quickly what hours are productive and what are non-productive.

One of the principal factors in the balanced production of a department is the delivery of parts for repair and the necessary material and the routing of the repaired parts. Concentration and proper group arrangement will cut down very quickly the rehandling and lost time. The arrangement of the shop buildings frequently is responsible for double handling and back track moves. Even in existing shop buildings, a great deal can be done to reduce expensive movements.

A Small Labor Gang Can Handle Transport of Parts

It would seem better to keep the foreman and the men at the department location, and have all material movement under the control of one man with a small labor gang, using electric trucks and cranes to supply the wants of all departments on a regular schedule, than to have work interrupted while workmen, or even worse, foremen, fetch and carry.

To illustrate this point a car is placed on an overhaul pit, where it is raised by mechanical means and blocked in place. Trucks will be run out from under on their own power, and removed to truck overhaul pits by electric crane. Parts and apparatus will be moved to the various departments either by electric crane or electric trucks, and all repaired parts and apparatus returned in the same manner.

The entire material movement will be carried on under the supervision of one man. It is this man's business to see that the material movement is carried out without interference and that operations on the car body move steadily and without delays. During the process of overhauling the truck, for instance, the foreman of the truck department will issue storeroom requisitions for renewal parts, which he will turn over to the man in charge of material movement; and the material will be returned from the storeroom and delivered to the truck department by electric truck.

This system can be applied to a force of surprisingly small size. The returns in reduced labor costs and elimination of lost time waiting for materials will pay for the investment in trucks, etc., many times over. The effectiveness of a shop schedule can be much hampered by material movement. Replacing manual labor by quick-moving machinery will produce sure results.

Foremen and Inspectors Must Know Their Jobs

In stripping down and building up a truck the man who supervises the job and the men who accomplish the work must know how to turn out a truck with all parts having the same clearances, bearing surfaces, alignments, and standards as were set by the builder. The man who makes the final inspection must know whether the work has been done right. This applies to all parts of the equipment in the same way that it does to a truck, and the necessary precision with which the work is carried out depends entirely on the way the equipment is designed and built. In order to obtain results that will permit the equipment to perform the work it was designed to do, it must, after an overhaul, be reassembled just as accurately as when it was first built. There must be an exact adherence to adjustments, fits and quality of the parts replaced. A liberal use of accurate gages, thorough and intelligent inspection, careful testing, preceded by a thorough practical knowledge of results required, are needed in the individual operations just as much as schedules and system are needed to control production.

It follows that if a repair shop should be placed on a production schedule with the chief product an overhauled car, the organization and its control should be made up on the same basis, the supervisory force consisting of specialists with ample supervision.

No small factor in the efficiency of a shop is a plentiful supply of well-designed, high-grade, small hand tools and labor-saving facilities. A repair shop without them will waste time, because repair work necessitates frequent changes from one class of job to another and trucks, motors, and auxiliary apparatus are dirty, rusted, and greasy, consequently hard to take apart.

A good share of the work has to be carried on in a manner that makes it impracticable to use machine tools, and hand labor predominates, but it can be speeded up with high-grade power tools. Electrically-operated cranes and hoists, electric lift trucks, and devices of this nature, will always warrant the initial cost in time saved. Much time is lost removing grease and dirt in preparing parts for assembly and machine operations, and well-designed devices to replace hand labor will help costs materially. A lye vat large enough to take a complete truck frame is one of the best of these.

Plenty of light scientifically distributed, air, gas, electric current and water carried to every point where they have a possible use, with numerous outlets arranged to cut down waiting time and steps, are necessities and at the same time economical.

Order and System Are Essentials

An editorial in the Electric Railway Journal of May 19, 1923, entitled "Orderliness and System in the Truck Shop" stated: "The general impression that one carries away from visits to most of these [shops] is one of disorder," and also, "Without doubt one of the least expensive improvements that can be made, and still one that will produce important results, is that of systematizing the work and maintaining an orderly truck shop." Frequently this can be applied not only to the place where trucks are being overhauled, but also to the entire shop. This results in a daily loss, because workmen feel the effect of disorder and dirt to the detriment of their performance.

The fact that aisles are blocked, or are not provided, parts are scattered, and floors are dirty and greasy, causes no small loss of time. It takes longer to move from one point to another on a crooked path than on a straight one, and longer to find parts if they are scattered than if they are placed for use following a thought-out plan to save time and movements. Much can be done with this idea alone. Good workmen do not live in dirt and disorder at home, and they do not like to work in it. Such conditions are pretty sure to cause the workman to slow down and to become careless of his time and the company's property. Temporarily discarded parts or half-finished jobs allowed to lie around on floors and under benches day after day will have the effect of making him more or less indifferent, because he rather logically figures out that if the management can afford to allow parts that are clearly of value to kick around with apparently little thought as to their ultimate use it is no affair of his. He also is very likely to treat as inconsistent constant cautions to practice economy and prevent waste.

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There is nothing that will kill the interest and efficiency of good workmen so quickly as to allow plant equipment to run down and get out of repair. It is no more consistent to expect a shop force as a whole to produce good results with a plant in which tools and equipment are generally in need of repair than it is to expect an individual workman to unbolt a suspension bar with a worn-out wrench.

Many old shops can, without the outlay of a great deal of money, have their operating costs reduced and their production increased by adopting some of the methods, systems, and facilities already developed by out-and-out manufacturing concerns, who would not even consider repair work. On the other hand, many repair shops are engaged in more or less comprehensive programs of manufacturing renewal parts, with the idea that economies are being effected, while everything about their organization and plant would indicate that this feature of their operation is hopeless competition, and that they have been drawn into it either through the difficulty of obtaining renewal parts from the manufacturers or because they do not know their actual costs.

To quote again the ELECTRIC RAILWAY JOURNAL of May 19, the editorial headed "Good Savings by Improvements in the Old Shop" states that "Many operating officials consider the shops a necessary expense and look with little sympathy on any proposal to put more money into these facilities," which is not only true but states the case rather mildly.

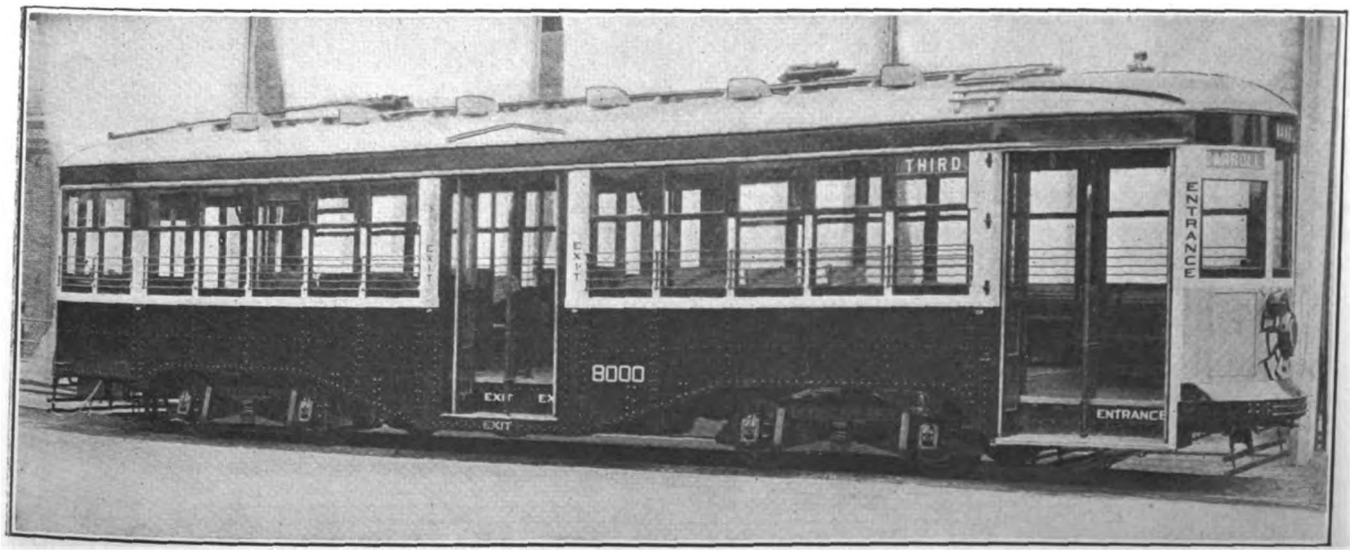
There are real opportunities for economies in the mechanical departments of electric railway properties. The shops offer fertile ground, and the head operating official will find it profitable to give this department of his road closer scrutiny.

Double-End Pay-as-You-Pass Car Introduced in Brooklyn

Two Hundred Cars, Just Being Placed in Service, Are Arranged for Front Entrance and Center Exit — Novel Scheme of Exterior Painting Attracts Attention—Variable Load Brakes and Electro-Pneumatic Door Control Are Used

A NOVELTY in merchandising transportation is being used by the Brooklyn City Railroad as a means of introducing its new front-entrance, center-exit cars. Between the belt rail and the bumpers the dash is painted peacock blue, and from the headlight as a center there extends a striking spider web of yellow and red, as shown in an accompanying illustration. The purpose of this unusual color scheme is to draw the attention of the public to the new cars. Posters in every car operated by the Brooklyn City Railroad will explain a couple of days in advance about the introduction of the new type cars, and when they actually appear on the street arrayed in these brilliant colors they will stand out conspicuously in contrast to all other cars in the city. The public will therefore more readily grasp the fact that the Brooklyn City Railroad has put 200 new cars into operation. At the same time this color scheme has a practical value in that it will inform prospective passengers when the approaching car is of the front-entrance type. This is important because there are no other front-entrance cars in Brooklyn, except the safety cars.

First deliveries of these cars are now being made and it is expected that they will be placed in service early in November. The cars are of the double-end type with front entrance and center exit, designed primarily for two-man operation in heavy city service, although they are so equipped that they can be operated by one man, if it is desired. When the car is operated by two men, the conductor stands in the middle of the car, near the



The First of 200 New Double-End, Front-Entrance, Center-Exit Cars of the Brooklyn City Railroad

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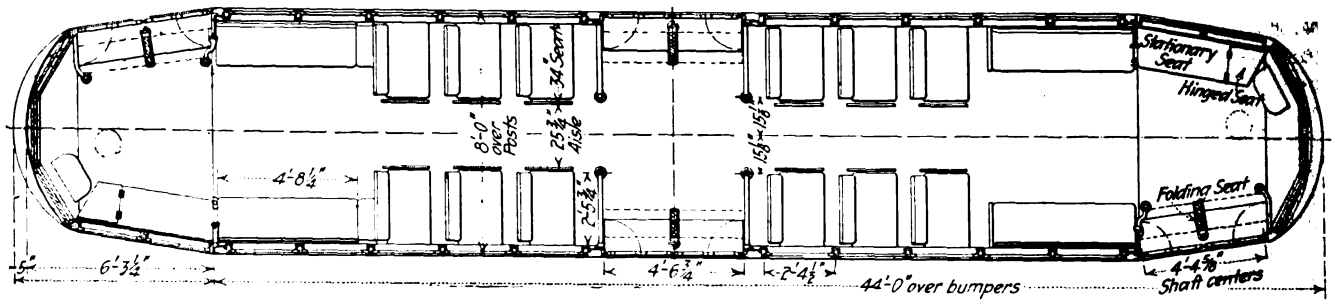


By Using All Available Space a Seating Capacity of Fifty-three Has Been Secured

center exit, and the passenger pays his fare as he passes on his way to the exit or on his way to the rear half of the car. This arrangement has been adopted with the idea of speeding up passenger movements.

Features of Underframe Design

Clearance is always a serious problem in the design of a street car for service in Brooklyn. The location of pillars of the elevated railway structure, especially the location of columns at the ends of the Brooklyn and Williamsburg Bridges, is such as rigidly to limit the length and width of surface cars. Small clearances exist also on several other city-owned bridges. Inasmuch as the new cars are designed for heavy city service, it was desired to have them of maximum size, and it is claimed that not a single inch could be added to the over-all dimensions of this car without causing trouble where the clearance is small. The length is 44 ft. over bumpers, with truck centers 21 ft. 6 in. The width over all is 8 ft. 3 in. Each platform is 6 ft. 3¼ in. long. By tapering the platform from its maximum width at the bulkhead to a width of only 6 ft. 8 in. at the vestibule corner posts it has been possible to design a car of this size without exceeding the clearance limit.

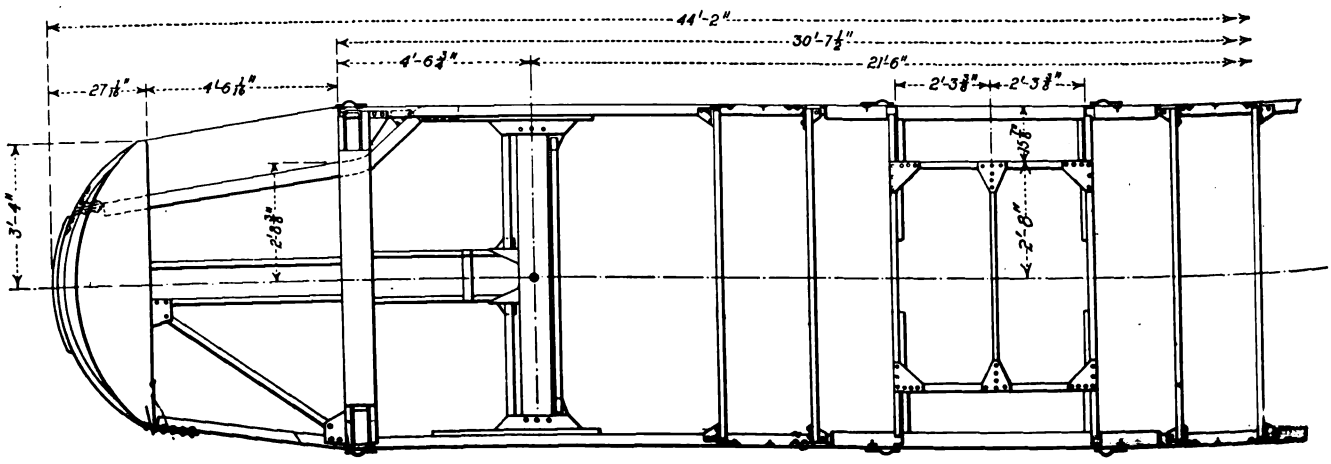
In order to keep within the desired dimensions the front step is built into the platform, forming a well into which the doors fold and eliminating any outside folding step. This has necessitated the design of an unusual platform knee on the near side of the car. The knee bends inward toward the center line of the body from a point slightly inside the bulkhead and passes behind the step well, as shown in the accompanying drawing of the underframe.

The steps for the center-exit doors are similarly within the lines of the car body. A well has been made on each side 16 in. wide and 4 ft. 6¾ in. long. The center cross sill is shortened and framed with steel channels running lengthwise between the adjacent cross sills. On each side of the car two strap brackets attached to the cross sills on each side of the center support the exit step. Feralun is used for all step treads and edges of the floor.

To secure the maximum seating capacity in a car of this type, an unusual arrangement has been adopted. There are twelve transverse seats in the center of the body, six on each side of the center exit; two longitudinal seats at each end inside of the bulkhead and a permanent seat on the left side of each platform. A folding seat of special design is used to cover the door openings not in use. This is a collapsible seat hinged in the middle and the two halves may be folded together until they meet. The seat may then be slipped down into a pocket, the process somewhat resembling that of slipping a book backward into a bookcase. This arrangement eliminates any chance of the seat falling down while a passenger is sitting on it because it is entirely independent of any supporting legs or similar device. Each car is equipped with four such seats, one for each center door and one for each platform door. When the car is in service the seats on the near side are collapsed and slipped back into their pockets, forming divisions in the center of the entrance and exit passageway and insuring a double stream of passengers. The seats on the far side are unfolded and put into service.

Preference for Wood Seats

An interesting investigation was made by the company before deciding upon the material of the seats. Officials made trips at various hours of the day to different parts of the system and inquired of passengers on the cars what kind of seats they preferred. It was rather expected that some type of covered seat would



A Feature of the Underframe Design Is the Platform Knee on the Near Side Which Passes Behind the Step Well

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find considerable favor. It was thought also that the passengers would be likely to express preference for the particular kind of seat used in the car in which they were riding at the time the question was asked. But neither of these things occurred. The officials say that the passengers favored wooden slat seats. Inasmuch as the company has found this type of seat to be desirable, not only on account of the economy of maintenance but also on account of sanitation, it was entirely ready to accept such a verdict from the riding public and all of the new cars have cherry slat seats.

Order Was Split Between Two Plants

Of the total number of cars being built, 100 are under construction at the Philadelphia plant of the J. G. Brill Company and 100 at the plant of the St. Louis Car Company. The cars built by the two different car builders are identical in construction. Duplicate prints of the same drawings were supplied to the car builders, covering all details of the car. Both lots have Brill 77-E-1 trucks with 26-in. rolled steel wheels.

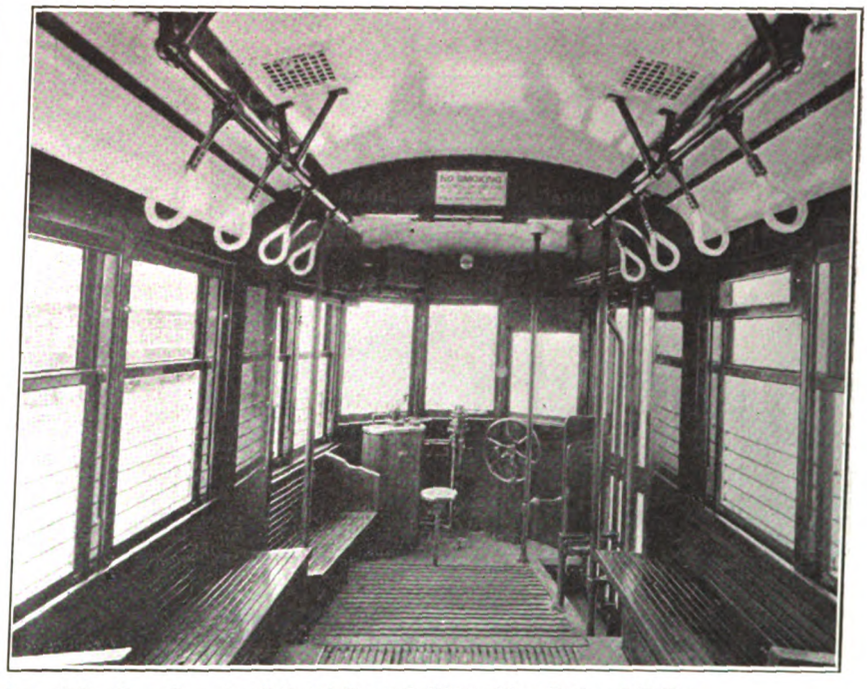
Although the cars are of steel construction throughout, the weight has been kept down below 37,500 lb. The side sheeting is 0.25 per cent copper bearing steel. The use of copper bearing steel in place of the ordinary metal adds approximately 15 per cent to the cost of the sheeting, but it is thought that rust-resisting material will have a longer life that will more than repay the greater initial outlay. Climatic conditions in Brooklyn are particularly difficult on account of the nearness of the ocean and the fogs which carry minute particles of salt. This results in considerable corrosion of ordinary steel. The only wood used in the car interior is that in the floor, seats, doors and sash.

The vestibule posts and vestibule carlins are of wood in contrast to the steel posts and carlins used elsewhere in the car. This arrangement has been made, as shown in the accompanying illustration of a partly completed car, so that in case of collision the whole frame will not be injured. The hood not being integral with the car body, it can be easily and cheaply replaced after being damaged in an accident.

Of the cars 100 are equipped with four Westinghouse No. 510-A 35-hp. motors and the other 100 have General Electric No. 265 motors of the same capacity. The control is K-72-A for all of the cars. This controller differs only slightly from the well known K-35, but has two extra contacts at the bottom for use in connection with an electrically operated fare box. The control is interlocked with the line switch under the car. The motors are not interchangeable between the cars built at the different shops. Through the co-operation of the motor manufacturers, however, it has been possible to make the gears interchangeable between the two types of motors; that is to say, Westinghouse gears will work with General Electric motors, and vice versa.

Westinghouse variable load brakes are being used for the first time on surface cars in Greater New York. A spring-actuated valve controls the admission of air into the brake cylinder. The position of this valve is governed by a rod which extends from the variable load device to the truck bolster. A cam on the truck bolster is connected with the rod and on the truck transom below the cam is a knife-edge contact. The cam is not fixed rigidly to the truck bolster but is lowered into position only when air is admitted to the opening of the door engine. When the car is stopped and the door is opened this contact edge touches the cam. If the total weight of the car and its load varies as passengers board or alight the spring-actuated valve of the brake cylinder is reset in another position. By this means the amount of air admitted to the brake cylinder by the ordinary application of the brake handle is varied according to the weight of the car and its passenger load when the last stop was made. A braking efficiency of 100 per cent at all times is attained by this apparatus. The hand brakes on the new cars are of the Peacock staffless type.

Standard safety devices are installed on the new cars and electro-pneumatic control is used on the center



Left—To Attract Attention the Dashes of the New Cars Are Painted Peacock Blue with a Red and Yellow Cobweb Effect in the Center. Right—The Entrance Doors Open Inward into a Well. On the Opposite Side of the Platform Is a Permanent Seat

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doors. These center doors are operated from the conductor's position by a push button. The door-operating mechanism is located above the doors, as shown in one of the accompanying illustrations, thus giving more floor space and insuring the apparatus against freezing in cold weather. The door-operating mechanism is manufactured by the Consolidated Car Heating Company. The front door is interlocked with and operated by the motorman's brake valve as usual with safety car equipment. All the doors are interlocked with a line switch to prevent the car starting before the doors are closed. A counter emf. relay is in circuit with the door control to prevent opening the doors when the car is traveling faster than a certain predetermined speed.

Fare Boxes Electrically Operated

Johnson type J electric registering coin boxes are used, together with International R11 registers, solenoid-operated. This apparatus is described elsewhere in this issue of ELECTRIC RAILWAY JOURNAL. When the car is in use with two men the fare box is located on a pedestal in the center of the car, but when it is being used as a one-man car the fare box will be moved to the motorman's end.

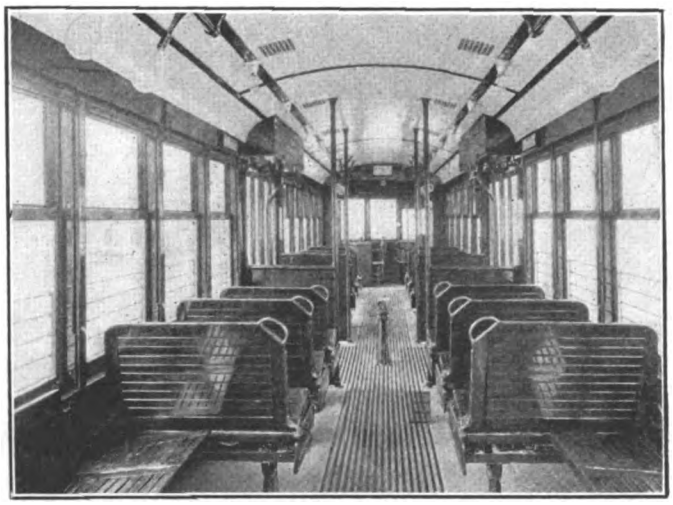
Mahogany finish is used for the interior woodwork and statuary bronze for the metallic trimmings. The cars are heated by Gold electric heaters controlled by Utility thermostatic heat regulators. The roof is of the arch type, equipped with twelve Utility honeycomb ventilators, and lined with white Agasote in one-half the cars and white Nevasplit in the other half.

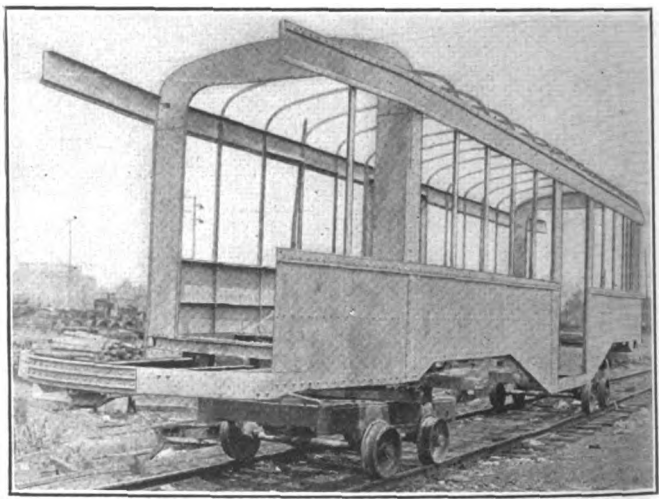
Artificial illumination is supplied by two rows of small unshaded electric lights placed approximately over the center line of the cross seats. There has been in the past considerable trouble in Brooklyn from stealing of lamps and headlights. When designing the new car, therefore, particular attention was paid to this and a lock was selected which would prevent theft. General Electric lock sockets are used for the lamps. The lid of the headlight is of wire glass locked by a special eccentric key.

Hand straps are the same as used in the subway cars, porcelain enameled handles, Rico No. 5. Curtains are Pantasote. A new type of trolley catcher, which is described elsewhere in this issue, is used on the cars. It is similar to the ordinary type manufactured by the Ohio Brass Company, but has a novel lubricating device incorporated in its design.

An unusual feature of the arrangement of signs is that all of them are at the front end of the car. Hunter signs are used entirely. One is in the center of the letterboard above the middle front platform window, one is at the top of the near side platform window and a third is at the top of the first side window on the near side of the car. The other end of course duplicates this arrangement. The first and third of these signs indicate by name the route on which the car is running. Only the sign in the right hand platform window indicates the destination.

The general color scheme of the new car is the same as that which the Brooklyn City Railroad ordinarily uses, the base color being aurora red and the trimmings citron yellow. On account of the narrow streets in Brooklyn much trouble has been occasioned in the past by wagons scraping the paint on the sides of the cars. In order to avoid this each new car will be equipped with eight small guards. These are nothing more than vertical strips of pressed steel riveted at the four corners of the car body, and on both sides of each center door extending up to the belt rail. The strips project 1½ in. beyond the steel side sheets and it is expected that they will hold away any vehicle that may brush against the side of the car and prevent it from scratching the body paint.





Left—When the Car Is Operated by Two Men the Fare Box Rests on a Pedestal in the Center of the Aisle. Right—The Steel Work Does Not Include the Hood. This Is Built of Wood for Greater Ease of Replacement if Damaged in Collision

New Car to Be on Display

The first car to be delivered will be placed on public exhibition Nov. 1 on a siding near the Brooklyn Borough Hall. Alongside of it there will be one of the old horse cars used many years ago. Placards will draw the public's attention to the fact that the old horse car cost about $650, whereas the new steel car cost approximately $15,500. In spite of the greater cost of the modern car the fare is now 5 cents instead of 8 cents, which the horse car charged, and the haul for a single fare is considerably longer. The public is invited to inspect this car and familiarize itself with its novel features before the company places it in regular service.

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Crane Car Built for General Utility Work

A Work Car, Rebuilt Into a Crane Car, Has Provisions for Hoisting, Transporting Heavy Loads and Supplying Compressed Air—Also Used as a Snow Plow

FOR handling and transporting heavy railway parts a crane car is the best equipment available. The addition of a few special devices makes the car useful for many other purposes, so that it can be kept in almost continuous service the year round. Such a car proves a real labor and time saver.

A double-end crane car combining many novel and useful features has been reconstructed by the Lehigh Valley Transit Company, Allentown, Pa., from an old work car that had a limited application. The cab of the original car was located in the center, and the framing was comparatively light.

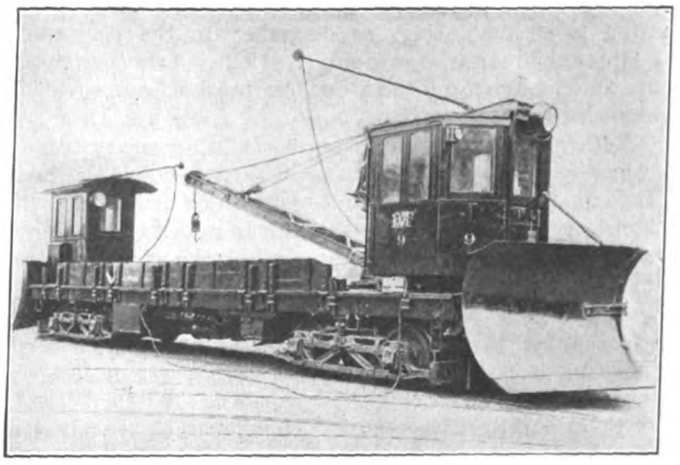
In the rebuilding of the car the center cab was removed and placed at one end as a stationary cab, while at the other end of the car a revolving steel cab was built to house the control mechanism for operating the car and for a jib crane. The underframing also was strengthened by the addition of steel members placed to provide for the additional strain incident to the work for which the crane car is suited.

The crane has an 18-ft. boom, constructed of 8-in. channels with a connecting steel lacing. The total reach from the pivot to the hoisting cable is 22 ft. The boom has steel jaw bearings resting against a 3-in. pin which is welded to the rotating base. The boom is raised or lowered by a hand windlass to adjust the height. This height seldom needs to be changed, as the rotation of the cab and the backward and forward movement of the car itself provide sufficient adjustment for nearly all classes of work. The boom can be removed easily, and a covered pocket is provided in the car floor, so that the crane car can be converted into a double-end work car on short notice, with the boom concealed and out of the way.

The revolving cab is built entirely of steel, and all the main members, the center frame and the sheet steel sides are electrically welded, bolts being dispensed with except where removable pieces are required or provision has to be made for the substitution of repair parts. The cab and the frame supporting the boom revolve around a heavy center pedestal which is supported entirely from a steel pivot cap.

At a distance of 1 in. above the rotating base of the cab a stationary false floor is attached to the central pedestal. On this stationary floor are located the operating mechanisms, comprising the controller, air-brake valve, hand brake, whistle, air gage, sander and gong. The wiring, air pipes and hand-brake chain go through the center of the pedestal, which is hollow. The headlight equipment, lightning arrester, circuit breaker and electric tail lights are attached to the outside of the rotating cab, receiving power through a contact ring located in the roof.

The hoisting cable travels over a pulley located at the end of the boom and another pulley at the top of the cab, whence it goes through the hollow central pedestal to a pulley located underneath the floor and thence by a double cable to an Ingersoll-Rand 4,000-lb. air hoist. Three speeds and capacities of the hoist are available. By attaching the hoisting cable direct to the double cable,

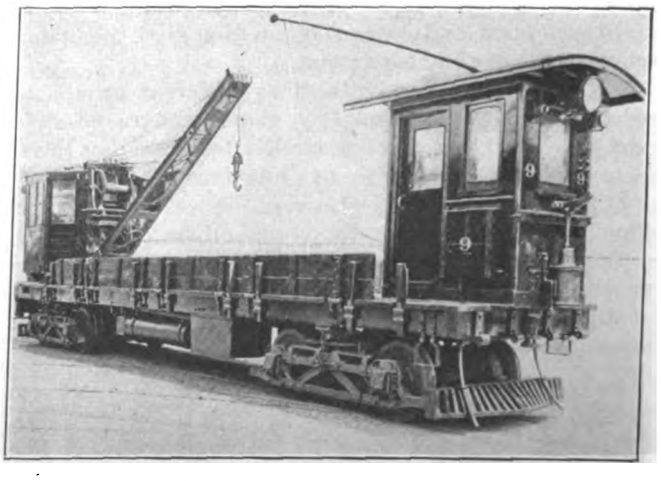


Provision Is Made for Use as a Snow Plow in Severe Storms

the 4,000-lb. lift is obtained at normal speed of operation. By placing the cable around a pulley at this point and attaching one end of the hoisting cable to a fixed hook located on the bolster, a 2,000-lb. lift at high speed is obtained. By passing the end of the cable through a sheave at the hoisting end, and attaching this to a hook located on the boom, an 8,000-lb. low-speed hoist is obtained. The normal lift of the cable is 19 ft., making it possible to attach the hook to a heavy article 40 ft. from the center of the pedestal.

Rotation of the hoist and cab is obtained through the use of a cable passing around a 4-in. channel ring which is located underneath the cab. The cable leads through pulleys underneath the car to a second Ingersoll-Rand 4,000-lb. air hoist. One end of the cable is attached to one drum of the hoist and the other to the opposite drum, being connected so that one cable is winding while the other is unwinding.

The air hoists used for operating the crane are of the type usually employed for shop use on carriers or booms, and are controlled by means of chain pulls. These controls have been removed, and electrically operated air valves, such as are used in the Type HL electro-pneumatic control, have been substituted. There are three stations from which the hoists may be operated to raise or lower and rotate the boom. One is on the pedestal in the rotating cab, one is near the rear window in the stationary cab, and the third is on a cable which may be plugged into a receptacle located underneath the car sill. These controls are ordinary contact switches, similar to those used in the car signal system of this



The Position of the Boom Is Adjusted by Means of Air Hoists

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company, each being built up of fiber with a small operating lever projecting, as described in the ELECTRIC RAILWAY JOURNAL for Sept. 1, 1923. Two switches, one for the hoist and the other for rotation, are provided at each operating station.

Before the hoist can be moved it is necessary to release the cab lock, which is operated from inside the cab. It is made up from ¼-in. steel plate which drops between stops on the floor. When the lock is raised clear of the stops a contact is made completing the control valve circuit so that operation of the air-valve switches is possible.

In order to steady the car when extremely heavy hoisting is done, and where there is danger of the car overturning, an outrigger is provided. A 6-in. I-beam, 8 ft. in length, is located in a roller pocket beneath the car floor, and may be pulled out on either side of the car. Hinged to the end of this beam is a 4-in. x 4-in. wooden block which folds up when not in use, but which fits directly under the end of the I-beam when pulled out, thus providing a sturdy brace which steadies the entire car while hoisting.

For winter service plow noses can be attached at either end of the car. These noses are adjustable through the use of simple raising levers actuated by 10-in. brake cylinders, which are installed outside the cabs, gravity sufficing to lower them. It is necessary, of course, that the rotating cab be locked in its normal position when using the snow plow on that end. Drawheads of cast steel are welded to the snow noses, so that there are no bolts or rivets in the drawhead. It is stated that these snow noses can be installed or removed within thirty minutes.

The air supply for brakes and hoists is obtained from a General Electric 130-A compressor, having a capacity of 50 cu.ft. per minute. Pipe attachments are provided so that pneumatic tie tampers or pneumatic concrete breakers can be operated from the supply of air provided by the car.

The main operating motors are controlled by K-28 controllers, with automatic reclosing line switches located beneath the car. An automatic cut-out is provided to prevent over-travel of the hoisting and rotating cables, shutting off the engines as the cables approach the limit of their movement.

For use at night, 94-watt portable incandescent headlights are installed on either side of each cab, and a five-light cluster, mounted on ¾-in. fiber, is located at the end of the boom. The cluster is easily removable, and the fiber protects the boom from accidentally coming in contact with the trolley wire.

The trucks were designed and built in the company's Madison Street shops, and all castings were produced in the company's foundry except side frames and journal boxes. These have given good service for more than two years, having been installed before the conversion of the car.

The car was designed by M. C. Garlick, supervisor of the Easton division, and was constructed under the supervision of W. C. Klein, superintendent of equipment

The Readers' Forum

Interchangeability and Standardization

DEPARTMENT OF COMMERCE
OFFICE OF THE SECRETARY
WASHINGTON, Oct. 18, 1923.

To the Editors:

In the ELECTRIC RAILWAY JOURNAL for Sept. 29, 1923, we note on page 520 your most interesting article on "Interchangeability and Standardization." We are particularly impressed with your remarks on page 521, beginning, "Standards of the type discussed may be established for a great variety of parts . . . ." This prompts us to ask your opinion regarding the possible usefulness of this division to the car-building industry in bringing about a reduction in the present variety of sizes and dimensions of many of the items enumerated in this paragraph.

We have co-operated with many different groups in reducing variety and find that our procedure offers a relatively short and effective method for obtaining satisfactory results. This does not interfere with the work of other groups, but, in fact, clears the way so that their standardization work can be carried on more effectively.

The inclosed bulletins by the U. S. Chamber of Commerce, which body is co-operating with us, show some of the things which have been simplified under the procedure referred to.*

Our point of view is that many of the items in present use do not need to be superseded by new or radically different types as standards, but instead, that present production and use could be concentrated on those articles of proved greatest demand or usefulness and that the other items which are not in such universal favor can be dropped or discarded.

We would like to have your views on this preliminary phase of standardization as applying to this particular field.

DIVISION OF SIMPLIFIED PRACTICE,
BY R. M. HUDSON.

[The editors replied that they believe there is an opportunity for this division of the Department of Commerce to contribute a very helpful influence in the work already under way in the American Electric Railway Association which might result in a much quicker accomplishment of the desired end. The matter was referred to President H. A. Johnson and Executive Secretary J. W. Welsh of the American Electric Railway Engineering Association for consideration.

The work of the Division of Simplified Practice is primarily to bring about a reduction of the great variety of types or styles of any article required by the trade. This is in the direction of standardization, though quite different from the program of standardization that has been followed by the A.E.R.E.A. It is distinctly a step toward securing greater interchangeability, which was one phase of the discussion in the article referred to in the Annual Convention Number. For example, if the thousand and one simple items on a car that are manufactured to perform a certain simple function, but are each made slightly different by each manufacturer, could all be manufactured to conform to a very few designs of each piece, what a help that would be to the railway company which has to stock spare parts for every design of every article used on all of its cars, in order to be prepared to make replacements.]

*In this bulletin, among a long list of similar accomplishments in various fields, there appears the following items: The number of varieties of steam railway car wheels required was reduced from 175 to 4; dry cells from 17 to 6; hammers, axes, etc., from 2,752 to 761; lamp bases from 179 to 6; paving brick from 66 to 7; tires from 287 to 32; wheelbarrows from 42 to 16, etc.

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Equipment Maintenance Notes

Removing Wheels from Transfer Table Axles

By H. Cowen
General Foreman New York Railways, New York, N. Y.

WHERE electric railways shops are equipped with transfer tables, it is most important that they be maintained in proper repair at all times, in order to anticipate emergencies and prevent unexpected breakdowns. Renewals of motor equipment and control parts can readily be taken care of, but the replacement of broken wheels or axles usually is a very difficult proposition and one that consumes considerable time. In order to prevent tying up the transfer table over an extended period, some railways provide spare axles and wheels so that these may be inserted without delay.

The transfer table axles at the Fiftieth Street shop of the New York Railways were too long to be accommodated in the wheel press, and for many years wheels were removed and replaced by hand pumping. In this operation the cylinder, ram and yoke were removed from the hydraulic axle straightening press and an arrangement with two 1½-in. diameter tension rods fitted with end and intermediate tie yokes was used as shown in the accompanying diagram.

The hydraulic pressure used for removal of the wheels was provided by hand pumping, which constituted a part of the standard cylinder of the straightening press. When carried out by this means the job required four shop men and generally took from eight to ten hours to replace two wheels. The pressure used for pressing on was about 40 tons. Not only did this method require an excessive amount of time, but it also proved very tedious and trying on the men, who considered it as a "man killer," but were loyal and conscientious enough to tackle it whenever occasion demanded.

In order to improve on this tedious method and to reduce the expense involved in performing the work, connection was made to a hydraulic plunger pump located near by. This pump was attached to a 250-ton wheel press and a connection was made between the pressure cylinder and this pump by a ½-in. pipe. The tie rods and separators were assembled in the same manner as previously used, but the electrically driven pump furnished the hydraulic pressure. As a result of this, the time for renewing two wheels was reduced to two hours, and two men could take care of the job without difficulty. The composite saving, therefore, amounted to thirty-six man hours, and in addition the men were not overtaxed and emergencies were promptly met as they arose in the transfer table operation.

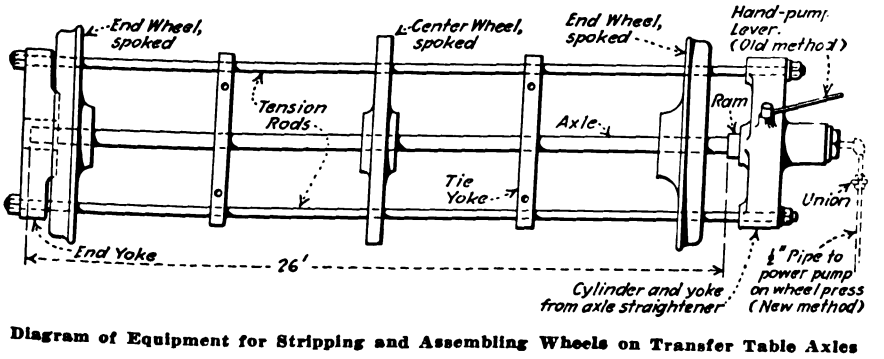


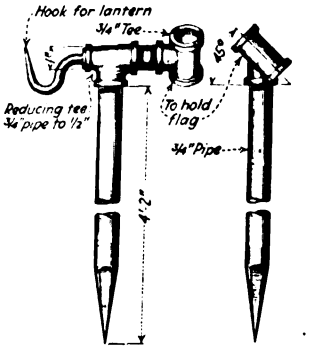
Diagram of Equipment for Stripping and Assembling Wheels on Transfer Table Axles

Pipe Staff for Flag and Lantern Signal

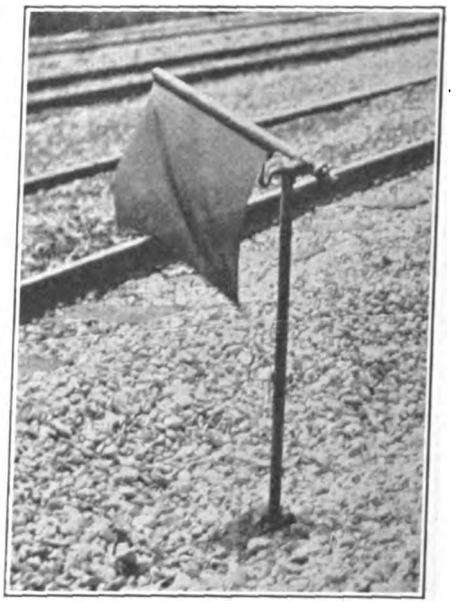
By Clifford A. Elliott
Engineering Department Pacific Electric Railway, Los Angeles, Cal.

THE Pacific Electric Lines found it necessary to provide a standard staff for flag and lantern signals used as a protection during track repairs. The rules of the road require foremen to place proper protection signals in advance of any work being carried out. These signals consist of a yellow flag during daylight periods and a lantern at night.

The staff used for supporting these signals is made of ¾-in. pipe with two tees, a nipple and a hook at the upper end. The upright is 4½ ft. long and is pointed at the bottom so that it can be readily placed in the ground. A reducing tee ¾ in. to ½ in. is screwed to the upright. The small end of the tee is bushed and a 1-in. iron hook is provided for hanging a lantern. A nipple is screwed into the ¾-in. end of the tee and another standard ¾-in. tee is screwed to this. This latter tee forms the support for the flag. The tee for holding the flag is placed at an angle, as it was found that this was most suitable for giving trainmen an unobstructed view of the flag. An accompanying illustration shows a flag in position.



Efficient Flag and Lantern Staff Used by Track Department of Pacific Electric Railway



Flag Signal in Position for Signaling Traffic

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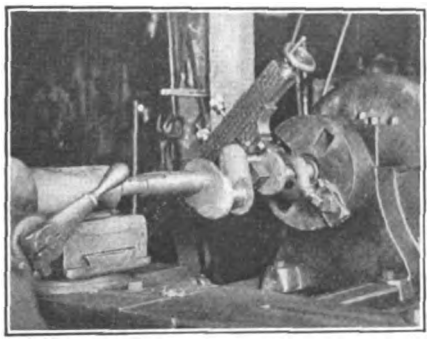
Grinding Air Compressor Cylinders

By O. A. Norene
Assistant Master Mechanic Omaha & Council Bluffs Street Railway

AIR compressor cylinders when badly worn or scored were formerly bored, bushed and reamed to standard size, a practice that was not very satisfactory. At present we are grinding worn cylinders and fitting them with oversize pistons. Two two-piece double-seal piston rings are fitted on each piston. Most of our compressors are ground to 0.020 in. oversize.



Re-turning Tool for Truing Up Crankshaft

Crankshafts are tested and bearing surfaces are trued up with a No. 1 Weber crank pin re-turning tool. With this type of tool, a crankshaft can be trued up in a very short time. Compressor suction line strainers are located inside of the car in one of the seat pedestals. This has eliminated, to a great extent, the collection of grit and dirt in the crank cases of compressors, which we were having when strainers were located underneath cars.

Level Board for Track

By J. S. Wilder
Engineer Maintenance of Way, Municipal Railways, St. Petersburg, Fla.

THE ordinary track level board which can be bought ready made is often heavy, awkward to handle and sometimes inaccurate. A much more satisfactory one can be very cheaply made in the railway shop. A graduated level having a movable shield to protect the glass, such as are to be found in machinists' iron levels, can be bought without the iron frame. By inserting a screw at each end of the level it can be very conveniently attached to a 5-ft. stick. A small square of sheet rubber packing is placed under each end and the screw passes through the center. This permits a slight adjustment to be made with a screwdriver.

The stick for the level board is made out of any convenient wood which does not warp too badly. A handy size is 1¼ in. x 2¾ in. x 5 ft. Both ends of the stick are shaped, It is planed to the desired size and laid out in the sun for a couple of days to season. If treated with oil it will warp less readily.

With such an apparatus, a difference of $\frac{1}{16}$ in. from level on track will show a movement as great as $\frac{1}{8}$ in. in the glass. While such accuracy is hardly needed in ordinary work, nevertheless it is sometimes of great convenience. Moreover, the marking of the track gage on the stick often saves time in making measurements.

What They Saw at Atlantic City

General Manager of Small City Railway Thinks $500 Well Invested—Representatives Present Preliminary Reports with Practical Suggestions for Improvement

"NOW while you fellows are drinking your coffee and lighting up the cigars which Charlie Riter is going to pass around, we'll get down to business, for I don't like these noon conferences to last too long." The speaker was William Redfield, general manager of the Jinxville Electric Railway, and the occasion was a luncheon meeting of his staff to listen to and discuss reports from the company's representatives at the Atlantic City convention of the electric railway associations.

"Sorry I couldn't go to Atlantic City this year. You know I was laid up with that lumbago I got the wet night we were out trying to get the crowds home safely after the county fair. John O'Neill and Bill Gainway made a good team, however, and we'll hear from them. You're first, John."

The superintendent of overhead, thus called upon, gave an account of the trip from Jinxville to the seashore and then said: "Of course I noted first the line materials. I was struck by the new things in overhead frogs. I think we can keep our trolley wheels on the wire better if we use up-to-date frogs with long approaches and no sharp angles. Then I learned a lot about automatic substations. I want to take up with you, Mr. Redfield, a plan for using one or two of them on our suburban lines. Tom Fairweather, our worthy roadmaster, would have been interested in a batch of broken rail joints that I saw; broken in a testing machine. Tom, it's up to you to know what that committee on welded rail joints is doing. Your joints will stand a little improvement.

"Another thing that struck me, fellows, was the fact that we're going to get the Engineering Manual in bound form. Our loose-leaf copies are always incomplete and out of date. Maybe it's our fault, but that's the fact. One thing more before I sit down. While I don't know much about car equipment, I think these new door-operating outfits are great, and I was glad to see that treadle-operated door that we've read so much about lately. That's all I've got to say today."

"Good speech, Johnny," was the general remark as he sat down. Mr. Redfield then called on Gainway, asking him to be brief as O'Neill.

"I'll cut it short all right, Chief; don't worry," was the rejoinder from the burly superintendent of transportation. "I'll second all John says and more about the interesting things we heard and saw. I'm sorry the whole bunch couldn't have been there. It was great.

"Now for some things John left for me to say. Did anybody say "buses?" You ought to have seen 'em—buses everywhere. It seemed like a bus convention in many ways. We've got to have a few here, Mr. Redfield. I'm sure I can sell you the idea. But there was a lot for my department besides buses. Take accidents, for example. The claims fellows are getting their grip on this thing and we operating men must cooperate with them. I heard a lot of good stuff about managing men, too. It all comes down, in my opinion, to treatin' 'em square. No coddlin', just a square deal. I noted that the claims agents and accountants are getting busy on ethics. It won't hurt any of us to be a little particular about such matters. Now when we get together again I want a little more time. I see the chairman winkin' at me so I'll sit down. No applause, please.

"Wait a minute, Mr. Redfield, one thing more. You know we talked about pull-ins, lately. Well, a chap from Memphis named McWhorter gave a report on that subject that struck me as a transportation man. It seems a lot of the master mechanics down South have a competition on pull-in records. They're getting great results. Wish we could get in on that."

"Well I'm glad we spent $500 sending John and Bill to Atlantic City," said Redfield, rising. "It's a good investment. But if we are to make the most of it we must change our practice here and there as our new information shows that to be desirable. I want John and Bill to call attention to anything they see around here that does not come up to the standards of the Atlantic City convention. We'll make improvements as fast as we can afford to make them.

"The meeting's adjourned."

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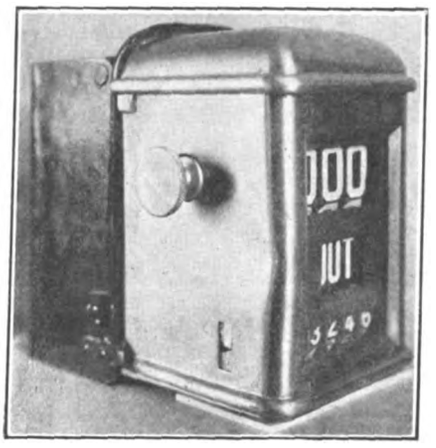
New Equipment Available

Fare Register and Coin Box Electrically Interlocked

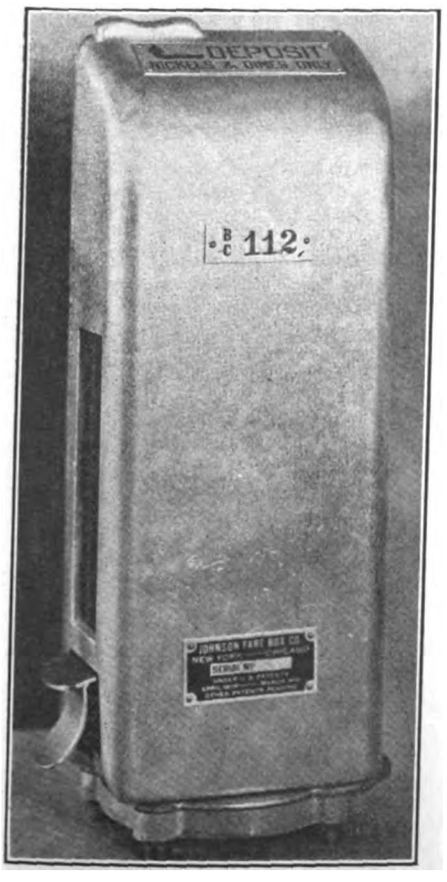
ON THE new cars of the Brooklyn City Railroad, described elsewhere in this issue, fare collection will be accomplished by means of a Johnson type J coin box and an International R-11 solenoid-operated overhead register.

A fare box as shown in the accompanying illustration is mounted on a pedestal in the center of the car. The passenger deposits his fare in the slot where it drops by gravity into a position making an electrical contact which operates a magnet. When this magnet is energized, it lifts a plunger which closes a second electrical circuit connecting with the overhead register and pushes the coin onto an inspection tray. The register is mounted on the inside of the bulkhead and is the usual type of International register with a simple magnetic actuating device attached to the rear.

The box is designed to receive either nickels or dimes, registering one fare for a nickel and two fares for a dime. Double registration for a dime is accomplished by allowing it to drop into a second and lower position, where the circuit is again closed. The nickel, being larger, will not drop into the lower position, but passes immediately to the tray. In the side of the box is a glass window so that the conductor can tell at a glance what coin has been put in the box. After registration the coin drops into a return chute, where it is available to the conductor for making change. The apparatus is adapted for use where there is a straight 5-cent or a straight 10-cent fare, or where all fares are paid by the use of a token of some uniform size.



An Electric Actuating Device Is Attached to the Rear of the Register



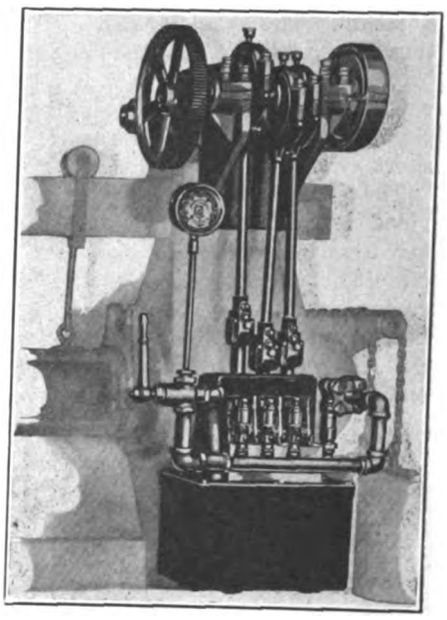
A Window in the Side Permits Conductor to Inspect the Money

New Pump for Wheel Presses

A NEW pump has been developed by the Hydraulic Press Manufacturing Company, Mount Gilead, Ohio, for use with its wheel presses. Extreme rigidity, careful guiding of all reciprocating parts and provision to take up wear are features of this pump. Due to the reciprocating motion and the high speed at which pumps for hydraulic wheel presses operate, they are subject to more deterioration on account of wear than other parts of the machine. In the design of this new pump particular attention has been given to overcoming these difficulties.

The cylinder block for the three-plunger, high- and low-pressure type of pump, is mounted on a casting which acts as a cover to the self-contained reservoir. This cover is provided with machined pads for the forged-steel cylinder block and the cast crosshead guide. The cylinder block is a one-piece steel forging with plunger and valve cavities bored out. Bronze seats are provided for the valves. The one-piece cast crosshead guide is provided with babbitted bearings. The crossheads are of large diameter so as to reduce the bearing pressures resulting from side thrust. Grease-cup lubrication and wedge-type brass adjustable take-ups are provided in the crossheads.

The Class "SS" pump is furnished in either two- or three-plunger types. With two plungers both are of the high-pressure type, while with the three-plunger construction, one low- and two high-pressure plungers are provided. Automatic knock-out or pump unloading valves of the spring-loaded type are connected to the pressure chamber. The springs are set to balance at a predetermined hydrostatic pressure. When this is exceeded the springs compress and cause a system of levers to raise the suction checks from their seats, thus rendering the particular cylinder which they serve inoperative. This is accomplished automatically and permits the low-pressure part of the stroke to be accomplished at high speed with all the plungers of the pump operating. As the work in the press increases the pressure builds up the knock-out valve on the low-pressure cylinder and holds the



Three-Plunger High and Low Pressure Type of Pump for Hydraulic Wheel Presses

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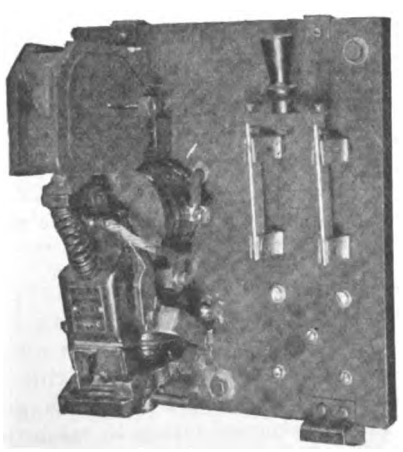
check from its seat, rendering the cylinder inoperative during the balance of the high-pressure stroke. The high-pressure cylinders are also provided with knock-out valves which are adjustable and can be set to release at a predetermined pressure.

In addition to operating automatically the knock-out valves are provided with hand levers and they may be thrown out at the will of the operator. The hand levers do not effect the automatic operation of the knock-out valves. The Class "SS" pump is provided in four sizes, from 7½ hp. to 15 hp.

New D.C. Control Relay

A MODIFICATION of the control relay known as the type S has been developed by the Westinghouse Electric & Manufacturing Company. Control relays are generally required for the closing-coil circuits of electrically operated air and oil circuit-breakers. The type S relay adds a trip free feature to the circuit-breaker control system, thus preventing the breaker from being held closed by the operator in case of a short circuit.

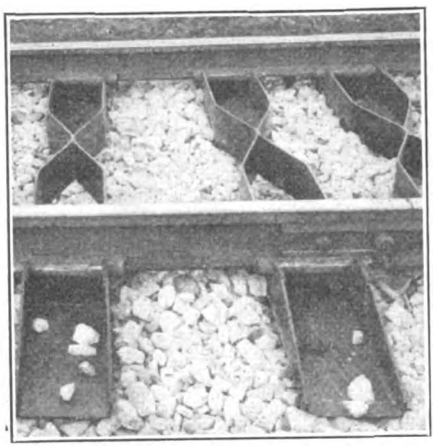
The type S control relay is provided with a two-piece contact arm and a release coil. As soon as the circuit-breaker is closed by the operator, the pallet switch on the breaker energizes the release coil of the control relay. The release coil opens the contacts of the control relay, irrespective of the fact that the operator may hold the control switch in the "closed" position and thus still be energizing the main coil of the control relay. This arrangement requires that the operator return the control switch to the "off" position before he can again close the circuit-breaker.



Control Relay with Knife Panel Switch

All-Metal Railway Tie

AN ALL-METAL railway cross-tie with several new features is being placed on the market by the Metal Safety Railway Tie Company, Philadelphia, Pa. This tie is of a channel type made to standard dimensions. Its construction permits of considerable flexibility, but is such that heavy tonnage thrusts and wheel shocks are received and absorbed.



Section of Track with Metal Railway Ties

Pockets are provided in the upright side of the tie to act as seats for the rail, which are held in position by wedges. Two semi-sleeve type wedges are used, one on either side of the rail at each pocket. When inserted they are driven home with a heavy maul. The rails are thus anchored to each tie and the wedges resist longitudinal and lateral thrusts. This method prevents widening of the gage and retains the rails firmly in a perpendicular position.

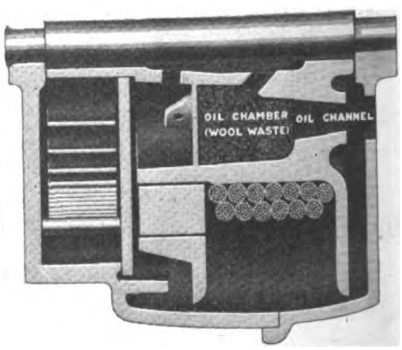
The metal safety ties can be applied to any size or section of rail and do not necessitate any departure from the rail or joint punching in use. At points where it is necessary to insulate the tracks for signal circuits this can be taken care of by using a fiber lining in the wedges.

A Self-Lubricating Trolley Catcher

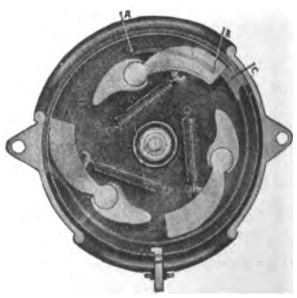
DUE to its location on the dasher of a car, the trolley catcher is subjected to the most severe weather conditions. The construction must be more or less open in order that it may function properly, and this exposes the parts to the influence of snow, rain and dust. Adequate lubrication is therefore of great importance.

The Ohio Brass Company has recently improved the O.B. catcher by providing means for oiling all parts with one application of oil through a single opening. This is done without removing or deranging any parts of the catcher or taking it off the dasher of the car. In the center of the new device there is a chamber packed with wool waste with outlets leading to the center stud and the throw-out dogs. It is necessary only to engage the reel latch with the reel and insert any ordinary oil through the opening in the cover thoroughly to saturate the wool waste. The rotation of the reel in its regular operation will then produce lubrication at every point where it is needed.

Another feature of this catcher is the positive protection against stepping-up. When the trolley wheel leaves the wire and the catcher is tripped, one of the dogs will slide over the guide, indicated by letters *A-B* in the accompanying illustration, and engage with stop *C*, preventing any further upward flight of the pole. Rebound of the pole cannot cause any stepping-up as it is necessary for the dog to back from *B* to *A* before it is released from the guide to assume its normal position. The guide is of sufficient length to permit taking in more of the rope than that which is released by the rebound effect.



In the Center of the Reel of This Trolley Catcher Is a Chamber Containing Oil-Saturated Waste



The Dog Does Not Release Until the Reel Is Turned Backward Nearly a Quarter Revolution

The new Brooklyn cars described in this issue are equipped with these catchers.

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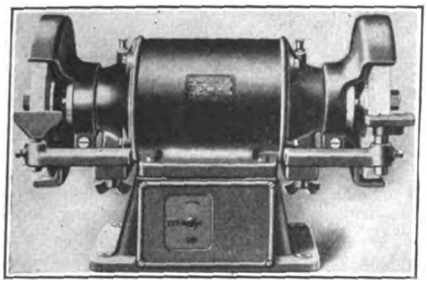
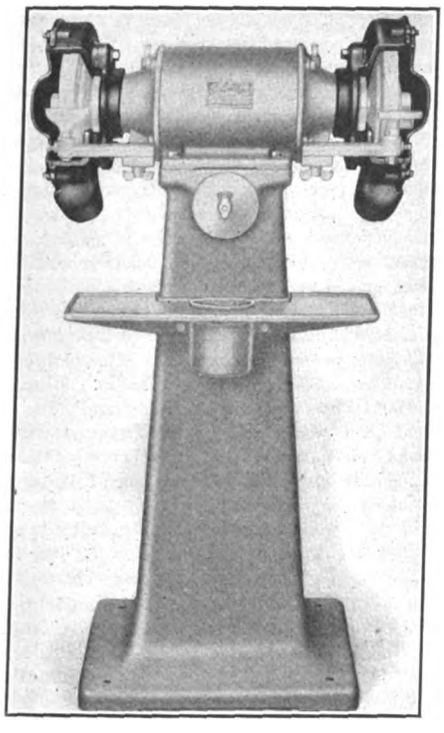




New Type Grinders—Above, Bench Grinder. Below, Floor Type

Improvements in Floor and Bench Grinders

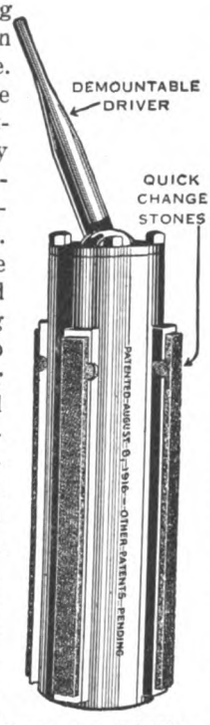
SEVERAL new features have been introduced into the design of floor and bench grinders being marketed by the Hisey-Wolf Machine Company, Cincinnati, Ohio. The control of the operating motor is by a button located on a plate in front of the machine with the switch proper completely inclosed in the base. This mounting insures protection for the parts and gives ready access to the switch mechanism by removing the cover plate.

The end heads for the operating motor are cone shaped, which gives the maximum working space around the grinding wheels. Combination wheel guards are provided with removable end covers and exhaust pipe connections. They are adjustable to any angle and to provide for wheel wear. They are designed so that the wheels can be removed independently. The spacing between the two grinding wheels is made particularly large, so that two operators can work without interference.

Ball bearings are used throughout, and are mounted in motor end caps in close proximity to the grinding wheels. The bearings are completely inclosed from dust and dirt and provided with heavy felt washers on each side of the bearing housing.

Tool for Resizing Compressor Cylinders

THE National Brake Company, Buffalo, N. Y., is marketing a device for resizing compressor cylinders, which is called the Auto-Hone. This consists of a center arbor with honing stones mounted on its circumference. The position of the stones is adjustable, so they may be made to fit cylinders between 3½-in. and 4½-in. bores. Pressure on the stones is regulated from the driving end of the tool. To grind the cylinder the tool is slipped in and is then connected to an ordinary electric drill by a demountable driver. As the Auto-Hone revolves, the stones grind the walls to cylindrical shape. Two sets of stones are furnished, one for quick cutting and the other for fine honing. The stones are 8 in. long and bridge the area of wear so as to grind the full length of the cylinder. One set of stones will grind about 100 cylinders.



Device for Grinding Compressor Cylinders

New Railway Lightning Arrester

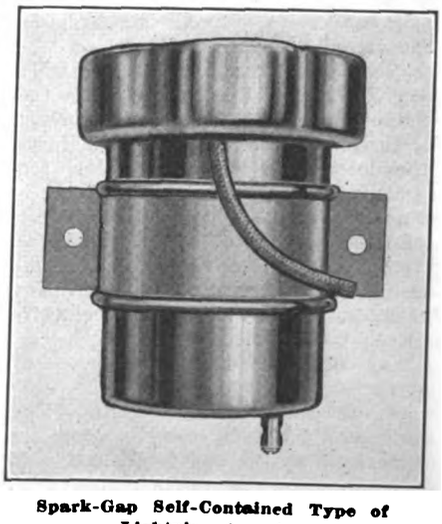
THE Electric Service Supplies Company has placed on the market a new type of direct-current railway lightning arrester, intended for both car and line service, and known as their type IC. These arresters have been designed to fill the demand for a highly efficient railway lightning arrester completely incased in porcelain.

Type IC arresters are entirely self-contained; that is, they do not require an external protecting box, and are so constructed as not to require or permit inspection. The maintenance of the arresters is practically limited to the replacing of damaged units. From experience gained through the use of porcelain-incased arresters on power and lighting circuits of some of the larger central stations, indications are that the total annual maintenance costs may be kept well below 1 per cent of the original cost of installation.

The new arresters permit of easy and cheap installation and are small enough to be installed on the most crowded pole, or in any convenient location in a car.

These new arresters consist of a porcelain body, entirely sealed, which houses the operating mechanism. The arrester is of the spark-gap type, and for interrupting the flow of power current following the lightning discharge to ground, use is made of the long standard Garton-Daniels circuit breaker principle in a modified form. In this new arrester a permanent discharge path is provided from line to ground. The circuit breaker path is normally open and forms a shunt to a portion of the discharge path. The power current following a discharge to ground closes this circuit breaker path, transfers the dynamic current flow from the discharge path to the circuit breaker path, de-energizes the solenoid-operating coil and permits the circuit breaker to cut off the flow of power current to ground.

Due to this particular construction it has been possible to secure a very compact unit and one whose efficiency is high. The same arrester is used for both car and line service, different hangers only being provided for the two conditions. The arrester being entirely self-contained enables one to tell at a glance whether it is in good condition or not.



Spark-Gap Self-Contained Type of Lightning Arrester

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American Association News

Exhibits Finest and Largest Ever Displayed

Many New Devices Were Shown—Something of Interest for Each Department of the Electric Railway—Space Devoted to Buses Was 24 per Cent of the Total

THE display by manufacturers at the forty-second annual convention of the American Electric Railway Association surpassed all previous records. A total of 167 exhibitors had displays, which occupied 75,930 sq.ft. of space. Of this amount 374 sq.ft. was outside the pier in various track exhibits.

A particularly noteworthy feature of the display was the large amount of space devoted to bus exhibits and accessories, which consumed 24 per cent of the space. At last year's convention in Chicago, out of a total of 62,000 sq.ft., 11 per cent was taken by bus exhibits. This year's record for space taken by bus companies is thus three times that of the Chicago displays.

There have been very interesting exhibits at the association conventions in the past, but none, in the opinion of those in attendance, where more new developments were shown. There was something instructive for each department of the electric railway.

Automatic Substation and Remote Control Developments

Power men found much of interest in the developments shown in apparatus for automatic substation and remote feeder control. New apparatus showed the adaptation for this service of electro-pneumatic contactors of standard types used in electric railway service for starting and running synchronous converters. Small synchronous converters with high-reluctance interpoles can be started successfully without raising the brushes from the commutator and the automatic control for such machines is simplified thereby. Other interesting developments included a pneumatic mechanism for closing oil-circuit breakers, supervisory control for switching equipment of all kinds at remote points and remote load indicating devices for transmitting meter indications over two-wire telephone circuits or their equivalent.

Way and track men found much of interest in a large variety of trackwork, tie and welding exhibits. The association's exhibit showing samples of various welded rail joints tested to destruction, together with photographs showing the methods used in making the test joints, received considerable attention. New designs for frogs and switches showed the attention that is being given toward developing trackwork that will give longer life with less trouble in service. There were a large number of exhibits of metal and substitute ties for both open and closed tracks. The new types showed that much attention is being given toward producing a satisfactory substitute tie. Welding displays were more elaborate than ever before and several new track grinders were shown.

The increased use of cars operated by one man has resulted in improvements in overhead construction to prevent trolley wheels from leaving the wire. Several new designs of overhead frogs were shown. A universal frog with overlapping runners has been brought out which prevents the flanges of trolley wheels from running on the pan.

Improvements in fare collection and registering devices have also been influenced by one-man operation of cars. New designs show a trend toward instantaneous registration, more rapid operation, reduction in weight and simplification of mechanism to relieve operator of duties.

Equipment for controlling and operating doors and steps also showed considerable advancement. Operation has been simplified to reduce trouble and save time. Special consideration has been given to preventing accidents. Thus in one new design shown the failure of the air supply or an open circuit in the electrical circuit closes the door automatically.

Other parts of car equipment showed interesting improvements. A new light-weight control equipment was shown for the first time and a fan ventilation attachment for application to old motors was said to make it possible to increase their capacity 36 per cent.

There were many developments in electric heaters and thermostatic control equipment. New heating elements imbedded in insulating material permit of many new designs of heaters such as the floor type, which was exhibited. The use of high-grade resistance wire is quite general and permits new types of construction of other parts.

Equipment for the Accountants Shown for First Time

The accounting and auditing departments of the railways, found much to interest them this year in the large number of exhibits containing new coin counting and wrapping machines, also improved calculating and listing machines.

Exhibits outside the pier included an electric trolley bus and two electric locomotives. The trolley bus was one of those purchased for use on Staten Island, N. Y. One of the electric locomotives was for service on the Glendale & Montrose Railway. This locomotive weighed 99,000 lb., had a total wheelbase of 22 ft. 6 in. and was provided with 36-in. diameter wheels and 5 x 9-in. journals.

Statistics on Bus Exhibits

There was a total of twenty-six gasoline-driven motor buses and one electric trolley bus shown. Of the twenty-six gasoline-driven buses, seventeen were of the street car type, six were of the sedan or limousine type, three were double deckers and one was of observation type. The street car types seat from sixteen to twenty-nine passengers on a single deck, while the intercity coaches accommodate from seventeen to twenty-four passengers. The double deckers carry from fifty-one to sixty-seven. Five of the limousines had smoking compartments that accommodate from six to eight persons.

For the most part, the street car types were finished with leather seats, only six having rattan, which is the popular choice on the three double deckers shown. Seven of the buses and chassis on exhibition had air brakes, in one case on all four wheels. Pneumatic tires in sizes ranging from 32 x 6 to 36 x 6 seem to be most favored with dual rears. The doughnut type of tire with 20-in. wheels was found in one exhibit.

Prices f.o.b. factory for the city type buses exhibited ranged from $2,400 to $8,000. For the long-distance intercity buses with smoking compartments the cost is higher, in fact the range is from $7,000 to $10,000. The double-deck buses exhibited cost approximately $9,000.

Special Reports Available

The Bureau of Information and Service of the American Electric Railway Association states that the following special reports have been prepared and are available to member companies in good standing upon request:

Wage Bulletin No. 128—For each of nearly 400 companies there is shown the rate of wages in effect Oct. 1, 1923, the date the rate became effective, the date of expiration, the average weekly wage earned under this rate, bonuses paid, previous rate of wages and the effective date, the union status of the trainmen and the wages of bus operators where the company operates buses.

Effect of Fare Changes on Revenues and Riding Habit—A group of companies having two or more fare changes has been selected and for each company there is shown the cash fare, ticket rate and transfer charge, if any, and a month by month statement of the number of cash passengers and ticket passengers, and the passenger revenue divided between revenue from cash fares and revenues from ticket sales.

The Weekly Pass—Gives a list of companies using the weekly pass with the effective date and the rate at which the pass is sold, together with figures showing the number of passes sold per year, the average number of rides on each pass, the average fare per passenger before and after the pass was introduced, the methods of introducing the pass and statement of the company's views as to the advantages and disadvantages of the pass.

The Indeterminate Permit—Contains copies of state laws providing for indeterminate permit, indorsements of it by public bodies and numerous public statements and arguments in favor of the general use of this type of franchise.

In addition to the above supplements to the Fare Bulletin and Cost of Living Studies have been prepared bringing this information down to date.

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The News of the Industry

Thompson Policy Reversed

Chicago Is $8,189,128 Richer Under the Policy of Conciliation of New City Administration

The City Council of Chicago on Oct. 17 voted unanimously to repeal the 1921 ordinance forfeiting the franchise of the Chicago Surface Lines. At the same time it approved the abandonment of pending forfeiture suits, voted to accept the city's share of the companies' profits, aggregating more than $8,000,000, and paved the way for immediate service improvements even while negotiations are under way to bring about municipal ownership of the traction system.

All these things were done on the recommendation of Mayor Dever. In other words, the City Council has reversed the attitude toward the company taken during the administration of former Mayor Thompson, who kept the traction question an issue in political campaigns.

After rising operating costs had made it necessary for the state regulatory commission to increase the fare in Chicago above 5 cents, Thompson insisted that the Chicago Surface Lines had broken its contract with the city, and the City Council, at his request, passed a measure forfeiting the 1907 franchise ordinance, under which the companies operate. The city law department also filed forfeiture suits against the traction lines and the city administration refused to accept the city's 55 per cent of the companies' net receipts since 1920, on the theory that it would prejudice the settlement of the forfeiture suits.

The city's share of the companies' profits which have been offered each year, but not accepted, now aggregate $8,189,128. If this amount had been accepted the city's traction fund would now total more than $36,627,000. By the Thompson administration's refusal to accept this money it is estimated the city lost $650,000 in interest.

Mayor Dever, in his message to the City Council, which resulted in tossing the policies of the former administration overboard, called attention to the fact that negotiations had been opened between the city authorities and officials of the Chicago Surface Lines looking to the purchase of the system by the city. He added that officials of the elevated lines are out of the city, but that conferences will be held with them in the near future, for the same purpose.

Mayor Dever said:

I respectfully request that you pass at once the ordinance recommended by the local transportation committee, repealing the so-called forfeiture ordinance of Feb. 4, 1921, and directing the corporation counsel and the special traction counsels, which I transmit herewith.

I concur in their conclusions that the results of the suit and ordinances have been detrimental to the best interests of the city and beneficial only to the surface line companies.

The policy pursued resulted in the city's refusing to accept since 1920 the city's 55 per cent of the divisible net receipts of the Surface Lines, amounting now to $8,189,128.

The institution and pendency of this suit have for the last four years obscured vital phases of the local transportation problem.

Based as it was on an erroneous theory, it has held false hopes impossible of realization, and at the same time has paralyzed all constructive efforts by the city to compel the companies to live up to their obligations under the ordinance.

Each time it was proposed by the City Council to take affirmative steps to procure performance by the company of its ordinance obligations to give better service or construct further tracks it was met with the objection that such action must not be taken because it would be inconsistent with and interfere with the prosecution of the forfeiture suit. In this way the companies got all the advantages of their franchises, because action by the city was suspended; they were relieved of their obligations under the ordinances.

With the forfeiture suit and ordinance out of the way, the city again will be in position to demand and enforce a complete compliance with those provisions of the ordinances, which under the decisions of our Supreme Court are binding upon the companies and enforceable by the city.

If then the companies fail to comply with those terms of the ordinance and thereby commit substantial breaches of their obligations, the city will be able to declare a real forfeiture and to institute proper suits to bring about a cancellation of the companies' rights.

The Mayor's legal advisers also recommended that the city appoint its representatives on the two boards of supervising engineers, who oversee the operation of the traction lines.

How the New Award Works Out in Boston

As was announced in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 20, a wage increase of 9 cents an hour was recently awarded the 7,500 employees of the Boston Elevated Railway. How the award actually works out in cents per hour for surface line men and rapid transit employees is shown in the accompanying table.

Surface lines, motormen and conductors:

First three months of service	57
Next nine months of service	63
Thereafter	70

Rapid transit lines, motormen:

First year of service	71
Thereafter	72

Rapid transit lines guards:

First three months of service	57
Next nine months of service	63
Thereafter	70

One-man car operators and bus drivers—8 cents per hour in addition to regular rate.

Snow work—Time held or worked.

Conductors, motormen or guards, 20 cents per hour in addition to regular rates.

Conductors, motormen, guards, gatemen, collectors, train clerks when instructing learners, 12½ cents per hour in addition to regular rate.

Settlement Plan Suggested

Ten-Cent Fare and Relief from Paving Burden Are Being Sought by Davenport Road

A comprehensive plan for rehabilitating the railway system of Davenport as a successful and continuing business has been proposed to the City Council by B. J. Denman, president of the Tri-city Railway of Iowa.

A 10-cent fare, a new car rerouting system, permission to operate single-truck cars on some lines, abandonment of some trackage, a lower revaluation of traction line property, backing by the city of a bill in the Legislature to give special chartered cities power to fix paving assessments on railway lines are the main points in this plan.

The increased fare would result in an increase in revenue of $109,299 annually, Mr. Denman estimates. The elimination of trackage would reduce operating expenses $50,000. The nub of the whole matter, however, is the burden of paving cost, now assessed against the company by state law. Under this law the company is compelled to pay the entire cost of paving between its rails and 1 ft. on either side. It is proposed to introduce a bill in the Iowa Legislature allowing special chartered cities, among them Davenport, to meet the cost of paving as they shall see fit. If this bill passes it will be understood that the Davenport City Council makes an equitable adjustment with the traction lines on paving. The suggestion has been made that the company pay for the foundation under its tracks and the city meet the cost of surface paving entirely, either by tax on abutting property or partly from a general fund.

The rerouting system asked was turned down by the City Council some time ago. It provides for the elimination of approximately 5 miles of track, a large increase in service, building of passing tracks, a generally faster schedule and an expense of approximately $400,000 to the company.

It is also proposed that the assessed valuation of $2,000,000 be reduced and the value of the property be more nearly based in its ability to earn. The Council has not the authority to make this reduction, but it could assist when the proper time comes, Mr. Denman states.

The Council received the communication and a special committee consisting of the standing committee on transportation, the Alderman-at-large, the Mayor and the city attorney was appointed to handle the problem.

The company, through Mr. Denman,

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had stated some weeks ago that unless financial relief were granted operation of the railway would cease. Prominent business men, Councilmen, the daily press and labor organizations clearly indicated that street cars are wanted and that concessions must be made to keep the system in operation.

The daily press, in commenting on this latest plan of the company, suggests that it is the basis of a constructive solution of the railway problem and that the traction lines and the Council should be able to come to an understanding that will remove the existing drawbacks to successful operation and provide for operation, adequate to the city and profitable for the company. The press, however, suggests a lower fare than 10 cents for habitual riders. The present fare is 8 cents.

Mr. Denman's letter to the Council contains an estimate of operation under the conditions outlined in his request. He says that it should not be overlooked that the riding is continually decreasing, due to the increasing use of the automobile. The expressed belief of the company is that its traffic will decrease 10 per cent with a 10-cent fare, due in slight measure to the increase in fare, but in greater measure to the increasing use of the automobile. Assuming, however, that there is a decrease of 7 per cent in the traffic, it is estimated a 10-cent fare would produce an increase in revenue of $109,299. This is arrived at by applying the proposed fare to the number of passengers in each class carried, and the increase in revenue arrived at as indicated in detail in one of the exhibits attached to the application.

Mr. Denman says that it will be some time before the operating economies mentioned in the application can be effected, and until that time the new fare would give the following results:

Annual revenue as shown in Exhibit D	$856,176
Less operating expenses, taxes and depreciation	706,307
Net return on investment	149,868

According to Mr. Denman, this gives a return on the valuation of Burns & McDonnell of 1920 (not including construction since that date) of 4.61 per cent. It should not be overlooked that operating expenses for the past twelve months include an increased wage to train and shop men since June 1. He says that had the new wage been in effect the previous nine months, expenses would have been increased and the net revenue decreased by that amount. When the operating economies previously mentioned are in force, it is estimated that a saving of $50,000 per annum will be effected, thus making the total net earnings available for return $199,868, or 6.14 per cent on the valuation of Burns & McDonnell.

During the past six years the company scarcely made operating expenses, and it was impossible to maintain the property adequately. It is explained that this relates particularly to the overhead work and that it is necessary to spend at least $50,000 to put the poles and trolley wires in proper condition. This will be an additional item in operating expenses, not taken into account in the discussion. Mr. Denman says that a great deal of this work will have to be done within the next twelve months and practically all of it within the next eighteen months. He assures the Mayor and the members of the Council of the sincere desire of the company to be of every possible assistance to enable them to check the correctness of the figures presented by the company.

Injunction and Damages Sought by Maumee Valley

Precedent may be established in Ohio when the Common Pleas Court at Toledo makes a decision on the petition of the Maumee Valley Railroad seeking to enjoin the Ohio-Michigan Coach Line from operating a parallel bus service without a certificate of convenience and necessity from the State Public Utilities Commission. The plaintiff claims the operation of the bus line is "unlawful competition" because other provisions of the new state bus regulatory law have not been complied with by the bus company.

The railroad recently spent $500,000 in providing new cars and equipment and speeding up service for the communities served.

In addition to the injunction the railroad seeks an award for damages it has suffered while the buses have been operating.

The court has taken the matter under advisement following a recent hearing on the petition.

Wage Settlement Reached in Springfield, Ohio

An increase of 3 cents an hour was granted platform men of the Springfield Railway, Springfield, Ohio, under the terms of a new scale after negotiations extending over a period of six weeks. The new scale, retroactive to Oct. 1, provides for 45 cents for the first three months, 47 cents for the next nine months and 49 cents thereafter.

The new scale represents a compromise offer by the company, the second to be made by it during the negotiations. The first compromise proposed a scale of 44, 46 and 48 cents. The carmen had demanded 46, 48 and 50 cents. The former scale was 42, 44 and 46 cents.

The company threw its books open for inspection by a committee from the union and made a second compromise offer, which was accepted. Some slight changes were made in the working conditions, one of these being the agreement by the company to supply tickets to the conductors and to collect for them at the end of the day. Heretofore, the conductors have been required to pay cash in advance for tickets. The conductors will still carry their own change. The scale continues the nine and one-half hour day basis on a seven-day week.

No Inequality to Seattle-Rainier Charge

The State Department of Public Works has found that since the Seattle 8½-cent carfare there is no inequality to the same charge by the Rainier Valley line. Walter B. Beals, assistant corporation counsel, who represented the city of Seattle at the hearing, said that although the complaint had been dismissed, most of the petitioners' grievances had been righted by the company on its own initiative since the hearing before the department handed down its ruling. He cited the granting of school fares for children at ten tokens for 25 cents, the same rate charged by the Seattle Municipal Railway; abolition of the transfer charge, under which patrons formerly paid 10 cents if they wished a transfer to the Municipal Railway, and the company's concession by which patrons can buy three tokens for 25 cents instead of buying 50 cents worth at one time. The department, tentatively accepting the company's valuation and operating costs, found that it was getting a return of 4.72 per cent, after the president's salary had been listed at $3,000. It commented on the non-resident president, pointing out that he lived in the East and acted as financial agent for the company, as well as for several other firms, and spent only two or three weeks in Seattle every year.

Service Restored in Milan

The Milan, Ill., tangle, involving a proposed new franchise for the operation of cars of the Tri-City Railway and the extension of the company's service, curtailed early in the summer by the hard road construction work, was adjusted at a conference between T. C. Roderick, general manager of the railway, and a special committee from the Milan town board, headed by Mayor B. H. Rollis. Under the agreement reached the railway will be completed in a short time and service restored to the Milan residents. The new route will cut off three blocks of the old car line routing. The franchise of the Tri-City Railway to operate cars in that village expired on Aug. 28 and up until the settlement the company had not indicated that it wished to resume service through the city.

Railway Troubles Discussed.—A public meeting was held recently in Anderson, S. C., at which the entire railway situation was gone into in an effort to devise some means to lighten the burden on the Southern Public Utilities Company. Efforts are being made to avert, if possible, the threatened suspension of service. It was brought out that revenue from street car service is not now sufficient to pay for operation, to say nothing of interest on bonds, taxes, depreciation, etc. No definite plan to aid the company to keep the system in operation was decided upon, but it was intimated that Council might relieve it of a part of its tax burdens and of its street paving assessments.

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No Agreement in Cincinnati Over Replacement Expenses

At a recent meeting of the directors of the Cincinnati Street Railway no agreement was reached in the controversy between the company and the Cincinnati Traction Company over $4,000,000 of repairs and replacements to the street railway system. Several members insisted that the arbitration procedure be abandoned and that the controversy be taken into the courts for immediate settlement. Another group contended that if the differences between the two companies could be settled by arbitration that was the proper course to take. It was said that any settlement made would be with a view of eventually returning the traction properties to the Cincinnati Street Railway, which leased it to the traction company in 1896 for a period of fifty years. It is understood that the lessor company would eagerly take back the system, but not in its present condition.

The directors of the Cincinnati Street Railway have intimated that the necessary repairs and replacements as outlined in the report of Stone & Webster, engineers, who made a survey of the traction properties, would have to be made or the amount necessary to make these improvements deducted from the selling price before it would consider any proposition. The Cincinnati Traction Company, on the other hand, is willing to surrrender its lease, but under no circumstances will it sell at a sacrifice price. The Cincinnati Traction contends that it has expended approximately $13,000,000 in repairs and betterments to the traction system since it took it over and that this amount must be taken into consideration. On the other hand, the Cincinnati Street Railway charges the lessee is in default of the covenants of the lease to the extent of $4,000,000.

Magazine Articles Helpful to Railway Men

Forbes for Oct. 13 might almost be called an electric railway issue. In it are told "How the North Shore Line Set Out for a Goal and Made It," by Neil M. Clark; "How Paul Shoup Made His Mark," by B. C. Forbes, and the story of "A Merit and Bonus System that Rewards and Fires," by Charles Alma Byers. On the cover is a full-length half tone of Britton I. Budd, the president of the North Shore. All of the articles are illustrated, the pictures including portraits of Mr. Shoup and of George Baker Anderson, originator of the merit and bonus system of the Los Angeles Railway and manager of transportation of that company. To readers of the ELECTRIC RAILWAY JOURNAL the personal accomplishments of these men and their achievements for the companies with which they are connected are pretty well known; but all of the stories, written by men trained in the school of popular magazine work, are most helpful to the railway man, in that the authors have unconsciously reflected in their stories the viewpoint of the general public about railway matters.

Will Extend Chicago "L"

Plans have been formulated for an extension to the Northwestern branch of the Chicago "L" system at Howard Street and a company has been organized to prepare the right-of-way. This new organization, to be known as the Chicago, North Shore & Northern Railroad, after construction is completed, will enter into an agreement with the Chicago Elevated whereby it will be possible for the Elevated to operate its cars over this new company's right-of-way. The proposed trackage will start at Howard Street, or the city limits, form whence it will proceed dircetly west 3 miles to Cicero Avenue, and then turn north and proceed 2¼ miles to Dempster Street, Evanston. Stations at appropriate locations will be constructed along the line, while terminal facilities and yards will be provided at the Evanston-Dempster Street end. The construction will include submerged right-of-way and elevated structure wherever necessary.

Future plans call for a connection between the Dempster Street terminal and the Chicago, North Shore & Milwaukee Railroad's right-of-way at North Chicago. Such construction would make possible the operation of the present North Shore's Chicago to Milwaukee electric trains over a private right-of-way which skirts the numerous municipalities located between Chicago and North Chicago. This would cut down considerably the running time for the North Shore "De Luxe" through trains.

Special Permit Granted.—The Rockford & Interurban Railway, Rockford, Ill., has been granted a special permit to operate cars for a period of ninety days after Oct. 3, when the franchise expired. Negotiations for a new franchise are now under way.

Signs Taraval Line Bill.—Following a conference with President T. A. Reardon of the Board of Works, Mayor Rolph of San Francisco has ordered through service on the San Francisco Municipal Railway from the Parkside to the ferries. The service is to be put into effect right away. The Mayor said that the development of the district served by the Taraval line would increase the assessment of San Francisco and for that reason he believed the best interests of the city were served by this extension of service.

Engineer Reports on Washington-Baltimore Road.—A report on the financial operation of the Washington, Baltimore & Annapolis Electric Railroad and the Annapolis & Chesapeake Bay Power Company, covering the years 1911 to 1922, has just been issued by J. A. W. Inglehart & Company, Baltimore. This report, which was prepared by W. T. Ballard, states that the physical properties were found to be in good condition, and while it is not possible that they will ever have a spectacular growth, their progress promises to be constant. The earnings of both companies have been fully sufficient over a period of years to protect interest requirements on the bonded indebtedness.

May Nullify Franchise.—At a recent meeting of the City Council of Milwaukee the company was charged with violating its promises by permitting the freight and baggage interurban cars to be operated over the streets in West Allis. The Council approved taking measures to nullify the present franchise, granted the company several years ago. The controversy, it is said, is an outgrowth of the track removal question which has been a matter of discussion for some time. The plan of the city is to have the company move the tracks on Burnham Street from the north side to the center of the road at the company's expense. The failure of the company to make this removal may result in the halting of service.

People to Decide Trolley Fate.—At a recent meeting of the committee of the whole of the Board of Estimate of New York, Borough President Connolly, discussing the operation of the New York & North Shore Railway, said that the residents of Flushing, Whitestone, Bayside, Douglaston and Little Neck, Long Island, would be questioned soon on their desires with respect to the operation of the line. He said that the matter would be determined definitely by a questionnaire which would be sent out by the borough. At the meeting at which the city operation of the line was considered Grover Whalen, Commissioner of Plant and Structures, gave his opinion as to the trolley line, as compared with the bus line, saying that a modern bus line owned and operated by the city would be preferable.

Safety Behind Refusal to Operate—General Manager Clinton E. Morgan, in emphatically refusing to continue bridge operations when the city starts the municipal lines on the Williamsburg Bridge, contends that safety of operation is the motive behind his refusal. He points out that while the bridge is not used now to the point of saturation, another line, of the type Mr. Whalen proposes, would crowd the private cars off. He said his company wants to give all the service possible and to make the service satisfactory, but it wants to continue to be a safe service. The franchises of the Brooklyn City Railroad and the Brooklyn-Manhattan Transit Corporation do not require bridge operation, and since the city owns the bridge the commission cannot stop it from running cars on it. The city has had tied up in equipment for three years the sum of $600,000. In addition there has been a loss to the city of 5 per cent interest for three years on this sum, making the total amount of money lying idle for three years $690,000.

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Financial and Corporate

Paris Expenses Exceed Receipts

With Its Subsidy, the Company Earns Profits and Pays 8½ per Cent on Its Capital Stock

All of the public transportation in Paris is conducted by the Société des Transports en Common de la Region Parisienne, which operates not only all of the tramways and buses, but one short suburban steam line and passenger boats on the Seine. On Dec. 31, 1922, the company operated on its electric tramways 1,818 electric motor cars and 861 trail cars; on its steam lines, nineteen locomotives, thirty-four passenger cars, ten baggage cars and 122 freight cars; on its bus lines 1,115 motor buses, and on its boat system, fifty-six motor passenger boats, two tugs and sixty-eight towboats. The annual report of the company for 1922, submitted June 26, 1923, indicated that on Jan. 1, 1923, the company had under course of construction to supplement this equipment sixty-seven electric motor cars of standard design and 250 light-weight motor cars, eighty-eight motor buses with four wheels and fifty motor buses with six wheels each, eight additional passenger boats and fifteen towboats.

PARIS TRAMWAY FARES IN CENTIMES

	First Class	Second Class
For the first zone	35 to 40	25
For two zones	55	40
For each succeeding zone after two	15	10

PROFIT AND LOSS ACCOUNT

Receipts of company (based on Article 23 of the franchise).	
Interest at 6 per cent on the capital stock of Fr. 60,000,000	Fr. 3,600,000.00
Premium earned by managing bonus	2,425,158.09
Premium earned by economy bonus	3,166,177.39
	Fr. 9,191,335.48
The expenses chargeable to the company are fixed, according to Article 23 of the franchise.	
Salaries, premiums, etc., to the operating management, remuneration to the directors and auditors, etc., amount to	Fr. 2,923,723.67
Second annual payment to amortize the guarantee fund	300,000.00
Total expenses	Fr. 3,223,723.67
Credit balance	5,967,611.81
	Fr. 9,191,335.48

Receipts from operation during 1922 amounted to nearly $21,000,000. Of this sum the electric cars brought in nearly 63 per cent and the motor buses nearly 35 per cent, leaving about 1 per cent for the steam railroad and boats combined and 1 per cent for miscellaneous operating revenue. During 1922 there was an increase of 5.1 per cent in passengers carried and of 10.8 per cent in operating revenue, as compared with 1921.

OPERATING STATISTICS, PARIS TRAMWAY, OMNIBUS AND BOAT SYSTEM, FOR 1922

	Vehicle-Miles or Boat-Miles	Passengers	Total Receipts	Receipts in Cents per Vehicle-Mile
Tramways (Electric)	56,715,777	622,405,302	$13,348,512	23.4
(Steam)	669,707	1,780,563	74,865	1.1
Total for tramways	57,385,485	624,185,865	$13,348,512	23.3
Omnibuses, regular service	26,941,282	289,937,863	7,275,548	27.0
Special night service	63,794	206,579	21,557	33.8
Special theater service	1,267	1,705	179	14.0
Total for omnibuses	27,006,344	290,146,147	$7,297,284	27.0
Boats	356,283	3,391,311	143,423	40.3
Miscellaneous receipts from operation, such as excess charges, adjustments, etc.	.....	.....	9,780	...
Total	.....	.....	$20,799,000	....
Receipts for freight and miscellaneous transportation	.....	.....	195,335	....
Grand total	84,748,112	917,723,323	$20,993,335	24.8

As has been described in previous issues, the company has a contract with the Department of the Seine, in which Paris is located, by which it operates these various means of transport under the direction of the department authorities. For this service it receives compensation, whether or not the operation of the system as a whole is profitable, and this compensation includes two premiums, known as the managing premium and the economy premium, varying in amount with the financial results obtained. As a net result the company earned a profit for the year, although the operating expenses exceeded the gross receipts. The accompanying tables are for the year ended Dec. 31, 1922.

There have been two increases in fare since Feb. 18, 1919. One was on April 1, 1920, the other on Jan. 19, 1922. Fares are on the zone basis, and the present tramway fares, expressed in centimes, are given in the accompanying table. One hundred centimes make a franc, and the rate of exchange for a franc has been assumed in this article as 7 cents. In the table of operating statistics below, the figures have been changed to miles and dollars. The other tables give francs.

Way Being Cleared for Kansas City Reorganization

A payment of claims aggregating $125,000 against the Metropolitan Street Railway by the Kansas City Railways has been authorized by Judge Kimbrough Stone of the Federal court. This is the first blanket order for payment of claims which has been made. It is taken to mean that the receivers have accumulated surplus funds and that a reorganization may be effected soon. The company will pay 80 per cent of the claims of certificate holders against the old Metropolitan Street Railway.

Judge Stone postponed the hearing on other priority claims against the company until Nov. 15.

In the meantime, claimants could perfect an organization among themselves.

James E. Goodrich, attorney for the company, admitted that the note and bond holders of the company had discussed reorganization at a meeting in Chicago.

The bondholders maintain their claims should be settled first, while the personal injury claimants are fighting for priority of payment. Judge Stone gave claimants who had not yet appeared in court ten days to obtain judgments or go to trial.

DISPOSITION OF CREDIT BALANCE

Credit balance		Fr. 5,967,611.81
5 per cent to legal reserve	Fr. 298,380.59	
6 per cent interest on the capital stock	3,600,000.00	3,898,380.59
Balance after these payments		Fr. 2,069,231.22
15 per cent of this balance to board of directors, according to Article 43	Fr. 310,384.68	
2 per cent extra dividend on capital stock	1,200,000.00	1,510,384.68
Balance after these payments		Fr. 558,846.54
One-half to Department of Seine (according to Article 23)		279,423.27
Balance after this payment		Fr. 279,423.27
Surplus from 1921		29,664.59
Total		Fr. 309,087.86
½ per cent extra dividend on capital stock		300,000.00
Balance carried over to next year		Fr. 9,087.86

It will be seen that each share of capital stock received an interest payment of 6 per cent and a dividend payment of 2½ per cent.

OPERATING REPORT FOR 1922

Passenger operating revenues	Fr. 297,128,574.11
Freight and other miscellaneous operating revenues	2,790,503.85
Miscellaneous revenue (exclusive of interest on investments)	3,021,418.85
Interest on sinking and other funds	641,482.52
Total revenue	Fr. 303,581,979.33
Operating expenses	304,271,425.95
Deficit from operation	Fr. 689,446.62
Amounts payable to sinking fund and special war fund guaranteed by the Department of the Seine to the eight constituent companies, etc.	Fr. 40,250,000
Charges payable by the Department on new capital	2,350,187.88
Total fixed charges payable by the Department	Fr. 42,600,187.88
Remuneration to the company under the franchise	9,191,335.48
Total of these two items	Fr. 51,791,523.56
Deficit from operation (as given above)	689,446.62
Total deficit for year	Fr. 52,480,969.98

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Birmingham Company Seeks to Defer Nov. 1 Interest

The receivers of Birmingham Railway, Light & Power Company, Birmingham, Ala., are of the opinion that their cash resources between now and July 2, 1924, will not be sufficient to discharge all of the obligations which they will be called upon to meet by that date. Among these obligations are $787,000 in principal amount of underlying bonds which mature July 2, 1924. In consequence they have filed with the court a petition in which they recommend that the interest which falls due Nov. 1, 1923, on the refunding and extension mortgage 6 per cent gold bonds be not paid. The question of whether or not the interest due on Nov. 1 shall be paid will come before the United States District Court at Birmingham on Oct. 30.

In view of the situation created by this appeal to the court the holders of the refunding and extension mortgage bonds organized with L. Carroll Root, vice-president of Newman, Saunders & Company, Inc., New Orleans, La., as chairman. This committee has arranged to pay the Nov. 1, 1923, coupon on bonds deposited with it, either by purchase of said coupons or loans secured thereby without interest. It has just announced that more than a majority of the bonds outstanding have already been deposited with the committee. If 60 per cent or more of the bonds are deposited with the committee and the principal is due by declaration or otherwise, the committee says responsible parties have contracted to buy the deposited bonds on or before May 1, 1924, at a price sufficient to yield to depositors the principal of their bonds and 6 per cent interest from May 1, 1923, to the date of payment.

As indicated previously the receivers appealed to the court because of the fear of inability to meet obligations coming due soon. The road has been in the hands of the court under the direction of Lee C. Bradley and J. S. Pevear since Jan. 23, 1919. The receivers have recently made a contract with the city which it is believed will eliminate destructive jitney competition. The ordinance went into effect on Sept. 15. It reduces the cash fare from 8 cents to 7 cents. Under the contract the receivers are required to make extensions and improvements in the service which will require very substantial expenditures. In addition the receivers have substantial amounts of receivers' certificates and bills payable, which will mature on or before July 2, 1924.

Appeals for a $40,833,292 Assessment of United Railways

The United Railways of St. Louis has appealed to the State Board of Equalization to reduce the valuation of the company's property for taxing purposes 20 per cent under the rate-making valuation fixed by the Missouri Public Service Commission at approximately $52,000,000.

If the Board of Equalization would accept the suggestion to reduce the assessment 20 per cent, it will be fixed at approximately $42,000,000 for taxing purposes this year. The company in appearing before the commission contended the valuation for rate-making purposes should be approximately $70,000,000.

The combined properties of the United Railways last year were assessed at $47,756,000, while the State Tax Commission this year recommended a combined assessment of $46,767,000, including the Missouri Electric Company.

The company paid 9.4 per cent of its total gross income last year for taxes.

Plea for Greater Participation by Owners

S. W. Huff, president of the Third Avenue Railway, New York, N. Y., has addressed a letter to the holders of the 5 per cent adjustment bonds inviting them to vote on the company's policy. Bondholders, he pointed out, are entitled to the same voting privileges as stockholders whenever the interest on the bonds has not been paid. He says that a comparatively small number of holders of these bonds are availing themselves of this voting privilege and that the directors are anxious to have as large a number of the security holders of the property as possible vote at its annual meetings, either in person or by proxy.

Minority Report Filed on New York Railways Reorganization

Frank D. Pavey has filed with Judge Mayer at New York a minority report in which he outlines a plan for the reorganization of the New York Railways which he considers much more feasible than the one filed by the majority, referred to in detail in the ELECTRIC RAILWAY JOURNAL for Oct. 20, page 718. His suggestion as to the readjustment contemplates the organization of three operating railroad companies designated as the Broadway & Seventh Avenue Railroad, New York Crosstown Railways, Manhattan Street Railway and one non-operating company designated as the New York Railways Assets Realization Company.

Mr. Pavey says the purpose of this grouping is to put the railway end of the business in a position where it can fulfill its duties to the public; where it will no longer be open to attack upon the ground that it is highly overcapitalized and operated solely in the interest of security holders; where it will be in a position to protect the relative rights of the owners of the underlying securities, and where it will be in an advantageous position for sale to the city of New York in case plans for municipal ownership are ever made effective.

Mr. Pavey feels that the plan as proposed by the majority "perpetuates the method of operation which has brought the railways of that system to ruin and to the verge of extinction." It is his opinion that the public can be served better by a series of short lines than by the new company proposed. He thinks that the organization of three operating companies will tend to protect the system in general from the adverse effects of local changes in passenger traffic. It is Mr. Pavey's opinion that the receivership ought to be continued until the affairs of the lessor companies are adjusted. He says that the New York Railways is hopelessly bankrupt, not only in respect to the payment of its private debts, but also in respect to the performance of its public duties.

Security holders of some of the companies have organized to protest against the details of the plan rather than the plan itself.

Conspectus of Indexes for Oct., 1923

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Oct. 1923 **6.95**	Sept. 1923 **6.95**	Oct. 1922 **7.00**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	Sept. 1923 **163**	Aug. 1923 **165**	Sept. 1922 **181**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages* 1913 = 100	Oct. 1923 **218**	Sept. 1923 **215**	Oct. 1922 **208**	Sept. 1920 **232**	Apr 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Sept. 30 1923 **5.04**	Aug. 31 1923 **5.41**	Sept. 30 1922 **6.69**	July 31 1920 **11.12**	Feb. 28 1922 **4.14**
U.S. Bank Clearings Outside N. Y. City (Billions)	Sept. 1923 **13.90**	Aug. 1923 **13.90**	Sept. 1922 **13.41**	Mar. 1920 **18.54**	Feb. 1922 **10.65**
Business Failures Number	Sept. 1923 **1,280**	Aug. 1923 **1,433**	Sept. 1922 **1,460**	Jan. 1922 **2,722**	Sept. 1923 **1,280**
Liabilities (millions)	**27.50**	**48.40**	**32.51**	**105.7**	**27.50**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	Oct. 1923 **220.3**	Sept. 1923 **221.5**	Oct. 1922 **188.6**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Sept. 1923 **154**	Aug. 1923 **150**	Sept. 1922 **153**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	Oct. 1 1923 **13.10**	Sept. 1 1923 **12.91**	Oct. 1 1922 **12.50**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's—Wholesale Commodities 1913 = 120.9	Oct. 1 1923 **190.8**	Sept. 1 1923 **188.0**	Oct. 1 1922 **175.6**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Sept. 1923 **149**	Aug. 1923 **146**	Sept. 1922 **140**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Sept. 1923 **163.4**	Aug. 1923 **161.6**	Sept. 1922 **155.6**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

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North Shore Stock Offered—Remarkable Earnings

Substantial increase in the business of the Chicago, North Shore & Milwaukee Railroad is shown in statements issued on Oct. 18 in connection with the first public offering of $1,500,000 of 7 per cent cumulative prior lien stock of the company. The earnings of the company for the twelve months ended Aug. 31, 1923, as made public in connection with the offer of the stock are as follows:

Operating revenue	$5,677,652
Operating expenses and taxes	4,540,741
Operating income	$1,136,821
Non-operating income	27,298
Gross income	$1,164,119
Fixed charges	504,516
Net income	$659,603

This statement shows that the sum required to pay the dividends on the new prior lien stock was earned more than six times.

The new stock offering is the first since the recent readjustment of the financial structure of the company. Capitalization of the company comprises a funded debt of $8,265,400 and authorized capital stock totaling $20,000,000. Of this $5,000,000 is 6 per cent preferred and $5,000,000 is common stock. This stock is already outstanding, but of the $10,000,000 of prior lien stock only $1,500,000 has thus far been offered.

The business of the North Shore line has quadrupled since 1916. The total operating revenue in 1922 was $5,007,951. The enormous growth of the merchandise dispatch business of the line is shown by the following revenue figures covering this branch of the business:

1916	$62,654
1917	105,572
1918	151,728
1919	219,396
1920	471,496
1921	477,896
1922	738,817

The number of revenue passengers carried last year was 15,204,758. The merchandise dispatch business totaled 355,183 tons.

Pamphlet on British Columbia Electric Railway

The British Columbia Electric Railway, serving Vancouver, New Westminster and Victoria, has just issued a booklet of forty pages, with maps, views and descriptive matter of the line and territory which it serves. The pamphlet is handsomely printed and gives a very good idea of the physical surroundings and of the nature of the business done by the property. Copies have been mailed to the stockholders, which number about 15,000, mostly in England. It is also being sent to a selected list of residents in the home territory of the company.

Although the pamphlet is not primarily statistical, some statistics are given, and those showing the traffic of the company during the last ten years are reproduced below:

TRAFFIC STATISTICS, BRITISH COLUMBIA ELECTRIC RAILWAY

	Passengers	Tons of Freight
1913	71,973,822	448,750
1914	63,494,023	343,944
1915	46,330,096	231,133
1916	43,021,790	218,065
1917	43,232,630	324,280
1918	52,853,373	365,830
1919	53,326,288	331,794
1920	66,411,030	430,931
1921	71,065,275	413,131
1922	69,314,667	321,081

The booklet is profusely and artistically illustrated. It was prepared for publication under the direction of J. Lightbody, who is in charge of all the company's publicity and advertising.

Time Extended for Pittsburgh Reorganization

The Public Service Commission of Pennsylvania has extended until Dec. 1 the date for the reorganization of the Pittsburgh Railways to become effective. The company presented the petition and no objection was presented by the city of Pittsburgh, which is a party to the new arrangement under which the company will operate. The master appointed by the Allegheny courts to make a report on the reorganization has reported as of Oct. 11. According to law, the master's findings must be advertised for thirty days before the court can make an order, and the further extension until Dec. 1 was sanctioned by the commission to meet this requirement.

Hearing on Denver Case Concluded

The hearing has been ended on the application of the Denver Tramway for a repeal of the 6-cent fare. Special master Henry A. Dubbs, who has been sitting in the case, will go over the entire evidence and arguments submitted.

Gerald Hughes, attorney for the tramway, closed the case on Oct. 14 by going over the evidence that the city submitted, especially the appraisal for the city made by Dr. Delos F. Wilcox.

Mr. Hughes said that from 1917 to date the Tramway had not earned anything net; that more than $2,000,000 had been used in betterments and asserted that the physical condition of the system and the service would show that vast improvements had been made. He added that for the city's attorneys to maintain that the tramway lines were losing heavily by natural depreciation was ridiculous as the system's condition would show.

Mr. Hughes answered the arguments of the city's attorneys as concerned franchises. James A. Marsh, for the city, has asserted that there was no perpetual franchise for the company, and Mr. Hughes called attention to the common use of the word "franchise" whereas the word "contract" should be used, and asserted that the company did claim perpetual rights to the use of the streets of the city for street cars.

$2,801,605 Balance After Preferred Dividends

Nesbitt, Thomson & Company, Montreal, are offering $1,000,000 of the 7 per cent cumulative preferred stock of the Illinois Power & Light Corporation, which took over the Illinois Traction Company and other properties. The stock is being offered at the market which is around 92½ bringing the yield to more than 7½ per cent.

A consolidated statement of earnings for the twelve months ended July 31, 1923, has been issued in connection with the issue. It shows:

Gross earnings	$26,973,032
Operating expenses, maintenance and taxes	18,422,770
Net earnings	$8,550,262
Annual interest on total outstanding funded debt	4,492,829
Balance for dividends and amortization	$4,057,433
Annual dividend requirements on 7 per cent cumulative preferred stock	1,255,828
Balance	$2,801,605

It is explained that about 70 per cent of the net earnings are derived from power and light.

Money Being Returned to Contributors

Hard luck seems to be pursuing the residents of the territory formerly served by the old Springfield, Troy & Piqua Traction Company operating between Springfield and Troy, Ohio. In the first place the effort failed which was made to secure subscriptions sufficient to keep the road in service and practically all the rails on the west end of the line have been taken up and shipped to the Huntington, W. Va., plant of the Schoenthal Company, Columbus, which purchased the property at its scrap value. As if these were not enough the subscribers who contributed to the fund to refinance the line are confronted with the problem of how best to get back the amount of their subscriptions. The money that had been raised was deposited in the Springfield National Bank, and just before the committee in charge decided to return the money to the various contributors, the bank was closed. Under the first dividend of 33⅓ per cent declared by the receiver, the committee received a portion of the money back and is now engaged in distributing it, but only 25 per cent is being paid to contributors, the difference between that and the bank dividend going to pay various expenses that have been incurred. Meantime, as noted previously practically all of the rails on the west end of the line are being removed.

Merger of Electric Subsidiaries Proposed.—The stockholders of the Public Service Electric Company, a subsidiary of the Public Service Corporation of New Jersey and United Electric Company of New Jersey, will meet on Nov. 5, to vote on ratifying a merger of the two companies. The Public Service Corporation of New Jersey owns nearly all the stock of both companies.

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Fare Fund at Lowest Point in Toledo

Car riding in Toledo has taken an increase in October, which indicates that September, with its net deficit of $34,484 for the Community Traction Company, is apparently the bottom for the present year. For the first half of October gross revenue was $6,000 ahead of the same period last month. Gross revenue for September showed an increase of $815 over last year to a total of $301,421, but fixed charges have increased $22,984 and expenses increased $23,068 per month this year as compared with last. Wage increases account for a large part of the expense increase.

Daily average of revenue passengers was 158,598 in September, which shows a decrease from August, with a daily average riding of 161,349 revenue passengers.

Feeder bus operations accounted for a loss of about $455 during the month.

The fare stabilizing fund is now at $85,938. This is the lowest point it has reached since the Milner ordinance has been in effect.

Auction Sales in New York.—At the public auction rooms in New York on Oct. 24 there were no sales of electric railway securities.

New Director Named.—J. L. Perron was recently elected a director of the Montreal Tramways. In this capacity he succeeds J. W. McConnell.

Gold Bonds Offered.—Harris, Forbes & Company and Coffin & Burr, Inc., New York, are offering $6,000,000 Alabama Power Company first mortgage lien and refunding gold bonds, 6 per cent series. The issue is being placed at 99 and interest, to yield about 6.07 per cent.

Preferred Dividend Paid in Cash.—The directors of the American Electric Power Company, Philadelphia, have declared a quarterly dividend of 1¾ per cent on the preferred stock, payable in cash on Nov. 15 to holders of record Oct. 31. The company on Aug. 15 last paid the preferred dividend in preferred stock.

Bonds Offered.—The National City Company and Halsey, Stuart & Company are offering at 92½ and interest, to yield more than 6⅝ per cent, $2,000,000 of the Portland Railway, Light & Power Company first lien and refunding mortgage gold bonds, Series B, 6 per cent. The bonds are dated May 1, 1922, and are due May 1, 1947.

First Mortgage Issue Offered.—Harris, Forbes & Company, New York, N. Y., are offering $1,000,000 of the Iowa Railway & Light Company first and refunding (now first mortgage) twenty-year 5 per cent gold bonds. The bonds, offered at 93 and interest yielding more than 6 per cent, are dated Aug. 30, 1912, and are due Sept. 1, 1932.

Tells of Creditors' Claims.—General Lincoln C. Andrews, receiver of the New York & Queens County Railway, has informed creditors of the company, other than the holders of the first mortgage bonds, that he has in hand $8,010 or less to pay claims aggregating $7,227,017. They were also informed that this amount was liable for city and Federal taxes and for claims that might arise out of the litigation now under way. Two suits are now pending for the foreclosure of two mortgages held against the company each for $1,500,000.

Seeks Discontinuance.—The Sistersville Traction Company on Oct. 5 presented arguments before the Public Service Commission of West Virginia for the discontinuance of its railway service at New Martinsville. The company in asking for authority to discontinue such service in the city claimed that it was operating that part of its line at a loss.

Review of Merger Denied.—The Supreme Court refused on Oct. 22 to review the case in which it was sought to have it determine the effect of street railway consolidation in New York City by the New York Railways upon the lien held by the Irving Bank and the Columbia Trust Company in the form of a mortgage upon the property of the Columbus & Ninth Avenue Railroad, a part of the former consolidated company.

Income and Passengers Increase.—The Philadelphia Rapid Transit Company realized a net income of $1,404,027 for the nine months ending Sept. 30, 1923. This compares with $1,365,129 for the nine months period ended Sept. 30, a year ago. The total passengers carried from January through September of this year was 677,003,228 against 623,972,005 for the same nine months a year ago. The passenger revenue for the nine months of this year was $32,595,400 as compared with $30,645,611 for the nine months ended September, 1922.

City Not Satisfied with Revised Toronto Award.—The city of Toronto will appeal to the Privy Council against the award of the arbitrators to the Toronto Railway in connection with the city taking over the railway at the expiry of its franchise. The award was $11,188,500. The city appealed to the first divisions court against this amount, and the divisional court reduced it by $543,500, being the estimated value of certain street railway property which the city need not take over. This, however, is not satisfactory to the city, and the Board of Control agreed to carry the case to the Privy Council.

Railway Bid In.—T. M. Hayes, Huntington, assistant general manager of the Ohio Valley Electric Company, and John Smith, representing Martin & Smith, Catlettsburg, attorneys for the Catlettsburg Street Railway, bid in that property's franchise on Oct. 15. It was sold at the court house at public auction by C. P. Carpenter, city treasurer and special commissioner appointed to conduct the sale. There being no competitors in the bidding the franchise was knocked down at the first bid of $50. The franchise runs for twenty years.

Will Begin Repayment of Loans.—Having accumulated a cash balance of $301,191, the Seattle Municipal Railway is in a position to begin repayment of loans from various city funds, which were made to the railway two months ago, when it needed cash to meet its payrolls, after the 5-cent fare experiment had exhausted its funds. Superintendent D. W. Henderson recently informed the City Council of this fact. He suggested that loans of $100,000 from the city light fund and $75,000 from the water department, made July 24, be returned. The railway also borrowed from several railway special funds which have not yet been repaid.

Bridge Line Settling Accident Claims.—The balance sheet of the Manhattan Bridge Three-Cent Line, New York, as of June 30, last, shows surplus of $10,759; road and electric line, $147,326; equipment, $117,727; floating capital, $29,613; investments, $74,214; reserve, $100,421; unfunded debt, $31,096, and total assets and liabilities of $592,277. The report states that as a result of the serious accident on May 1, 1923, the reserves for accidents have been used up and before all claims are settled the surplus will be gone. The total amount paid out to Sept. 1, 1923, on account of this accident amounted to $34,593. The company has settled thirty-seven claims and there are seventeen still pending.

Research Bureau Reports on Finances. The Bureau of Government Research, in asking where the $120,000 is to come from for the increased wages recently put in effect on the lines of the San Francisco Municipal Railway, has published in the San Francisco *Chronicle* of Sept. 21 an itemized statement of the railway's income account for the fiscal year, ended June 30, 1923. The total revenue, according to the statement, was $3,013,552, with total operating expenses of $2,301,156. After the consideration of interest on funded debt and reserve for depreciation and account, the excess after all payments amounted to $23,050. The increase of 40 cents a day recently granted to the employees, or a daily salary of $5.40, would increase the expenses of the Municipal Railway $120,000 a year.

Time for Deposit of Saginaw Securities Extended.—Formal announcement was made in New York on Oct. 22 that the reorganization plan for the Saginaw Valley Traction Company, Saginaw, Mich., had been put into effect and the securities of the company are ready for distribution. The protective committee representing the first mortgage gold bonds of the company has extended the time limit for the deposit of bonds under the reorganization plan until Jan. 8, 1924. The committee, consisting of H. M. Addinsell, John R. Macomber and J. W. Hamer, stated that more than 95 per cent of the bonds had been deposited under the reorganization plan. As has been stated before in the ELECTRIC RAILWAY JOURNAL the new company, the Saginaw Transit Company, has acquired and is now engaged in rehabilitating the street railway properties in Saginaw.

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Traffic and Transportation

Fare Case Before Court

Special Master Considering Arguments in Houston Fare Fight—Fare Increase Imperative

Hearing of the action brought by the Houston Electric Company against the city of Houston to prevent the city enforcing a 7-cent fare ordinance was begun in Federal court on Oct. 9, before Special Master Hunt. The city is represented by John A. Beeler, who has made a careful survey of the traction properties in Houston.

It was indicated early in the hearing that the company will ask for an 8½-cent fare, on the basis that the 7-cent fare fixed by the city is confiscatory and that a fare of 8½ cents is necessary to enable the company to meet operating costs and yield a fair return on its invested capital.

H. P. Gillette, editor of *Engineering and Contracting*, was the first witness presented by the traction company. He testified that the deficit on which the company based its petition was in the earnings, and not due to any mismanagement or lack of economical operation. The company, he said, is entitled to charge a fare that will enable it to meet its operating expenses, when the lines are economically administered, and to yield a fair return on the invested capital.

Net earnings of the company at present, Mr. Gillette said, constitute a confiscation of property, as the company's books show net earnings varying from one-half of 1 per cent to a maximum of 2½ per cent of the investment during the last three years.

Estimated cost of reproducing the property of the company as of May 31, 1923, was given by Mr. Gillette as $7,601,588 minus depreciation, with true net earnings of $112,346, or, by the "sinking fund" method of calculation, an earning of only 1½ per cent of the invested capital.

Mr. Gillette then showed that the amount of the alleged deficit for the year ended May 31, 1923, divided by the number of fares collected in the preceding year, showed that to bring revenues up to a point where a fair return on the invested capital would be produced it would be necessary to add 1.7 cents.

The average fare paid in 1922 was 6.8 cents and the added 1.7 cents would produce a fare of 8½ cents.

Reproduction cost now is about 64 per cent higher than in 1914, counsel for the traction company stated to the court, explaining that in 1919 Judge Hutcheson of the Federal District Court allowed a reproduction cost about 33⅓ per cent higher than in 1914 and the Supreme Court had held that the Houston court did not err, although the company attacked this point in its suit.

C. J. Kirk, Public Service Commissioner of Houston, sought to prove that Stone & Webster are overpaid for the work which they do in supervising the operations of the company at Houston.

Service Increases Noted in Chicago

Twice recently Mayor Dever has commended the Chicago Surface Lines for improvements in service. With the installation of all day trailer service on Madison Street on Oct. 14, he again issued a public statement. Trains previously had been operated during rush hours only on other routes, but with the arrival of cars of sufficient motor capacity it became practicable to keep the two-car trains in all-day service. Madison Street is one of the heaviest arteries of travel in Chicago. Its complement now is eighty-nine motor and sixty-six trail cars for weekdays, service having been increased about 20 per cent. Results have been most encouraging to the company as the business continues to grow daily.

Cars in operation on the system have increased 220 since a year ago. Of the 214 new cars ordered some time ago, 184 have been placed in service. Besides, schedule revisions have added the equivalent of thirty-six more cars. Sixty other cars are being built. About 50 per cent of the schedules have been revised since Jan. 1, with the result that 1,525 round trips have been added daily, or more than 6 per cent gain on these changed routes.

Seeks Increased Fare in Oklahoma City

The Oklahoma Railway, operating in Oklahoma City, has asked for authority to increase its fares to 8 cents, and a committee of business men which investigated the financial condition of the company has recommended to the State Corporation Commission that the increase be granted.

John Shartel, general manager of the company, said that the 7-cent fare with four tokens for a quarter now charged is not sufficient to meet operating expenses and that unless relief is granted the company will be compelled to go out of business in Oklahoma City. The traffic has suffered greatly because of the increase in the number of automobiles, Mr. Shartel said.

The company operates interurban lines in three directions out of Oklahoma City and plans to electrify the steam railway from Oklahoma City to Shawnee. Mr. Shartel said that unless relief for the local situation in Oklahoma City is granted the electrification project would be dropped, at least for the present.

Bid for Co-operation

Saginaw Operator Seeks to Impress Business Men with Need for Their Help

"Your job did not end when you approved the franchise; in fact your job just started. From now on you have your biggest job, to help us to make the system all you want it to be, to give the kind of service you want.

"You have an ideal system here—the money supplied to you, and your own people directing the company. Try it, with the help of every man, woman and child in the community. We are at your service, and all we ask of you is patience and co-operation while we are working out the details."

These were the words with which Charles S. Kressler, president and general manager of the Saginaw Transit Company, concluded a speech which he made a few days ago before the members of the Exchange Club. Street railway service in Saginaw has been shut down for two years, and Mr. Kressler knows that he has a tough job ahead of him. He hopes to resume railway service on Nov. 15. The new buses are arriving and they, too will be placed in service soon. Mr. Kressler made no bones about the fact that his talk was a bid for support for the new enterprise. He said some things to business men that might well be repeated elsewhere. Mr. Kressler painted the picture with these words:

"When you consider the transportation problem in a city the size of Saginaw you realize that in a city of 60,000 to 200,000 people there are not enough people who do not own or cannot afford automobiles to support a transportation system properly. Where is the revenue coming from to pay the cost of operation?

"At present many of you get into your autos in the morning and after driving downtown park them in front of your places of business. That space does not belong to you. You should ride to and from your work on the transportation system.

"You are after the business of the farmers, but when the farmers find a place to park downtown they buy in nearby communities, instead of coming to the business center to trade. Within the past few years the business of the neighborhood stores has more than doubled because the people can't find places to park downtown. They buy nearer to their homes. Instead of coming to town frequently to buy, the farmer comes only when it is absolutely necessary.

"It is a merchandising problem, but it also has to do with transportation. I believe that if more attention were paid to that question it would mean proper support to the transit company as well as a profit to yourselves, the appreciation of the farmers and a whole lot better feeling in the community.

"If you drive your own car down to work and back twice a day it will cost you 40 to 60 cents a day, while you can ride on the street car the same number

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of times for 25 cents. You can't afford to drive your own car when you have a good transportation system—and that is what we are trying to give you. In doing this we want your co-operation. In fact, we must have it if we are to succeed. It is as much your problem as it is ours."

Mr. Kressler expressed the need for greater care about safety, particularly in view of the fact that during the period the street cars were withdrawn autos were permitted to wander all over the streets.

Adopts Traffic Resolution in New Orleans

The Commission Council of New Orleans by a vote of four to one (Mayor McShane dissenting) adopted on Oct. 17 the resolution of Commissioner Paul H. Maloney of the Department of Public Utilities to open up North Rampart Street from Esplande to Elysian Fields.

The widening of North Rampart Street will cost approximately $500,000, one-half of which expense will be borne by the Public Service, Inc., and the other half by the city. In order to hasten the work of improvement the Public Service, Inc., has signified its willingness to advance the entire sum, to be reimbursed later by the city for its share of the expense. For this purpose, the resolution adopted directs the budget committee of the city to set aside $125,000 out of the budget of 1924 and a like sum out of the 1925 budget.

Commissioner Paul Maloney pointed out in his resolution that the annual yield from present grants to the Public Service Inc., together with that derived from an agreement made with the Cumberland Telephone & Telegraph Company, available for municipal improvements would be materially increased in 1924 and 1925 and that this should approximate the total cost of financing the project. The project contemplates widening the street for a lineal distance of 2,900 ft., and it is quite likely that work will be started soon and rushed through to completion.

A paragraph in the Beeler report on traffic conditions in the city points out the immense benefits to be derived from this work of improvement, "affording a great artery for all traffic to this important industrial center."

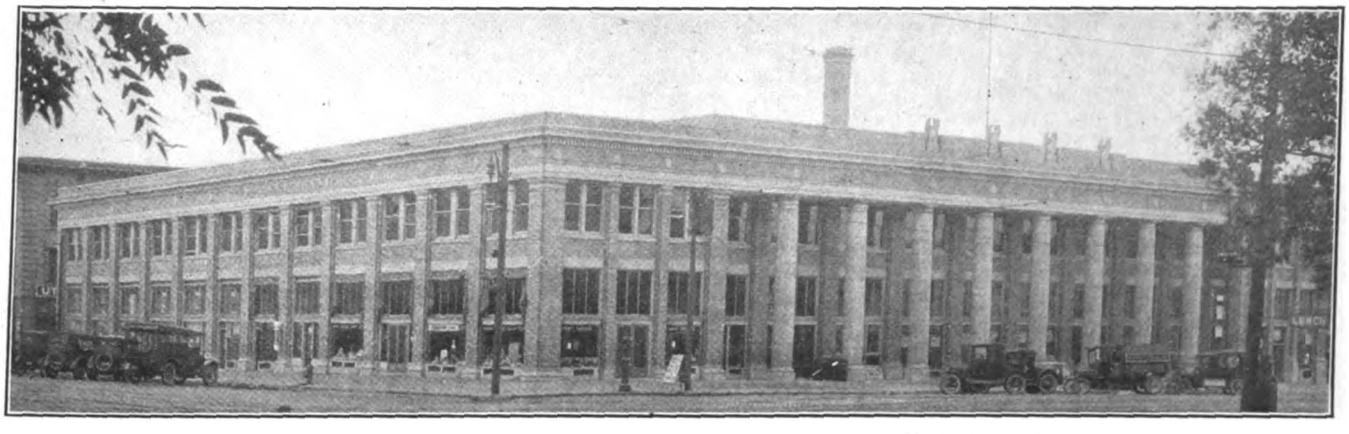
Salt Lake City Has New Interurban Station

The new interurban station for electric railroads of Salt Lake City was formally opened to the public on Oct. 4. Former Gov. Simon Bamberger, chairman of the board of directors of the Bamberger Electric Railway, with other officials of that road and of the Orem Electric Railway, were on hand. All officials were commissioned as ushers and guides. A thorough inspection of the structure was made by a large number of guests.

The big waiting room, which is 125 x 42 ft. in dimension, with a ceiling two stories high, was specially decorated and lighted for the occasion, and all other parts of the new building were in festive garb.

The building, which is the local terminal of the Bamberger and Orem lines, was constructed by the two electric roads at a cost of $300,000. The second story is divided into offices, including those of the traffic and operating departments of the two roads. On the first floor the waiting room and ticket office, which are handsomely finished in marble and tile, occupy the central position, while at the south end of the building there are offices and stores facing the street.

The Bamberger Electric line was started in 1890 by its present head. It was built as far as Lagoon in 1895 and into Ogden in 1908 and was electrified in 1910. The Orem electric line was started in 1911 and completed as far as Payson, Utah, about three years later.



Railway Station and Office Building at Salt Lake Adds Greatly to City's Attractiveness

Expedites Freight Deliveries

The electric lines play an important part in a campaign for better and more rapid and efficient freight service to towns and cities served by Fort Wayne jobbers and shippers. In a systematic effort to expedite shipments and provide "next morning deliveries" to towns in this territory, the traffic and transportation bureau of the Chamber of Commerce, in co-operation with the Fort Wayne Traffic Bureau, has arranged a schedule to provide rapid service over the electric railways to points between Fort Wayne and Lafayette, Ind., on the south, and Warsaw, Goshen and South Bend, Ind., on the west. The schedule, it is announced, will make possible next morning deliveries to points south, as well as at Warsaw and Goshen, with noon deliveries at South Bend. Freight destined for this service may be delivered at the electric railway freight terminal up to 4 o'clock in the afternoon.

Wyandotte Division of Detroit United Reopened

Interurban service was resumed on Oct. 20 on the Wyandotte division of the Detroit United Railway. The road has been shut down since August, when the city of River Rouge obtained an injunction restraining the company from operating through that municipality. The injunction was issued when the railway company attempted to increase fares.

The resumption of service was the result of an order issued by Judge Henry A. Mandell in the Circuit Court directing the railway to sign bonds for $25,000 pending the outcome of litigation started by the township of Ecorse, one of the down-river communities served by the Wyandotte division.

Plans for resuming car service between Detroit, River Rouge, Ecorse, Wyandotte, Riverview, Sibley and Trenton were about completed when a new barrier was raised by the Ecorse Township Board. It was claimed by the board that the railway owed more than $20,000 as the company's share of the expense of a bridge connecting Ecorse and Wyandotte. Ecorse backed up its claims by nailing planks across the company's tracks on the bridge and guarding the bridge.

The bridge was erected about eight years ago and it was claimed by the Ecorse officials that at the time the bridge was built the work was done with the understanding that a friendly suit was to be started against the railway to determine what proportion of the cost should be paid by the company. The suit, it is claimed, was never called, and Ecorse officials refused to accept settlement offered by the company. The question was raised as to whether the company was legally bound to pay anything toward the expense of the bridge, the contention being made that the claim was outlawed according to the statute of limitations.

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Report on Louisville Fund After Jan. 1

Charles Roser, auditor of the Public Utilities Bureau of Louisville, stated that there would be no report issued on the barometer fund of the Louisville Railway until some time after Jan. 1. Because of several questions about the matter, he has explained the working fund and the chances for a lower fare for Louisville citizens in the future. Mr. Roser said that under the ordinance providing for the barometer fund the Louisville Railway created a cash fund of $350,000 on Jan. 1, 1923, so that computation was based on that amount. If at the end of any operating period the fund exceeded $500,000 the fares were to be decreased. When the barometer fund reached $500,000 the public should get the first benefit in the reduction of fares.

He said that the report would be made some time after Jan. 1, 1924, as the period on which this report will be based ends Dec. 31, 1923. He said also the stockholders of the railway would get the benefit of an increase in the barometer by a rate of return on the common stock. When the barometer fund exceeded $500,000 he said that the excess would be withdrawn and one-third of the excess paid into the city treasury, one-third to the company to be distributed among its employees and one-third retained by the company as corporate funds.

Six-Cent Fare Extended.—The City Council of Richmond has extended the 6-cent fare on the lines of the Virginia Railway & Power Company for six months. The company began operating under the extended privilege on Oct. 11.

Eight-Cent Fare Asked in Tulsa.—The Tulsa Street Railway, Tulsa, Okla., reports to the Corporation Commission an operating loss of $15,910 in the first seven months of 1923, $4,407.61 of which was incurred during July. An 8-cent fare is asked.

Fares to Be Advanced.—Fares in Iowa City will be advanced to 7 cents. The Mississippi Valley Electric Company announced that it can no longer afford to operate on a 5-cent fare. Local bus lines also will increase their fares. Car and bus tickets will be sold at the rate of four trips for a quarter.

Will Extend Freight Service.—Wide extensions in freight service on the Tiffin & Fostoria Railway, Tiffin, Ohio, line are soon to be put into effect. Through freight service from Tiffin to Cleveland went into effect on Sept. 20 and through service to Dayton and Cincinnati will be put into operation soon.

Ride for One Cent. — The Danville Traction & Power Company, Danville, Va., designated Sunday, Sept. 30, as "1-cent fare day." On that day the public was allowed to ride on any street car for 1 cent. The purpose was to give the patrons an opportunity to inspect five new double-truck cars which were put in operation on that day.

One-Man Cars Up to Voters.—Plans are being made by local labor unions of Sacramento to place on the ballot at the coming municipal election in November a measure pertaining to one-man car service. Conferences were arranged recently by the city at which were present officials of the Pacific Gas & Electric Company and representatives of the local labor unions.

Wants to Operate a Bus Line.—The Pennsylvania & New Jersey Railway has filed with the Trenton City Commission a petition to establish a bus line that will operate between Trenton, N. J., and Morrisville, Pa., in co-operation with the present electric railway service. The company wants to establish a terminus in the center of Trenton and run buses over the Delaware River bridge. The fare will be the same as charged by the railway, with transfer privileges to the trolley company.

Commission Protects Railway from Competition. — The Corporation Commission of Oklahoma has denied the application of J. E. Clark for a certificate of public convenience and necessity to operate a motor vehicle between Muskogee and Fort Gibson. In so doing the commission sustains the protest of the Muskogee Electric Traction Company, which stated that it now furnishes a full and complete service to passengers between those points, and that no necessity existed for additional transportation service.

Keeps Way Clean.—An effective remedy has been found by the Rockford & Interurban Railway, Rockford, Ill., for keeping the right of way free from weeds, grass, etc., in an improvised mower, hooked on behind the trolley car. The attached mower is fitted with standard wheel equipment, a seat is attached for the operator and two scythes are placed in wing fashion on the right and left side of the rails, the trolley car in front pulling the mower. The mower is similar to the one described in the ELECTRIC RAILWAY JOURNAL for Oct. 6, page 569.

Bus-Trolley Service.—A contract has been let by the Monongahela-West Penn Public Service Company as a preliminary to operating a bus service between Rivesville and Morgantown, W. Va. It will be possible for persons desiring to make the trip between Fairmont and Morgantown to obtain a combination ticket that may be detached for carfare on the trolley cars between Fairmont and Rivesville or Rivesville and Fairmont, so that the fare between Morgantown and Fairmont will be 91 cents. All buses will be met at Rivesville by cars of the Monongahela-West Penn Public Service Company.

Will Continue Through Business Center.—According to an order of Edwin M. Walker, president of the Schenectady Railway, service on the Albany-Schenectady interurban line will continue through the business district of Albany and turn at the Fulton Street loop, as a means of accommodating merchants and shoppers. Heretofore all local Albany cars turned at the waiting room, but it was found out following the traffic survey that the continuation of the schedule to include the downtown district was more than warranted. Mr. Walker in announcing the change said he believed that the interests of the public and those of the company were mutual and that he thought the new plan would prove popular generally.

City Bus Line in Prospect.—A municipal bus line is to be established in West Seattle, between the end of the Alki car line and Lincoln Beach. A citizens' committee is to raise $4,500 of the purchase price of a bus, estimated at $7,000, and the Seattle Municipal Railway will then buy the bus and operate it. According to an opinion of Walter B. Beals, assistant corporation counsel, sent to D. W. Henderson, superintendent of railways, the Municipal Railway is not empowered to establish automobile bus service under the local improvement district plan of financing street railway extensions, authorized by the 1923 Legislature.

Safety Assured. — The Tennessee Legislature recently passed an act to insure the public safety at all grade crossings of interurban railroads (outside of the limits of corporate municipalities) on all highways in Tennessee now designated by the State Highway Department as main traveled ways and incorporated in the general highway plan of the State. Under House bill No. 122, Acts of 1923, all interurban trains either freight or passenger, must come to a full stop 25 ft. before all grade crossings in the state and shall not proceed until track is clear of vehicles and pedestrians. The railroads cannot rely on the defense of contributory negligence on the part of person or persons injured or owning the property damaged. Violation of the above act is a misdemeanor punishable by a fine of not less than $25 or more than a $100 or by fine of not less than thirty days.

Commission Seeks Solution. — The Traffic Commission of Los Angeles has asked a committee of engineers to furnish it its joint opinion as to what form of subway construction should be adopted to solve the city's traffic congestion problems. The question is whether to adopt a subway system with a central terminal station, a loop system or a diffusive distribution of subway stations. The committee to decide the question is composed of Richard Sachse, street railway expert; Samuel Starrow, nationally known consulting engineer; Franklin D. Howell, public utility expert and chief engineer of the Motor Transit Company of Los Angeles; H. Z. Osborne, formerly chief engineer, Los Angeles Board of Public Utilities, and Alvaro Pratt, subdivision and traffic engineer. The Pacific Electric and Los Angeles Railways, operating the local street car lines serving Los Angeles, have each prepared tentative plans of a proposed subway system.

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Personal Items

C. L. Crabbs Retires from Brooklyn-Manhattan

C. L. Crabbs, for seventeen years in the way and structure department of the Brooklyn Rapid Transit System, has resigned as chief engineer of way and structure. Mr. Crabbs has been one of the department heads of the Brooklyn Rapid Transit System since 1909. He joined the organization in 1906 as principal assistant engineer in the way and structure department, when W. S. Menden was chief engineer. Prior to this connection he had been associated with Mr. Menden in engineering work in Chicago during the construction of the Metropolitan West Side Elevated Railway. In 1909, when Mr. Menden was appointed general superintendent of the Brooklyn Rapid Transit System, Mr. Crabbs was promoted to the position of engineer way and structure, and on Jan. 1, 1920, was appointed chief engineer way and structure.

His engineering career began in Chicago in the employ of General William Sooy Smith, and in May, 1892, he joined the staff of engineers engaged in the construction of the Metropolitan West Side Elevated Railway in Chicago. When the "L" construction work was completed, Mr. Crabbs resigned and in 1897 entered the Chicago civil service, first as construction engineer on the Hyde Park sewer system and later as engineer in charge of tunnel construction for the city's water supply system. From 1900 to 1906 he was engaged in the construction of a dock and terminal project along the Hudson River waterfront in Manhattan, and also did some supervisory work in connection with the construction of a factory in Moline, Ill.

Mr. Crabbs was born in Decatur, Ind. He studied engineering at the University of Illinois, from which he was graduated in 1890 with the degree of B S. in civil engineering. He will establish his home in Florida. On Sept. 26 members of his department presented Mr. Crabbs with a gold watch and chain.

Mortimer E. Cooley Resigns Presidency of Engineering Council

Mortimer E. Cooley, dean of the College of Engineering and Architecture of the University of Michigan, has resigned as president of the American Engineering Council of the Federated American Engineering Societies. In presenting his resignation Dean Cooley said that he retires on account of ill health. He also made it known that he has been granted leave of absence by the university for the second half of the academic year of 1923-1924. With his retirement as principal executive of the Engineering Federation Dean Cooley rounds out a career of almost half a century in the service of the state, of education and of his profession. Dean Cooley's successor will be formally chosen at the annual meeting of the American Engineering Council, in Washington, D. C., early in January.

Henry F. Merker Appointed Head of B.M.T. Way and Structure

Henry F. Merker has been appointed engineer of way and structure of the surface lines of the Brooklyn-Manhattan Transit Corporation, successor to the Brooklyn Rapid Transit Company, and has direct charge of all work of the way and structure department on the properties of the surface companies. Mr. Merker goes to Brooklyn from St. Louis, where he was construction engineer for the Missouri Rolling Mill Corporation for about two years. For a similar period he held the position of field engineer for the St. Louis Coke & Chemical Company at Granite City, Ill. From 1905 to 1919 he was engineer of maintenance of way for the East St. Louis & Suburban Railway.

H. F. Merker

Mr. Merker was born in Belleville, Ill. He was graduated from the University of Illinois in 1898. Prior to his joining the staff of the East St. Louis Railway, he was city engineer of Belleville, engineer in charge of power plants at Muskogee and Enid, Okla., and also served on the engineering staff of the Illinois Central Railroad and the Terminal Railroad Association of St. Louis.

Henry J. Kolb has been made engineer of way and structure, New York Rapid Transit Corporation, with direct charge of the way and structure department work on the rapid transit lines and for the South Brooklyn Railway. He has been connected with the engineering department of the system since 1904. In March, 1913, he was appointed engineer of design of the New York Municipal Railway in connection with the carrying out of the construction work under the dual subway contracts with the city of New York. In 1919 he was appointed engineer of construction in charge of engineering design and construction and in January, 1920, was appointed assistant chief engineer way and structure.

Mr. Kolb received his technical education in the Massachusetts Institute of Technology. He has been connected with the maintenance of way department of the New York, New Haven & Hartford Railroad at Boston; has been identified with the Kansas City, Mexico & Orient Railway, Chihuahua, Mexico, and has been associated with the Pennsylvania Steel Company at Steelton, Pa. He was employed two years prior to May, 1904, as a designing engineer by the New York Central Railroad on the design of the engineering track arrangement of the Grand Central Terminal improvements in New York City.

Harry W. Cushman has been appointed transportation superintendent of the Saginaw Transit Company. He has held the position of assistant superintendent with the Tri-City Railway of Davenport. Mr. Cushman was honored by Davenport railway employees with a farewell party, at which a handsome gold watch was presented to him.

Raymond C. Lenahan has been appointed general manager of the Buffalo & Lackawanna Traction Company, Buffalo, N. Y., to succeed Nelson H. Brown, resigned. Mr. Lenahan was general manager of the Depew & Lancaster Railway, operating a short interurban line from Buffalo to Cheektowaga, Depew and Lancaster. He has resigned as manager of this line, but still retains his place on the board of directors.

M. T. Montgomery has resigned as superintendent of transportation for the Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, effective Nov. 1. Mr. Montgomery was formerly general superintendent of the Atlantic & Suburban Railway at Atlantic City, N. J. Prior to that he held executive places with the Pittsburgh Railways, was superintendent of a traction line in Mexico City and later manager of a railway at Monterey, Mexico.

H. F. Cameron, who has been serving as manager of the Arkadelphia-Malvern district since C. P. Couch was transferred to the active vice-presidency of the Mississippi Power & Light Company, at Jackson, Miss., has resumed his position as new business manager. J. E. Couch has been made manager of the Arkadelphia-Malvern district. He was formerly with the Southwestern General Electric Company in Texas, and has had years of experience in the industry.

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C. E. Blee has been appointed chief assistant to E. E. Carpenter, recently appointed consulting engineer of the British Columbia Electric Railway in Vancouver. Mr. Blee has worked on the construction of the Copco dam of the California Oregon Power Company, being with that company since 1916, with the exception of a year when he served as assistant professor in the department of civil engineering at Stanford University. He was assistant engineer of the California Oregon Power Company at the time of his recent appointment.

M. R. Frederickson, who has been in charge of the Wisconsin Valley Electric Company at Tomahawk as division manager for the last few years, has been promoted to take over the duties of commercial manager of the company at Wausau. He will be succeeded at Tomahawk by Ralph Lillie, who has been in charge of the purchasing department of the company for many years. In his new capacity Mr. Frederickson, will succeed E. V. Pryor, former commercial manager of the company, who resigned to become connected with the Altofer Brothers Company of Oakland, manufacturers of the A.B.C. electric washing machine. The Wisconsin Valley Electric Company owns and operates extensive electric railway properties in the north central part of Wisconsin.

L. B. West has resigned as auditor of the Pine Bluff Company. Early in the present year when Mr. Longino was made manager Mr. West relieved him of some of the details of this office. Mr. West has been identified with the Arkansas Company for several years. He was a member of the Arkansas force when the properties were acquired from Ford, Bacon & Davis. When Byron C. Fowles, secretary-treasurer, general superintendent and purchasing agent of the Pine Bluff Company, resigned to become general manager of the public utilities in Kingsport, Tenn., in 1917 Mr. West went to Kingsport with him, and when Mr. Fowles returned to Arkansas Mr. West also returned and was made auditor. He plans to leave shortly for the west.

A. R. Delo has been appointed line foreman on the lines of the Beaver Valley Traction Company and the Pittsburgh & Beaver Street Railway, Pittsburgh, Pa. He was recently with the Duquesne Light Company for a period of two years, having previously served as line foreman with the Citizens Light, Power & Traction Company, Oil City during the years from 1900 to 1906. In the latter year he served in a similar capacity with the Franklin Electric Company, and remained there until 1915, at which time he entered the services of the Ridgeway Electric Company at Ridgeway, Pa. He left the latter concern in 1921 to become associated with the Duquesne Light Company. Mr. Delo succeeds John J. Tesh, who resigned as line foreman after having served the company for nine years.

T. J. Lucas

T. J. Lucas and E. S. Hight New Illinois Power Appointees

Two important appointments to the official roster of the Illinois Power & Light Corporation were announced recently by William A. Baehr, vice-president and general manager.

Thomas J. Lucas, electrical and gas engineer of many years' experience and widely known in the public utilities field, was appointed chief engineer, and E. S. Hight, electrical engineer, was made general operating engineer of the big corporation. The headquarters of both will be at Chicago.

For the last fourteen years Mr. Lucas has been associated with the William A. Baehr organization, consulting engineers, Chicago. He has been active in the direction of the engineering work of the Illinois Power & Light Corporation since the organization of this company on June 1, this year, formed by the consolidation of numerous public utility companies of the Middle West, among them the Illinois Traction System.

Mr. Hight is an engineer well known in the field in Illinois. For a number of years he was chief operating engineer of the Illinois Traction Company, with headquarters at Peoria, Ill. He will finish construction of the Topeka, Kan., power house, the transmission line from Topeka to Atchison and the construction work under way at the Venice, Ill., power house, properties of the Illinois Power & Light Corporation, and will also be responsible for efficiency and operation of the various power plants of the company.

E. S. Hight

Obituary

Charles P. Steinmetz

Dr. Charles Proteus Steinmetz, chief consulting engineer of the General Electric Company, died at Schenectady on Oct. 26, after a very brief illness. Dr. Steinmetz was taken sick during a recent visit which he made to the Far West, and although he recovered sufficiently to make the return trip to the East, the attack of illness which he suffered in the west proved fatal because of the patient's lowered resistance.

Dr. Steinmetz was an engineer-scientist whose gifted genius was widely reflected in electrical and chemical experimentation, research and design. His ability was recognized everywhere, and on old and new problems alike his opinions were eagerly sought. His most constructive work was done, perhaps, in connection with the development of alternating current motors, generators, converters, regulators, lighting and the like. His contributions to the advancement of electrical science and indirectly to humanity will probably never be fully appraised.

Dr. Steinmetz was born April 9, 1865, at Breslau, Germany. He was educated at the Breslau gymnasium and university, studying mathematics, astronomy, physics, chemistry and other branches including economics. In Switzerland he studied mechanical engineering at the Polytechnicum of Zurich. In 1889 he came to America and secured a position with the Eickemeyer Manufacturing Company, first as draftsman then as electrical engineer and designer, and finally on research work in charge of the Eickemeyer laboratory. With the absorption of the Eickemeyer interests by the General Electric Company, Dr. Steinmetz was attached to H. F. Parshall's calculating department in Lynn, Mass. When the company's headquarters were transferred to Schenectady, N. Y., in the spring of 1894, he organized and took charge of the calculation and design of the company's apparatus and of the research and development work. Since 1902 he has been professor of Electrical Engineering at Union University, at the same time retaining his connection with the General Electric Company as consulting engineer, organizing and assuming charge of its consulting electrical department in 1911.

Dr. Steinmetz was a fellow of the American Association for the Advancement of Science, a member of the Mathematical Society and of the Physical Society. He was a past president and member of the American Institute of Electrical Engineers. He was the author of more than a score of books and of numerous scientific papers.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Small Increase in Use of Wood Preservatives

There has been a relatively small gain in the total amount of timber treated in the United States during the past ten years, according to data compiled by the United States Forest Service, in co-operation with the American Wood Preservers' Association. The total for 1913 was 156,613,888 cu.ft., while that for 1922 was 166,620,347 cu.ft., an increase of only a little more than 6 per cent. During the same period the number of treating plants increased from 93 to 128, or more than 36 per cent. The figures show a decided falling off in 1922 over 1921, in which year there was treated a total of 201,643,228 cu.ft. This was probably due to financial retrenchments on the part of the railroads, the car shortage and the coal situation.

The number of ties treated in 1913 was 40,260,416, as commpared with 41,316,474 in 1922, although 55,383,515 were treated in 1921. On the other hand, only 142,069 poles were treated in 1913, as compared with 966,400 in 1922, and there was also a decided increase in the extent of treatment of structural timbers, 138,843,536 ft. B.M. having been treated in 1913, as compared with 152,556,960 ft. B.M. in 1922. Of the ties treated in 1922, nearly 50 per cent were treated with creosote and about 42 per cent with zinc chloride, while the balance were mostly treated with a mixture of zinc chloride and creosote. The total consumption of creosote oil decreased from 108,373,359 gallons in 1913, of which 2,165,736 gallons, or 4 per cent, were imported, to 86,321,389 gallons in 1922, of which 35,462,238 gallons, or 41 per cent, were imported. Zinc chloride, on the other hand, showed an increase in consumption from 26,466,803 lb. in 1913 to 29,868,639 lb. in 1922, the figure for 1921 having been as high as 51,375,360 lb. This indicates a very marked increase in the extent of the use of zinc chloride as a preservative, either alone or in combination with creosote or other preservatives.

Westinghouse Shows Gain

Orders of the Westinghouse Electric & Manufacturing Company for the quarter ended Sept. 30 amounted to $41,940,000, compared with $37,453,000 for the corresponding period last year and $47,649,000 for the quarter ended June 30, 1923. Sales billed for the three months ended Sept. 30 were $38,619,500, against $30,291,800 in the 1922 period and $35,094,800 in the first quarter of this year ended June 30.

For the first half of its fiscal year Westinghouse booked $89,589,100 new business, an increase of 28.8 per cent over the corresponding 1922 period. Total incoming orders for last year were $152,328,564. Billings for the half year amounted to $73,714,300, topping 1922 by 31.6 per cent.

Lumber Specifications Available

Recommendations from the Department of Agriculture for the standardization of grading specifications for yard lumber and for structural timbers will soon be available in circular form. Distribution of the circulars will probably be from the Forest Products Laboratory at Madison, Wis. The first editions, consisting of a few thousands each, will be distributed free on request as long as the supply lasts. In order to make the distribution as effective as possible, the laboratory will give priority to all direct requests received now, before the circulars are sent out to its general mailing list.

World Production of Coal, January-June, 1923

A summary of the data received by the United States Geological Survey up to Oct. 15 shows a total of approximately 666,000,000 tons of coal produced during the first half of 1923. This is an increase of about 79,400,000 tons, or 13.3 per cent, over the corresponding period of last year. Nearly all the countries listed have increased their production, the most notable increases being in the United States, United Kingdom and Poland. The proportion contributed by the United States was 44 per cent of the total. The accompanying table gives the figures.

PRODUCTION OF COAL IN PRINCIPAL COUNTRIES OF THE WORLD, JANUARY-JUNE, 1923.

(In metric tons of 2,204,622 lbs.)

Country	Metric Tons	Per Cent of Total
North America:		
Canada	7,912,610	1.19
United States	294,261,000	44.18
Europe:		
Austria: Coal	74,698	.01
Lignite	1,242,196	.19
Belgium	11,127,700	1.67
Czechoslovakia: Coal	5,919,835	.88
Lignite	8,725,861	1.31
France: Coal	17,659,350	2.65
Lignite	433,741	.06
Hungary	3,807,521	.45
Netherlands	2,686,246	.40
Poland	21,680,056	3.25
Russia	5,609,000	.84
United Kingdom	143,051,102	21.50
Asia:		
British India	10,074,000	1.51
Japan	13,745,000	2.06
Africa:		
Rhodesia	250,447	.04
Union of South Africa	5,222,674	.78
Total	666,000,000*	100.00*

* Germany, South American countries and others not shown individually are included in the total.

Electrification Progress in Mexico

Orders have been placed with the International General Electric Company for an 11,250-kva., 4,000-volt water-wheel generator to furnish power for the electrification of the Maltrata Incline of the Mexican Railways, contract for which was let to this company recently. More than 50,000 kva. in water-cooled 60-cycle transformers designed for 42,000 volts primary are also included in this order. This is the second important step in beginning electrification. Shipment has been completed from Schenectady and Erie of the overhead line equipment, including trolley wire, feeder hangers, etc.

The 3,000-kw., 3,000-volt motor-generator sets for the substation to be located near the center of the electric division will be the largest ever constructed for this voltage. These are now being assembled for test, while the locomotives are themselves nearing completion at the company's Erie works.

General Electric Will Buy the Canadian General Electric

The directors of the Canadian General Electric Company have unanimously approved the offer made by the General Electric Company for the purchase of the stock of the first-mentioned Company. It appears that only the formal ratification by the stockholders is necessary to consummate the agreement.

A question has been raised in regard to the probable disposition of the subsidiary companies in Canada, particularly the Allis-Chalmers Company, which has factories at Toronto, Montreal, Bridgeburg and Stratford. These plants were greatly expanded during the war, but recently have been unprofitable.

The Canadian General Electric Company has an authorized capitalization of $18,000,000 of common stock, of which $10,800,000 is outstanding. There is also $2,000,000 of 7 per cent cumulative preferred stock outstanding. It is thought likely that the agreement will include a stock conversion feature. In order to give the stockholders ample time to consider the offer special stockholders' meetings will probably not be held before the latter part of this year.

Metal, Coal and Material Prices

Metals—New York	Oct. 23, 1923
Copper, electrolytic, cents per lb.	12.687
Copper wire base, cents per lb.	15.25
Lead, cents per lb.	6.85
Zinc, cents per lb.	6.65
Tin, Straits, cents per lb.	41.125
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.575
Somerset mine run, Boston, net tons	2.25
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons	1.45
Central, Ill., screenings, Chicago, net tons	.925
Kansas screenings, Kansas City, net tons	2.25
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.60
Weatherproof wire base, N. Y., cents per lb.	18.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal.	$0.95
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	11.25
Turpentine, (bbl. lots), N. Y., per gal.	$0.99

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Rolling Stock

Long Island Railroad, New York, N. Y., has placed the contract for motors and control apparatus for sixty new cars with the Westinghouse Electric & Manufacturing Company. Each car will be equipped with two 225-hp. motors arranged for multiple-unit control. This new equipment, which involves approximately $600,000, was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Sept. 22, 1923.

Track and Line

Northern Texas Traction Company, Fort Worth, Tex., has completed a feeder line to supply current for operation of cars on the Seminary Hill Line.

Los Angeles Railway, has started work on reconstructing the West Forty-eighth Street track between Gramercy and Van Ness. The reconstruction of Hill Street from Fourth to Eighth has been completed.

Saginaw Transit Company has placed track orders for March 1 delivery. The company will then proceed with replacements which have been ready for the junk yards for many months.

Tama & Toledo Railroad, Toledo, Iowa, is tearing up its old rails at Toledo and is replacing them with heavy steel. The rails are being welded. Concrete and cement filling is being put in at the end of the ties instead of the old brick.

Connecticut Company is ready to double track the construction through Capitol Avenue in co-operation with the city betterment project of widening that street. The Capitol Avenue widening calls for widening the thoroughfare from Main Street to Trinity Street.

Harrisburg Railways has completed construction of work on North Cameron Street between Calder and Maclay Streets. Construction extends for a distance of 2,850 ft. and costs the company approximately $30,000. The work was accomplished within twenty days.

Dallas Railway has been granted a requisition for construction of the new line in Oak Cliff. The new line will begin at Tyler Street and Jefferson Avenue, extending southward along Tyler Street to Burlington Boulevard, westward along Burlington Boulevard to Waverley Drive. The cost of the new line is estimated at $200,000.

New York State Railways has applied to the Public Service Commission for permission to build and operate a single track extension of its lines from the present terminal in Salina along the Syracuse-Bridgeport highway, a distance of 2,200 ft., thereby forming a loop. The extension is to afford transportation facilities to a large factory about to be constructed along the company's lines.

Wilkes-Barre Railway will install new double tracks on West Market Street from the Public Square to River Street, just as soon as the Goeringer Company has the street in readiness for the work. After the double-tracking is done, the street will be repaved with sheet asphalt. The work will be rushed with all possible haste. With the new improvement will come the removal of all poles and wires.

Kansas City, Clay County & St. Joseph Railway, Jefferson City, Mo., will pay $7,304 of the cost of an overhead crossing on the State Road from Liberty to Excelsior Springs. This is in accordance with an order previously issued by the Public Service Commission requiring the company to pay one-half of the estimated cost. The total project is estimated at $14,608. The bridge will be constructed under the direction of the Highway Commission.

Birmingham Railway, Light & Power Company, Birmingham, Ala., has placed an order with the Buda Company for special trackwork layout to be installed at the railway's carhouse at Third Avenue, Tenth and Eleventh Streets, Birmingham. This layout consists of fifty-five branchoffs, and is probably the largest single layout purchased in the southeast for a number of years. Construction is to be of the new A.E.R.E.A. 7-in. guard rail with solid manganese switches.

New York, N. Y.—The Transit Commission will receive bids on four important rapid transit contracts on Nov. 2, constituting the largest amount of contract work upon any one occasion since the time of the construction of the dual system of rapid transit. Two of the contracts cover the construction of a portion of the Flushing extension of the Corona branch of the Queensboro subway. A third contract calls for the removal of the kiosks which block the curb line and encroach upon the roadway of Broadway at the 157th Street Station of the Interborough Rapid Transit Company. The remaining contract for which bids will be received is for frogs, switches, tracks, etc., for the 180th Street yard of the Interborough, adjacent to Bronx Park.

Power Houses, Shops and Buildings

American Electric Power Company, Wilmington, Del., has bought two Westinghouse new model multiple-retort underfeed stokers.

Texas Electric Railway, Dallas, has begun work on a new passenger and express station at Ennis. James P. Griffin, vice-president of the company, in announcing the beginning of work on the new station, said it would cost $17,000 and is to be completed by Jan. 1.

United Light & Railways Company, Grand Rapids, Mich., is contemplating a central power station in the vicinity of East Moline, Ill., with a capacity of at least 150,000 kw. and to cost approximately $10,000,000 when completed. The United Light & Railways power plant is now located at Moline, Ill., where it is in close proximity to a hydro-electric station. This combined central station, while recently expanded, will not be able to serve the rapidly growing demands of this industrial community for electrical energy and the new plant is made necessary to provide for the industrial development of the next decade.

Trade Note

Westinghouse Electric & Manufacturing Company at its South Philadelphia Works has established a general engineering division which will be devoted to the study of central-station and industrial plant problems, which involve the application of steam power apparatus such as steam turbines, condensers and reduction gears. This department will also co-operate with the sales organization in providing engineering service to purchasers of this equipment.

New Advertising Literature

Ohmer Fare Register Company, Dayton, has issued form 400, entitled "Making Money by Saving Money."

Economy Electric Devices Company, Chicago, has issued a sheet—a reprint from *Electrical Traction*—entitled "The Air Rectifier Eliminates Frozen Air."

Hauck Manufacturing Company, Brooklyn, N. Y., has issued bulletin No. 506, illustrating and describing the new Hauck Venturi low-pressure burners.

Combustion Engineering Corporation, New York, N. Y., has issued Catalog L-1, entitled "Lopulco Pulverized Fuel Systems." The pamphlet explains the Lopulco system as designed for stationary boilers.

Hale-Kilburn Company, Philadelphia, Pa., has issued a forty-page pamphlet on car seats for electric railways. The various designs of seat types for car equipment are described in detail with photographs giving the standard features of the particular type of seat.

Torchweld Equipment Company, Chicago, has issued a new catalog covering its complete line of oxyacetylene welding and cutting apparatus, lead welding, soldering, brazing and decarbonizing units, gas pressure regulators, automatic machines, generators and supplies. The catalog contains cross-sectional views of equipment with detailed explanation, is 8½ in. x 11 in. and consists of forty pages.

Garland Ventilator Company, Chicago, represented by Hegeman-Castle Corporation as general agents, has issued a twelve-page circular descriptive of the Garland steam and electric railroad ventilators. In a list of thirty-six typical orders recently received by the company are included sixteen from electric railway car builders and prominent electric railways. A list of representative railroads using Garland ventilators includes fifteen electric railways.

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New York, Saturday, November 3, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 18

The Electric Railways Are Coming Back

SO MUCH evidence has accumulated showing the electric railways are coming back, that they now have a real story to tell to the financial world. An opportunity to do that came last week at the convention of the Investment Bankers' Association in Washington, D. C., and J. W. Welsh, executive secretary American Electric Railway Association, made the most of an invitation to speak on the electric railway situation. His address is presented elsewhere in this issue. It consists of a plain statement of facts, forming for the bankers inescapable proof that the electric railways are making noteworthy progress in working out their difficulties. They are surely coming back.

That was the most impertant message the industry had to give the investment bankers, for many of them have not been cognizant of the improving situation and have continued their disapproval of these securities. In reality the time is not far distant when electric railway securities are again going to be considered in the investment rather than the speculative class. And this the investment bankers want to know. So Mr. Welsh's talk was timely and helpful.

An Intensely Interesting Narrative of Railroad Development

LEST some readers may have missed it, special attention is directed to the publication in the JOURNAL for Oct. 20 of the brief of the Chicago, North Shore & Milwaukee Railroad submitted in the contest for the Charles A. Coffin gold medal prize. Every one interested in electric railways will find the reading of that brief most interesting and profitable. The editors of this paper were familiar with the matter set forth in the brief, as practically every accomplishment recorded there had been related in the JOURNAL as it was done. And the 1922 Annual Convention Number of the JOURNAL devoted fourteen pages to a story surveying all the things that had been done to build up this property.

Yet the editors found this brief—the road's own story of its accomplishment—the most interesting narrative of electric railway development they had ever read. It is a plain statement without embellishment of what has been done, the methods followed and the results obtained. It ought to be read and reread by every interurban railway man in the business, for it contains a host of practical, proved suggestions of things that can be done to build up a railroad. Of course it is realized that fundamentally this line had something to build on, but aside from having a good right of way between good terminal cities, few roads are any farther down the scale of physical and public relations imperfection, as a basis to build on, than was this line.

That the development of the road has involved more than ordinary progressiveness is reflected in the frequency with which it has been the subject of comment and articles in this magazine. Having thus followed the work of Britton Budd and his associates, the JOURNAL indorses the finding of the Coffin prize committee, for it believes a record of accomplishment is set up here that is without parallel in recent electric railway history. And the significant thing is that it has all been done by simple, ordinary means. There has been nothing spectacular or superhuman in the program. It is just the accumulative result of a thousand little improvements, but coupled with a sound, sincere policy of giving the public what it likes and wants.

The Motor Bus at the Convention

TO SHOW the progress of the electric railway industry toward acceptance of the motor bus, and the general thinking about the bus, it is interesting to bring together the gist of the discussion on this subject at the recent convention.

L. S. Storrs, president the Connecticut Company, observed that today we find the careful students of transportation in practical agreement that the two agencies (railway and bus) must be co-ordinated. As to how to establish co-ordination, he said that the necessary preliminary to any effort to co-ordinate these two agencies is a public opinion that will support legislation which recognizes that the two agencies are merely different means of providing a convenient and needed public transportation service, which must be unified in order that the various communities may have a thoroughly efficient transportation service at the lowest possible rate. We can talk all we please, he said, about co-ordinating these facilities, but we can accomplish nothing until public opinion is of a temper to accept the needed regulation. Real co-ordination devolves upon the transportation utilities, and a full measure of bus operation should be undertaken as rapidly as the need for service is apparent and funds available to provide the equipment.

Of the situation in California, where bus competition has been most intense, D. W. Pontius, vice-president and general manager Pacific Electric Railway, told of the material progress that has been made in correcting the situation—partly by the railways themselves going into the bus business and partly through legislation. The main point cited in correcting the situation was the legislation effected imposing a tax of 2 cents a gallon on gasoline and requiring that buses and trucks operating in common carrier service must pay to the state 4 per cent of their gross revenue.

Pertinent among the statements made by the com-

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mittee on bus operation was one that if a railway company adopts the policy of providing all transportation needs in the territory served, the possibilities of the bus as an aid to such a policy cannot be overlooked. While noting that supplanting of existing rail lines with bus routes is a matter of economics, the committee acknowledges that it will be found that when rail lines with low earning power are faced with heavy rehabilitation or paving charges, the bus can be used as a means of continuing service with an expenditure for equipment much below the cost of plant renewals or paving. It is also asserted that the electric railways are becoming increasingly interested in the use of the bus in meeting the full requirements for transportation in the territory which they individually serve.

H. W. Alden, president Society of Automotive Engineers, the engineering association of the automotive industry, in a friendly discussion of the report of the committee on bus operation, pointed out how this report lacked comprehensiveness in several respects. He observed that the figures presented in the report would have been somewhat different if independent companies had been included, because a great many bus companies are making money. His principal mission in appearing before the railway association was to encourage and urge co-operation between the railways as bus users and the S.A.E., in order that designs of buses may be developed which will meet the requirements of service.

Another non-railway man who addressed the association was Alfred Reeves, general manager National Automobile Chamber of Commerce, the body which primarily looks after the business interests of the automotive industry. No progressive railway man could take exception to his remarks. Out of an interesting address, these few thoughts are worth repeating here. He said that with the present congestion of traffic and concentration of population, the trolleys cannot properly handle all street transportation. They cannot afford to build in sparsely settled territories. Nor can the bus do it alone. Think how many buses would be required, he says, to supplant the trolley which last year carried 15,000,000,000 passengers. A combination of trolley and bus seems to be the real answer. In certain fields of street transportation, the trolley is supreme in efficiency and economy. In other places, the bus holds a similar position. This demands that the two forms be co-ordinated. The prime consideration, therefore, is to fix the fields of endeavor which each shall enjoy.

Speaking of the opportunity which the bus affords to railway men, he said that as experts the trolley people have a rare opportunity to enter the bus field and thus give the public complete transportation. By hesitating, trolley men have missed some golden opportunities, although it is not too late if they will enter the field in the proper spirit. He offered the suggestion that unless the electric railway interests take steps to discharge the apprehension held by many people that if the railways take over the buses it will be for the sole purpose of bringing about their elimination, their entrance into this new field will not receive a proper welcome.

On the matter of regulation, he commented that the automotive industry is in accord with the railway industry, so far as it relates to state supervision of common carriers. He reminded the railway audience that more than two years ago the National Automobile Chamber of Commerce declared that control over motor vehicles as common carriers if deemed necessary should be placed in existing state commissions, and that as a prerequisite to operation the owner should be obliged to obtain a certificate of convenience and necessity. A proviso in this declaration was that lines in actual operation should *prima facie* be regarded as necessary.

The Opportunity of the Railway Association

WITH the best thinking inside and out the railway association now concurring very largely in the desirability of co-ordinating bus with railway, and of preserving the monopoly of all transportation facilities in any community, it would seem that the American Electric Railway Association has such an opportunity for broadminded treatment of the bus problem that it cannot afford to miss that opportunity by permitting the reactionary spirit of a minority to hold it back longer in its position of partial aloofness.

Just now the principal organizations of the automotive industry and the leading manufacturers of buses are of a mind to co-operate with the American Electric Railway Association to the end that its members, rather than disinterested or antagonistic interests, may have prior opportunity to capitalize whatever usefulness the bus possesses. They prefer to have the railway men take hold of the bus. But if the association cannot soon see its way clear to accept in generous measure this offer of co-operation, and to take the lead in determining where and how the bus can be used, these automotive industry companies and associations will naturally direct their aggressive energies into other channels of development. There, their activities might be more harmful than helpful to present transportation companies. The transportation industries really have too many common interests to permit the few opposing ones to keep them apart, following separate courses.

The JOURNAL believes that the association might well now accept and encourage whole-heartedly the full co-operation and joint effort of the automotive industry associations. Furthermore, to make this movement effective, its membership should now be opened, on some basis, to those legally authorized bus companies which are established and recognized as permanent, dependable transportation agencies operating in a non-competitive way. Some change must shortly be made, anyway, to provide for membership of the bus subsidiaries of railway members, and of the companies where railway has been superseded by bus, but operated by the same company, and hence it is well to consider the whole question.

It appears now that the association can hardly postpone such action beyond the present association year without missing a really wonderful opportunity to bring together into one fold all of the interests pressing for the common objective of developing the transportation facilities available to the public. The basis of bus membership might be that of a bus section of the railway association, as suggested in ELECTRIC RAILWAY JOURNAL for Dec. 2, 1922, page 869, or any other plan that would bring all the transportation companies "into the family."

Unless all the energies of these various associations and railway and bus operating companies can be directed into a harmonious program, the prospect is a half-hearted co-operation at best, and much destructive competition. But with this harmonious program, the future of transportation is inspiring to contemplate.

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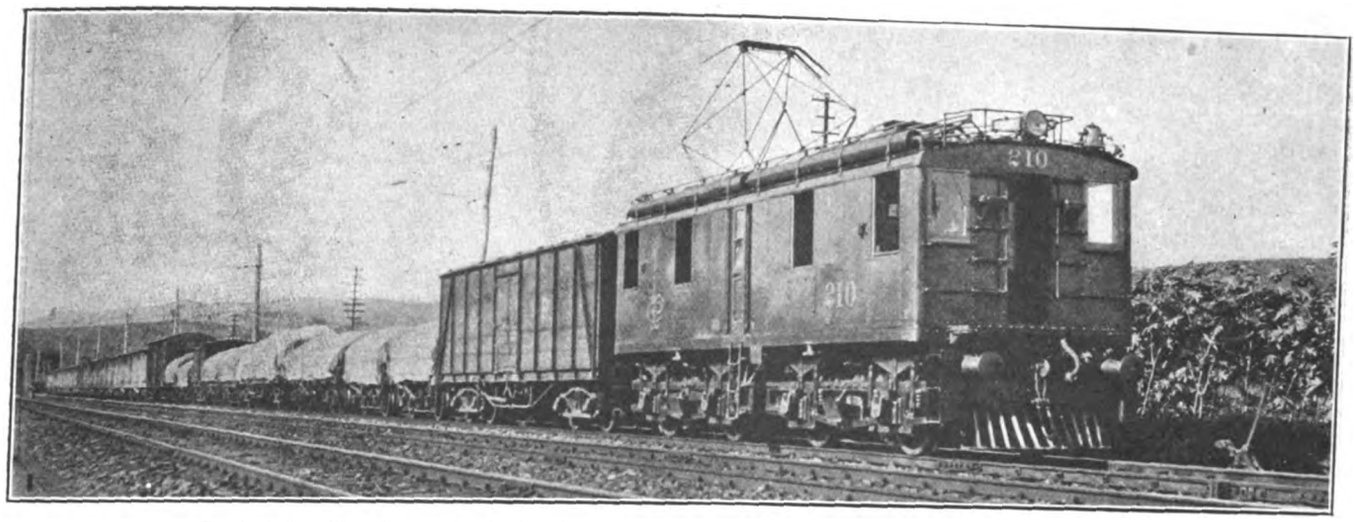


Typical Brazilian Export Train Consisting of 700 Tons of Cattle and Coffee Hauled Electrically

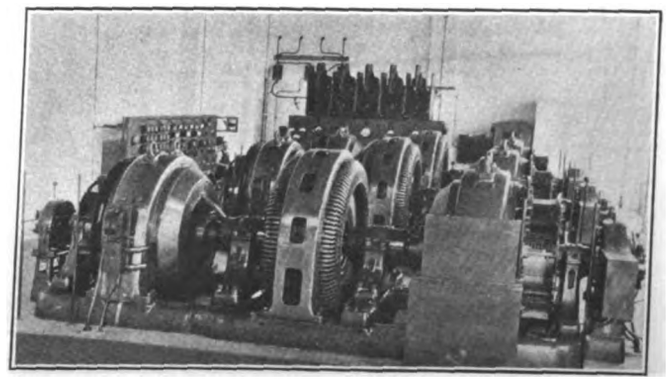
Savings from the Paulista Electrification Estimated

The Costs of Electric and Steam Operation Over a Period of Five Years Are Analyzed on Brazil's Important Main-Line Railway—Electrification Is Expected to Save as High as 65 per Cent of the Total Operating Cost—Fuel Is a Major Factor

By S. B. Fortenbaugh
Railway Engineering Department, General Electric Company

THE Paulista Railway, Brazil, furnishes an interesting example of a projected electrification where the only considerations involved in the decision to employ electric operation to replace steam were economy in operation and the general improvement of the service. This road recently contracted for the electrical equipment necessary for a 50-km. extension from Campinas to Tatú, in addition to its initial installation between Jundiahy and Campinas. This latest addition is in line with the original policy and intention to extend the electric service as far as Cordeiro, 206 km., and beyond as soon as the exchange situation becomes more nearly normal.

Brazil today produces practically no coal or fuel oil, the high price of imported coal and oil and consequent operating costs having originally led the Paulista company to utilize its natural and easily accessible sources of wood as fuel for the operation of its trains. Today obtaining a supply of wood for engine fuel is a serious and much more costly problem with the Paulista, the net result of this condition of affairs being a decision to push electrification and utilize some of the country's water-power development.



Interior of Louviera Substation, Paulista Railway

Coal—From an extended series of careful tests and observations it has been found that the ton-miles moved by an average of 7 lb. of coal on the engine tender of a steam locomotive is approximately equal to that which can be moved by 1 kw.-hr. input to the substation. This figure includes, for convenience of comparison, all the transmission and conversion losses inherent to electric operation, as well as the stand-by losses of the steam engine. It is sufficiently liberal and accurate, furthermore, to include all classes of service, miscellaneous switching, etc., and any usual and reasonable variation in the kind and quality of coal.

This figure of 7 lb. represents the amount of coal burned on steam engines to get the equivalent tonnage movement of 1 kw.-hr. delivered from an electric power station. From this it follows that 1 ton (2,000 lb.) of coal on the engine tender is the equivalent of approximately 286 kw.-hr. of delivered electric power.

Wood—As a result of a survey of Brazilian steam railway practice, it has been determined that the work done by 1 ton of coal is equal, on the different railways, to that accomplished by from 8 to 9.3 cu.m. of wood. Assuming 8.5 as an average figure,

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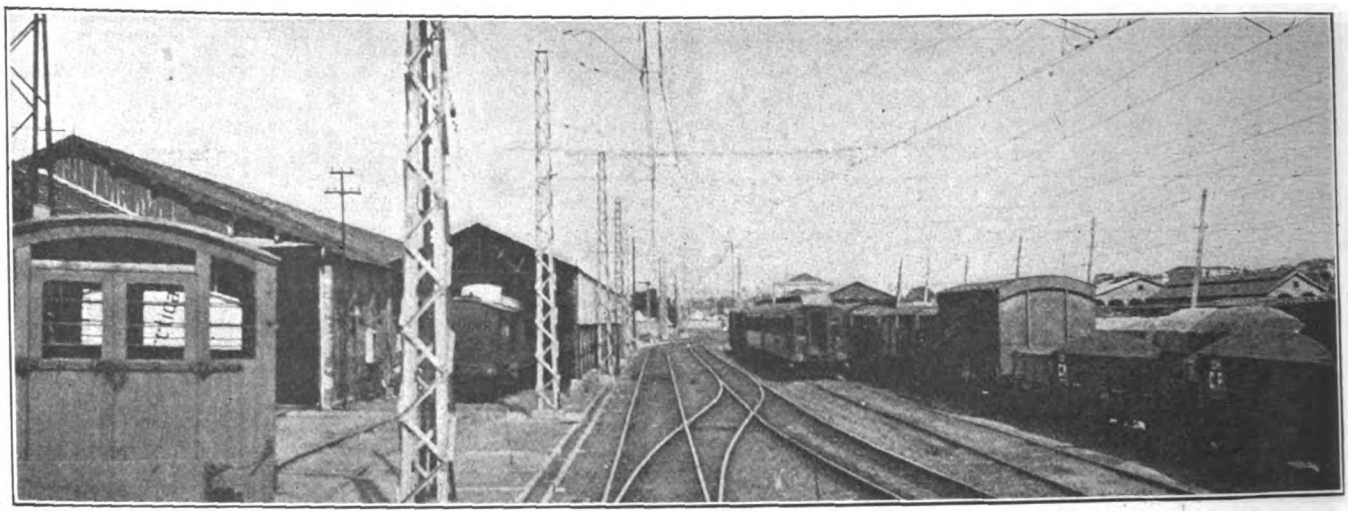


Campinas Yards, Where Much of the Freight Classification Is Done

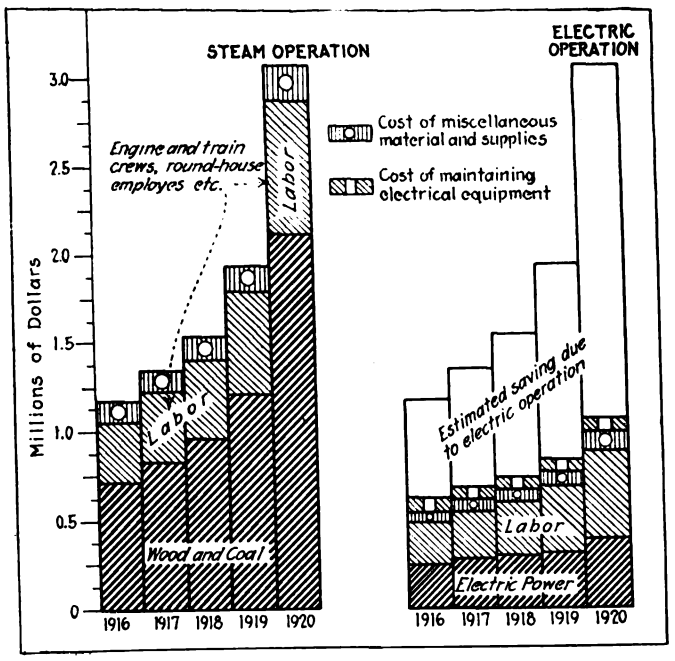


Fig. 1—Comparative Costs of Conducting Trains, All Lines

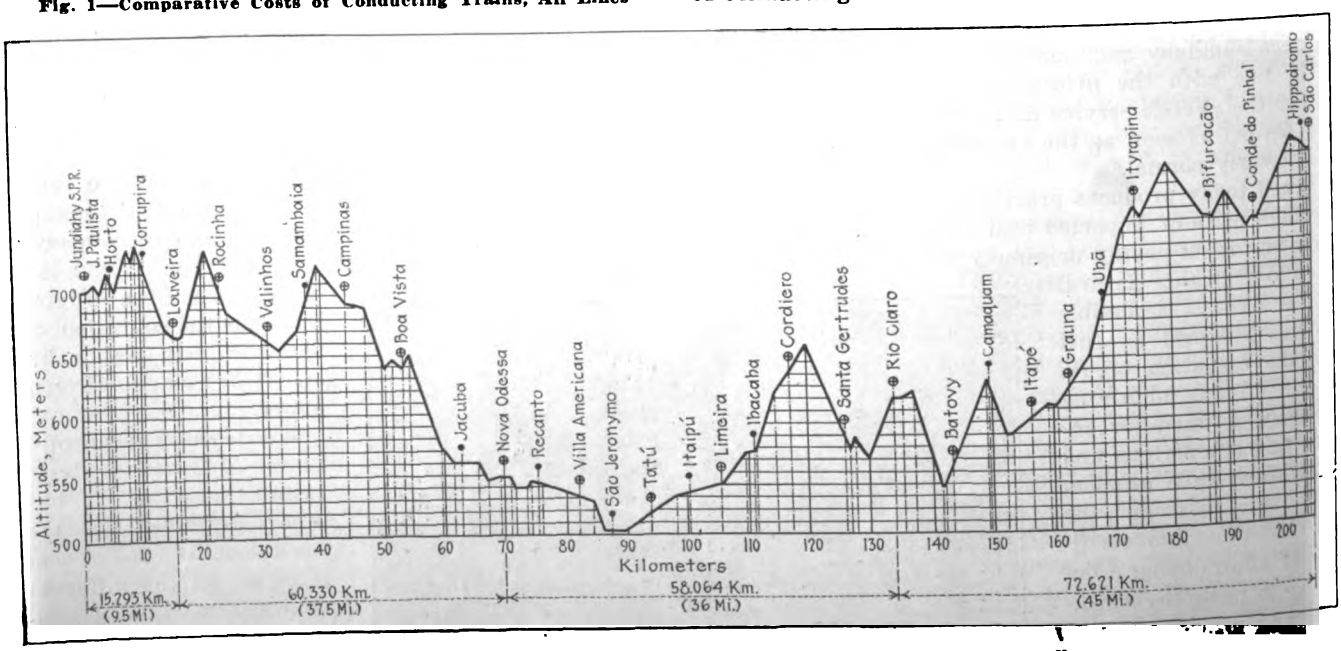
1 cu.m. of wood burned on the steam engine is the equivalent, in work done, to approximately 33.6 kw.-hr. of delivered power.

During the last twelve years the average annual cost of wood per cubic meter has increased from approximately 90 cents to $2.15 in 1922. This is equivalent to purchasing electric energy at rates ranging from 2.75 to 6.35 cents per kilowatt-hour. Power has, however, been contracted for by the railway on a long-term basis at approximately 1 cent per kilowatt-hour.

Possible Saving of 85 per Cent of Fuel Cost

Investigation indicates a possible reduction in the total cost of fuel, based on the existing contract price for electric power, ranging from approximately 40 to 85 per cent for the years 1910 to 1926, inclusive. This is a very large proportion of the total operating expense, and clearly shows the wisdom of the Paulista Company's decision to substitute electric for steam traction. The indications are that the savings effected in fuel alone will more than fully justify the capital expenditure required for electrification.

Table I gives the Paulista's actual operating costs of conducting trains on all lines for the years 1916-1920



Profile of Portion of Paulista Railway Which May Be Electrified Eventually

With completion of the new contract recently announced the section between Jundiahy and Tatú will be under electrification, constituting half of this route.

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TABLE I—TOTAL OPERATING COSTS, PAULISTA RAILWAY, BRAZIL—CALENDAR YEARS OF

	1916	1917	1918	1919	1920
Steam operation (actual):					
Waste	$9,250	$8,500	$11,750	$12,500	$14,250
Water supply	11,750	8,500	10,250	10,000	23,500
Lubricants	49,500	51,500	50,500	53,500	86,250
Miscellaneous supplies	39,000	46,000	53,500	62,750	77,000
Total	$109,500	$114,500	$126,000	$138,750	$201,000
Labor	352,500	401,500	447,250	586,000	756,500
Fuel	710,500	824,000	955,500	1,205,500	2,114,750
Grand total	$1,172,500	$1,340,000	$1,528,750	$1,930,250	$3,072,250
Electric operation (estimated):					
Miscellaneous material	$54,750	$57,250	$63,000	$69,500	$100,500
Labor	235,000	267,750	298,250	390,500	504,250
Electric power	241,000	274,750	294,000	297,750	384,250
Maintenance electric equipment	75,000	75,000	75,000	75,000	75,000
Grand total	$605,750	$674,750	$730,250	$832,750	$1,064,000
Estimated saving with electric operation:					
Total	$566,750	$665,250	$798,500	$1,097,500	$2,008,250
Per cent	48.3	49.7	52.3	56.9	65.3

TABLE II—OPERATING COSTS, PAULISTA RAILWAY, BRAZIL SEVEN MONTHS, JUNE-DECEMBER, 1923

	Cents per Train-Mile Steam	Cents per Train-Mile Electric
Fuel or electrical energy	37.56	13.09
Conducting trains:		
Engineers and firemen	7.63	5.13
Other train expenses	6.88	4.03
	14.51	9.16
Locomotive repairs:		
Labor	2.99	1.40
Material	6.12	0.92
	9.11	2.32
Substation:		
Labor	.....	1.79
Material	.....	0.25
		2.04
Secondary distribution:		
Labor	.....	0.74
Material	.....	0.12
		0.86
High-tension transmission line:		
Labor	.....	0.23
Material	.....	0.02
		0.25
Totals	61.18	27.72

inclusive, and also the estimated costs for the same period assuming equivalent electric operation. All figures are given in United States dollars on the basis that $1 equals 4 milreis (4$000). The estimates are based on a previous detailed investigation of the 1918 service, and for this reason they are submitted as approximate values only, but with the belief that they are well within the probabilities and are reasonably accurate.

An inspection of these data indicates the magnitude of the possible saving. It is largely a question of fuel vs. electric power.

The estimated cost of the operating force, engineers, firemen, train crews, etc., for the electric service has been assumed at two-thirds of the actual value under steam operation. Experience has shown conclusively that the savings to be expected from such items as the increased speed, heavier trains, reduced engine and train mileage are well within the limit suggested. The marked reduction in the cost of miscellaneous material and supplies, including roundhouse charges, the entire elimination of water tanks, ashpits, etc., will effect an estimated saving in these items of not less than 50 per cent in favor of electric service.

In order to complete the picture a liberal amount has been added to the electric service for the operation and maintenance of the required substations, transmission lines and secondary distribution. This is a relatively small proportion of the total expense, and necessarily speculative, but no possible or probable change in this item can have any material effect on this general comparison of the two methods of railway operation:

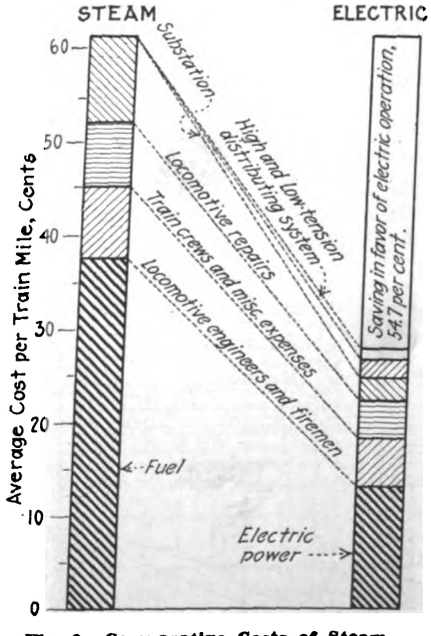

Fig. 2—Comparative Costs of Steam and Electric Operation, June-December, 1922

Only More Evident Savings Included in the Estimate

This startling picture includes only the more evident of the direct savings effected by the substitution of electric for steam traction. The indirect savings to be effected by increased speed and capacity, reliability, convenience in operation, etc., are virtually impossible of accurate determination on a purely engineering basis, but of sufficient magnitude and importance to demand the most careful consideration.

The complete change from steam to electric traction on the section between Jundiahy and Campinas, approximately 27.5 route-miles of double track, was made about a year ago and the costs for the first seven months, June to December, 1922, are now available for the first time. The corresponding steam operating costs for the remainder of the Paulista Company's broad-gage lines (a total of approximately 150 route-miles of single track) are presented herewith for comparison. These values have been converted into United States currency of the basis of 7 milreis (7$000) to the dollar and are therefore approximate only as regards the actual amount in United States currency. The relative values are definite, however, and independent of the conversion factor used. This comparison is shown both graphically and in tabular form. Fig. 1 shows the estimated saving due to electric operations based on actual steam operating costs for 1916 to 1920 inclusive. Fig. 2 shows the difference between steam and electric operating cost for the last seven months of 1922. This comparison, while on a different mileage basis, nevertheless clearly shows how near the estimate made in 1920 came to the actual results now being obtained in the operation of the electrified section of the Paulista.

All permanent notices for display in the cars of the Montreal Tramways are made of neat blue and white decalcomania. Only in the case of one-day or one-week campaigns are paper posters placed in the cars, as it is believed that dirty, ragged paper notices seriously detract from the appearance of the vehicles.

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Traffic Survey in Los Angeles

Street Congestion Is Particularly Severe in Los Angeles, Because of the Narrowness of Its Downtown Streets—Remedial Measures Are Suggested in Report Just Issued—Methods of Determining What Constitutes Adequacy of Service Also Discussed

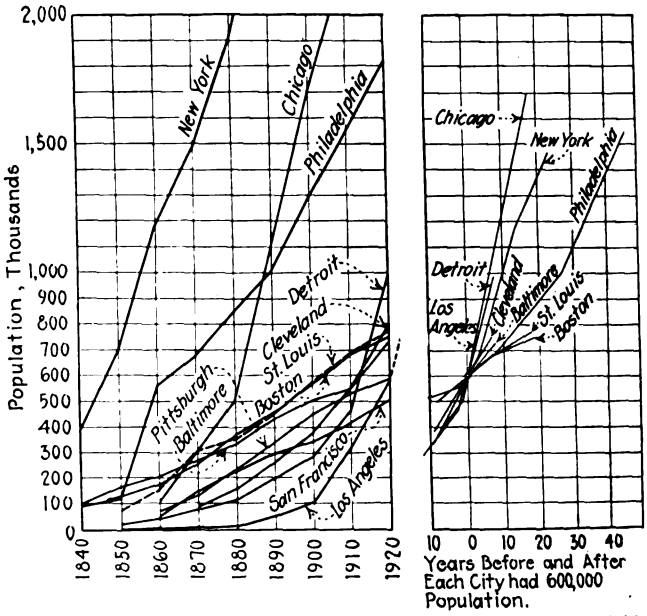
A TRAFFIC survey has recently been completed in Los Angeles for the Los Angeles Railway Corporation by Joe R. Ong of Piqua, Ohio. Los Angeles, Mr. Ong points out in the early part of his report, is a rapidly growing city, as shown by the accompanying population chart, and its expansion in population and activity has increased the concentration in the central business area. This has introduced complications in many directions, one of which is transportation.

It will be noted from one of the charts that the automobiles in Los Angeles County are increasing at a much faster rate than either population or passengers carried by the Los Angeles Railway. This increased use of automobiles has materially affected the traffic of the Los Angeles Railway Corporation. Statistics of the service given by other public utilities is also charted. All show a larger annual rate of increase in the last four years than in earlier years. In street railway traffic there was, following 1913, a period of actual decrease in passengers carried, and not until 1919 did the traffic exceed that in 1913. Another chart shows, on a logarithmic scale, the passengers and car mileage by months since 1916. It will be noted that the maximum mileage was in the year October, 1917, to October, 1918. In the latter month there was a somewhat belated curtailment, because the traffic began to fall off in 1914. Since 1918 there has been little change in the average monthly car mileage, though, through rerouting, the service was improved in 1920. The irregular sawtooth mileage curve is largely due to the difference in the monthly total of a thirty-one day month as compared with a thirty-day month. The low mileage shown in August and September of 1919 was caused by a strike.

Traffic Congestion from Automobiles

There is no magic, says the report, that will relieve traffic congestion. It is a matter largely beyond the control of the street railways. It requires the co-operation of all interests in the community, as well as a vast amount of education. Any solution of the traffic congestion problem will unquestionably curtail the liberty of some individuals. Thus far, the individuals owning automobiles and the merchants, who (mistakenly) believe that their customers are largely automobile users, have effectively blocked sincere efforts to relieve the traffic congestion by non-parking regulations.

The time was when it mattered little in what kind or size of vehicle an individual used to come downtown. It mattered little where, when, in what position or for how long he left this vehicle standing in the public streets. Those days have gone. There are so many automobiles and trucks in the central business area that parking space along the curb for any significant number of them is absolutely out of the question. There is an ordinance against "second line parking" or the parking of a vehicle parallel to a machine that is parked at the curb. This ordinance, the report says, should be strictly enforced and extended so as to clear the

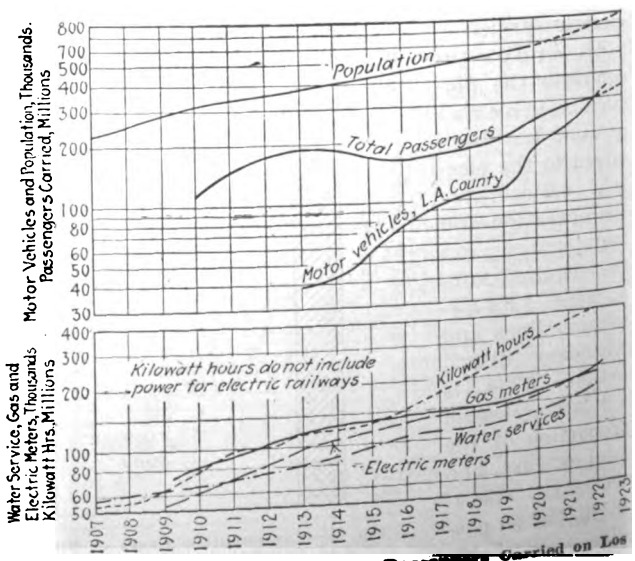


Population and Comparative Growth of Large Cities. At Right, the Population Curves at 600,000 Have Been Superimposed for Comparison

congested area of all automobile parking, leaving curb space for a limited business delivery and pick-up service and for passenger cars just long enough to permit persons to board and alight.

Los Angeles has relatively a small percentage of street area in the congested business section, perhaps a smaller percentage than any other city. There is much interest in street-widening projects, involving millions of dollars, but the least expensive method of widening the streets for the movement of traffic is to eliminate parking. Even single-line parking on certain very narrow streets greatly impedes traffic movement.

Business men in Los Angeles have mistakenly opposed non-parking ordinances, thinking they drive trade away.



Statistics Since 1907 of Population, Passengers Carried on Los Angeles Railway, Use of Other Utilities

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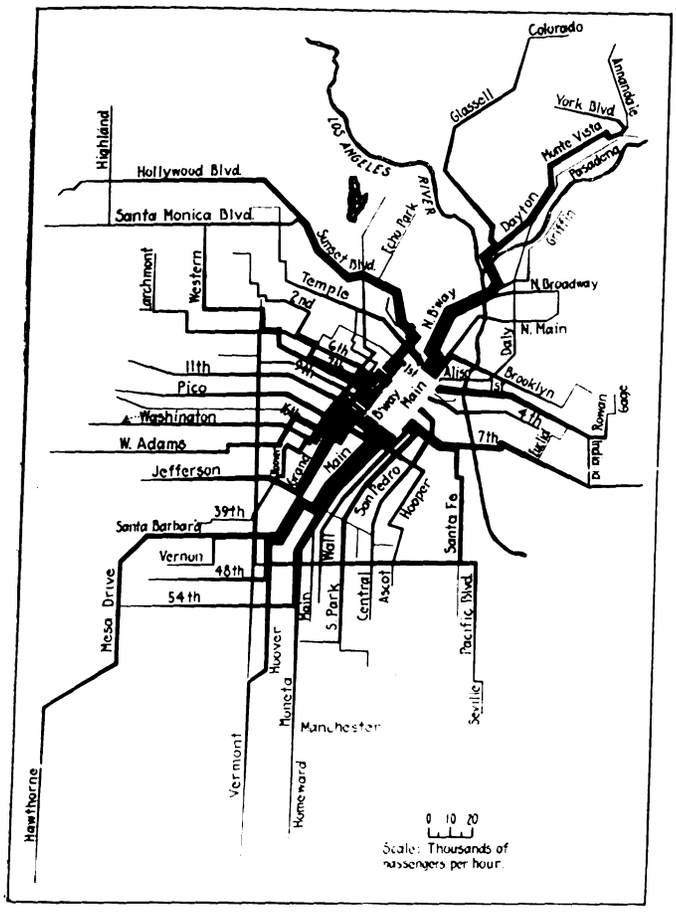


Map of Los Angeles Showing Passenger Traffic Flow During P. M. Rush on All Lines of Los Angeles Railway and on City Lines of Pacific Electric Railway

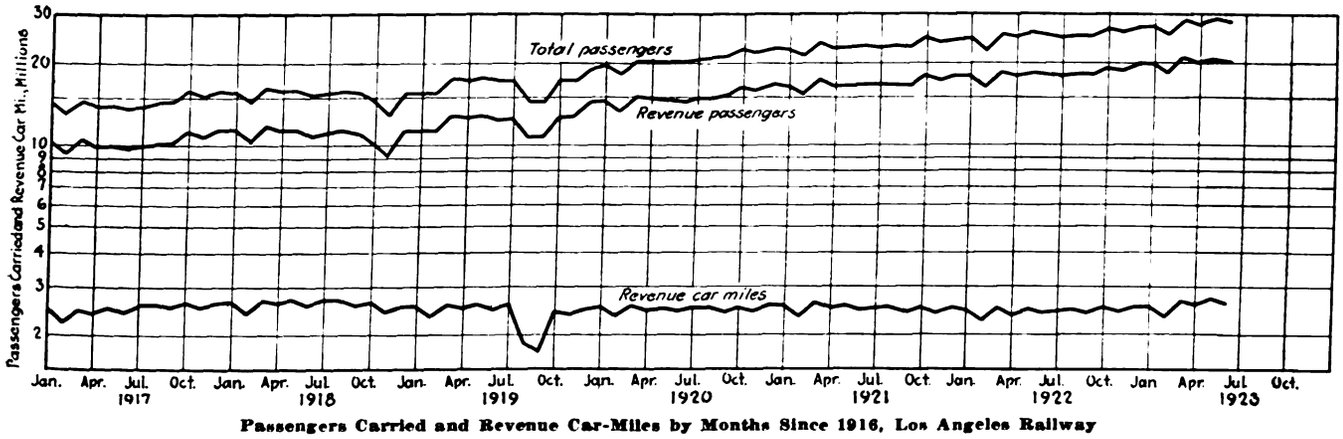
There is not a merchant who could survive on the business he gets solely from customers who park in front of his establishment. The ordinance prohibiting parking in the central congested area, passed in April, 1920, was repealed after a short trial of two or three weeks because of violent opposition on the part of the Broadway Merchants' Association, but they failed to submit actual data in support of their contention or to realize that automobiles parked at the curb do not indicate customers in their stores. Other limited parking ordinances have proved ineffective, partly because they have not been strictly enforced.

Unfortunately, the great mass of the traveling public, being unorganized, is never proportionately represented in hearings and investigations of the traffic problem, and the suggestions of the railway company, whose interests are largely the same as this public, are looked upon as selfish. Nevertheless, the street car rider is entitled to more consideration than he has had in the past. The street car is the unit best adapted to handle mass transportation, and mass transportation is the problem in the congested areas. Recent observations at the corner of Seventh Street and Broadway during the evening rush hour showed 191 street cars and 668 automobiles using Broadway, but the passengers on the street cars totaled 14,325 and those using the automobiles totaled 1,169. It is doubtful if the actual capacity of the streets for automobile movement would be increased more than 50 per cent if the street cars were eliminated entirely.

An accompanying illustration shows an analysis of the time distribution of street railway traffic by twenty-minute periods. Thirty-two per cent of all inbound travel occurs by 9 a.m., 50 per cent by 12:10 p.m., 75 per cent by 4:40 p.m. and 95 per cent by 8:20 p.m. Only 14 per cent of the total outbound travel occurs by 9 a.m., 23 per cent by noon, 50 per cent by 4:40 p.m., 75 per cent by 6:10 p.m., and 90 per cent by 9 p.m. The map on this page shows the distribution by lines of the outbound passengers between 5 p.m. and 6 p.m. The local city passengers on the Pacific Electric Railway are included in this chart, but are in addition to the 55,600 Los Angeles Railway passengers.

Possible Remedies Besides Non-Parking

During the war a great deal of prominence was given to the question of staggered hours for opening and closing of stores, offices, and factories for the purpose of spreading out the rush-hour travel peak. This matter has been discussed in Los Angeles as a possible aid in the relief of traffic congestion, but an examination of the rush-hour peaks shows that while they are pronounced, they are fairly well spread. There are more than 13,000 passengers per twenty-minute period for four consecutive twenty-minute periods in the morning rush inbound, and in the next period there are possibly 12,000 passengers. To be of any material benefit in spreading out the peak, some of the travel would have to be shifted to near 9 o'clock in the morning, and outbound travel to 6:20 to 6:40 p.m. It is very unlikely that any group of employees can arrange to start work at 9 a.m. and can be held after 6 p.m. The staggered-hour plan is of greatest value, practically, when applied to large industrial concerns employing thousands at concentrated points and served by a limited number of street car lines. Too much should not be expected of it in other circumstances, for its application in offices and stores in a central business district would change the hours of a large number of employees not concentrated under one management.



Passengers Carried and Revenue Car-Miles by Months Since 1916, Los Angeles Railway

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Some gain has been secured by double berthing or triple berthing of street cars at congested crossings. Another gain would be obtained by an ordinance requiring automobiles, trucks, and other vehicles to stay off the street car track zone except at street intersections. An aggravating situation arises whenever there is a street parade in the central business area. Vehicles can usually detour, but street cars get little consideration. Relief should be sought through the creation of public sentiment by education and publicity demanding municipal regulation of parades, restricting them to streets which will cause a minimum of delay to the city's transportation service. Co-operation with the other utilities may help to reduce interference to street traffic caused by the opening up of manholes and conduits unnecessarily.

Analysis of Adequate Service

Too much stress cannot be laid upon the absolute necessity for a systematic and continuous traffic survey by the schedule department. The only commodity the Los Angeles Railway has to sell is service. The service ought to be adequate—commensurate with the fare.

Adequate service has four outstanding features:

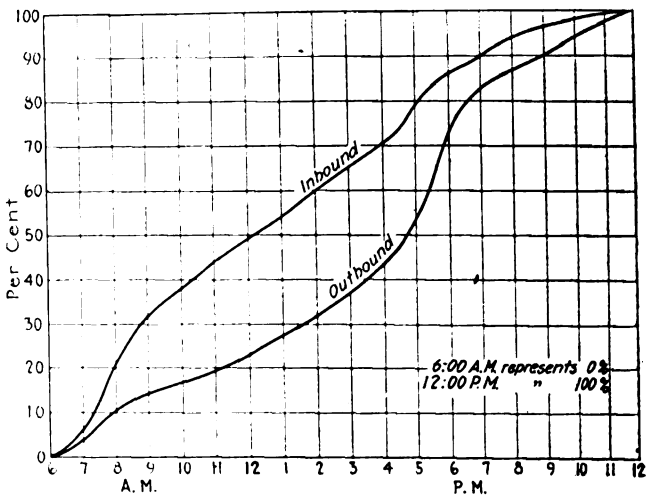
1. Sufficient cars to handle the traffic.
2. Cars operated frequently enough to serve a reasonable convenience.
3. Cars that run with regularity.
4. Cars that run with speed, not recklessly but fast enough to satisfy the passenger that he is getting somewhere.

Commenting briefly on these four points it may be said:

1. "Sufficient cars to handle the traffic" does not mean a seat for every passenger at all times. The American people do not expect it nor want it, though they sometimes think they do. During off-peak periods there should be approximately a seat per passenger after making allowance for those who prefer to stand. Standing by preference is still a real factor on the California type car with its closed center section and open end sections, smoking being permitted in the front open section. During rush hours adequate service contemplates cars loaded to comfortable carrying capacity. The number of standing passengers that may be carried on a car and be within the limits of comfortable carrying capacity is determined by the width of aisles, arrangement of seats, amount of unobstructed floor space and the arrangements of entrances and exits.

2. "Cars operated frequently enough to serve a reasonable convenience." During the off-peak hours the travel on many lines is so light that it becomes a question not of how many cars must run to handle the passengers but how infrequently can they be scheduled and still serve a reasonable convenience. The distance of the territory from the business section of the city, or from some other traffic center, the proximity of other lines and perhaps the density of population in the territory served, are some of the factors having a bearing on the required frequency of cars to serve a reasonable convenience.

3. "Cars that run with regularity," not that the time interval between cars should be the same at all periods, but that cars should be on time at the intervals prescribed in the schedules. In other words, cars must be on time, neither late nor ahead of time. Even a minute makes a difference. If the first car is one minute ahead of time, and the second car is one minute



Time Distribution of Travel on Los Angeles Railway, Expressed in Cumulative Percentages by Twenty-Minute Periods

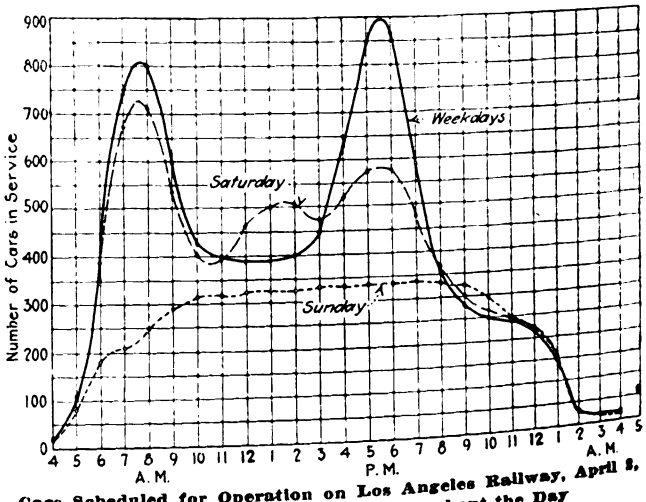
late, and the prospective passenger has just missed the first car, it means that he must wait two minutes longer than the schedule maker intended for him to wait. Not only that, but the second car has a larger load than its share because it followed a time interval two minutes longer than the schedule maker intended. It seems particularly hard to convince old motormen of the disastrous effects on the service of running a minute or two ahead of time.

4. The fourth element mentioned as being a factor in adequate service is speed. "Cars that run with speed, not recklessly, but fast enough to satisfy the passenger that he is getting somewhere." Safety first, of course, but up to a certain reasonable limit it cannot be said that accidents increase with speed; speed is not the controlling element in accidents. Slack time in schedules should be taken out. People living in an automobile age demand speedy transportation.

It is at once apparent that the character of the schedules has a vital bearing on items 1, 2 and 4 referred to above as factors in adequate service. Item 3 is largely a matter of supervision and discipline.

The importance of the schedule department of the electric railway is too often overlooked. It is one of the very vital spots of the railway. Correct schedules can show profitable operation on a given fare and satisfy the traveling public with adequate service. Incorrect schedules on the same fare might show too much service and too little return, or too much return and too little service.

It is not possible to put all lines on the same earning



Cars Scheduled for Operation on Los Angeles Railway, April 8, 1923, by One-Hour Periods Throughout the Day

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basis because of the variable factors—such as the length of the line, the speed at which it can be operated, the number of passengers carried, their distribution along the line and their distribution by time periods throughout the day. On a flat-fare and a universal-transfer basis some lines will never show a profit. If an attempt were made to reduce the service on these lines to a point that would materially pull down the expense per passenger it would cause such an overcrowding of cars that the traffic offering itself could not be handled, causing a reduction in revenue as well as a reduction in expense so that the net per passenger would still not show a profit. Such a situation prevails on several lines in Los Angeles, notably those which have a high percentage of transfers. The good lines that show a profit must help carry the poor lines that show a loss.

It must therefore appear evident that an adjustment of service to make all lines show approximately the same profit per passenger or to provide the same number of car-seat-miles per passenger is not the goal to be attained. The auditor's daily analysis cannot be used as the measuring stick of the adequacy of the service unless it has been calibrated by actual traffic observations on each line.

Traffic Checking Methods

It is therefore essential that the schedule department should include a permanent traffic checking staff in order that continuous systematic checking be carried on, and in order that the service may be adjusted to the traffic demands. A tentative program has been outlined for checking all lines not less frequently than every thirty days, and particular lines as much oftener as conditions may require. The staff should include at least eight regular checkers. Owing to the limited opportunity to get observations on Saturday and Sunday travel, the checking program should include observations every Saturday and Sunday, allowing checkers a day off in the middle of the week.

The traffic checkers must be accurate in their observations and records, and men with proper qualifications should be selected and trained for this work. Traffic checking is not to be looked upon as a place to use disabled or convalescent trainmen. The records of the traffic checkers form the basis for making schedules, and the need for reliability is beyond argument. New forms have been recommended and are in use for recording and summarizing the traffic data.

The number of cars scheduled for operation by hourly periods during the day on weekdays, Saturdays and Sundays is set forth graphically in an accompanying chart. As will be seen, the morning and afternoon peaks in the week-day schedule are very pronounced, the ratio of cars scheduled in the afternoon peak being 2.3 times the number in service at mid-day, and 3.2 times the number in service at 9 p.m.

The Saturday curve has an entirely different characteristic. The cars in service during the morning peak outnumber those used at any other period. The afternoon 5 p.m. to 6 p.m. peak is much lower than that on weekdays but the number of cars in service at noon is substantially greater than for the corresponding period weekdays. On Sundays, there are no peaks. Approximately the same number of cars is in service from 10 a.m. to 9 p.m.

Planning a Car Repair Shop

A Layout for the Upkeep of 1,000 Cars Which Will Turn Out 2.4 Overhauled Cars and 2.2 Painted Cars a Day—Speed in Repairs and Economy of Man-Power Are the Governing Features

*By Henry S. Day**

Railway Department, Westinghouse Electric & Manufacturing Company

THE car repair shop should be planned to give complete accessibility of equipment, cut down duplicate movements and as far as possible make it practicable progressively to route the work attendent on repairs and overhaul. In the present suggested layout no particular attempt at economy of space or facilities or first cost has been made, the main object sought being plenty of room around cars and trucks, good light, all movement of heavy parts performed with cranes, electric trucks or transfer tables, and all work carried on both by shop and stores department where it cannot be hampered by weather conditions. First costs have been set aside to obtain speed in repairs, short shopping periods and reduction in number of men constituting the shop force.

The principal features of this plan are as follows:

1. Three transfer tables which serve any car in the overhaul section or paint shop and make it possible to move any car without interference of operations or other movements.

2. The grouping of departments to eliminate interference and to reduce to a minimum cross-routing and back-tracking of material and parts.

3. Adequate crane service quickly to move material and parts in process of repair to and from car bodies and trucks undergoing overhaul.

4. A receiving and shipping dock for repair parts for carhouses and other departments incorporated as part of the shop.

5. Ample light, ventilation and space.

This layout is based on a total of 1,000 cars, each averaging 3,000 miles per month or 36,000 miles per year. On the basis of a mileage of 48,000 the overhaul period is sixteen months and with a painting period of eighteen months the shop would have to produce 2.5 cars overhauled per day and 2.2 cars painted per day.

Operating the shop on a 300 working-day year and a twenty-five-day month, a fifteen-day shopping period and an eight-day period for painting would require twenty-two cars in the shop for overhaul and twenty-two cars in the paint shop at all times.

Allowing 10 per cent of the equipment out of service

*Formerly superintendent of equipment Kansas City Railways.

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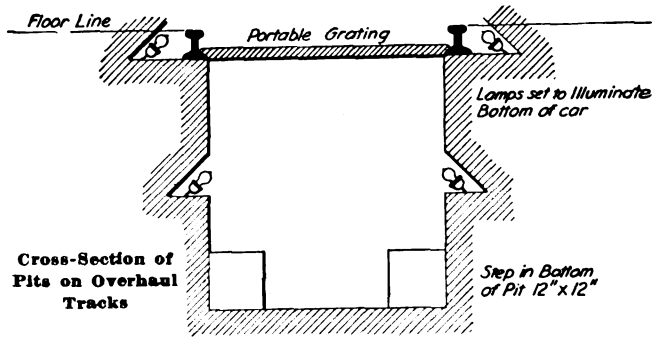


Cross-Section of Pits on Overhaul Tracks

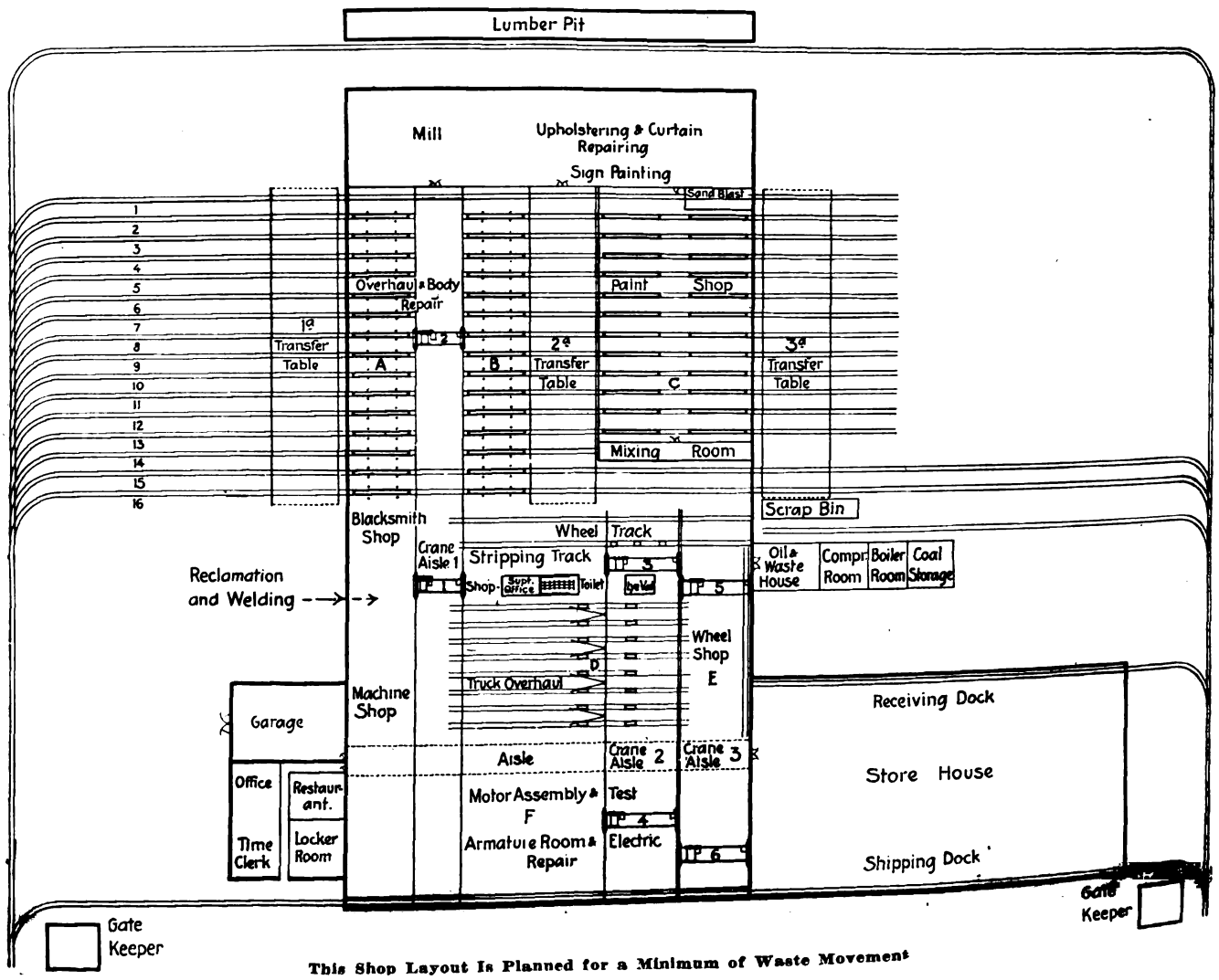
for all causes would give forty-four cars for overhaul and painting and fifty-six cars for wrecks and miscellaneous failures. It is believed that this assumed number of cars and the time required for shopping can be reduced, thereby increasing the capacity of the shop and the number of cars available for service.

In the diagram of the shop layout, it is planned that cars to be overhauled will enter the shop on any tracks from 2 to 14, or on track 1, which is equipped with trolley wire, to transfer table 2*a*. Car spaces on each side of electric crane No. 2 are equipped with stationary air jacks and pits. Unless the car is to be painted it will be completely overhauled in the space originally selected, without further shifting. Trucks will move from under the car on their own power to electric crane aisle No. 1 and by crane to the stripping track. From the stripping track pits crane No. 3 will move the motors to the motor assembly and the wheels to the wheel track back of the stripping track. Truck frames and parts will go into the lye vat and from the lye vat to the truck overhaul tracks. Wheels will be rolled to crane aisle No. 3 through the wheel shop, and after repairs will be dropped by crane No. 5 at the end of the truck overhaul track, where the truck they are intended for is being overhauled. When the truck is completed it will be moved forward to crane aisle No. 1 for delivery back to the car.

Crane aisle No. 1 serves all overhaul cars, blacksmith shop, welding and reclamation, machine shop, armature room and shipping and receiving dock by transfer. No. 2 serves the wheel shop, where all operations on wheels will be carried on, and the receiving and shipping dock by transfer. No. 3 serves the truck overhaul, motor assembly armature room, and end of receiving and shipping dock.

Cross-movements, as from storeroom to machine shop, or armature room to machine shop, will be made by electric lift trucks, as will material moved to and from mill and paint shop. Cars overhauled in overhaul section *A* and not intended for the paint shop would move out of the shop when completed to transfer table No. 1*a* and cars from overhaul section *B* over transfer table No. 2*a* and out of the shop over tracks 15 or 16.

Trolley wire is extended above overhaul sections *A* and *B* and in the paint shop, but not over crane aisle No. 1 except on track 1. Tracks would be laid from transfer table No. 1*a* to No. 3*a*, as the transfer tables



This Shop Layout Is Planned for a Minimum of Waste Movement

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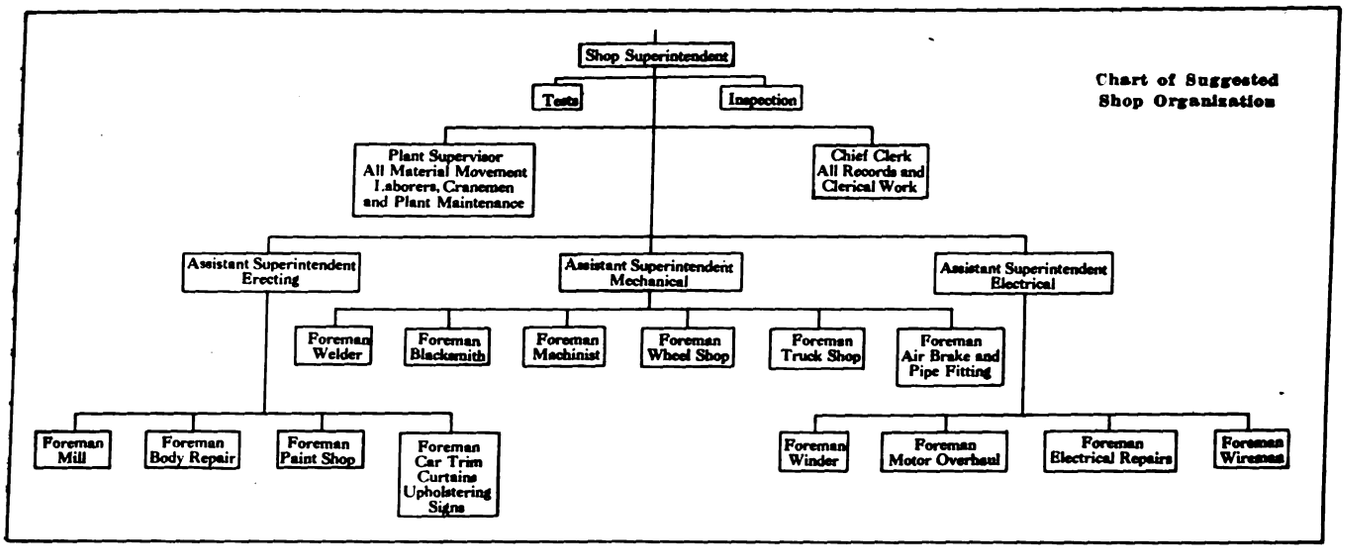


Chart of Suggested Shop Organization

would be of the surface type without pit. With trolley wire extending from overhaul section *B* over the transfer table and through the paint shop, cars can move on their own power from section *B* out. Tracks 2 to 14 in section *B* and 2 to 10 in section *A* would usually be reserved for straight overhaul, leaving tracks 11 to 14 in section *A* for wrecks and emergency body repairs, with tracks 15 and 16 in sections *A* and *B* held for hurry-up work on cars sent in for wheel and motor changes.

All tracks in sections *A* and *B* would have pits covered by portable gratings as shown in the accompanying diagram, to act as a floor when the car was on jacks or blocked up, and to be removed when the car was down on the trucks for final connections and inspection. Dummy trucks would not be necessary as the car would leave the location in which it was overhauled on its own completed trucks, which would be painted in the truck overhaul section. If the car was scheduled for the paint shop it would move in on its own trucks and not again be jacked. The objection of painting trucks in the center of the shop would be overcome by spray painting under a portable hood handled by crane No. 1 and connected to an exhaust duct in the floor.

The lighting scheme in the pits is arranged to floodlight the bottom of the car in each position and would do away to a large extent with the use of extension lamps.

This idea is also carried out in the truck overhaul pits, as shown in the accompanying illustration. These are also arranged so that by the removal of the gratings three standing levels are provided. This will afford greater ease to the truck repair men and consequently get more accuracy and speed. Electric tier lift trucks with projecting beds would be used to move brake cylinders, compressors, grid frames, controllers, etc., from the crane way to the exact location on the car body and would also be used to raise apparatus into position for hanger bolts without additional handling.

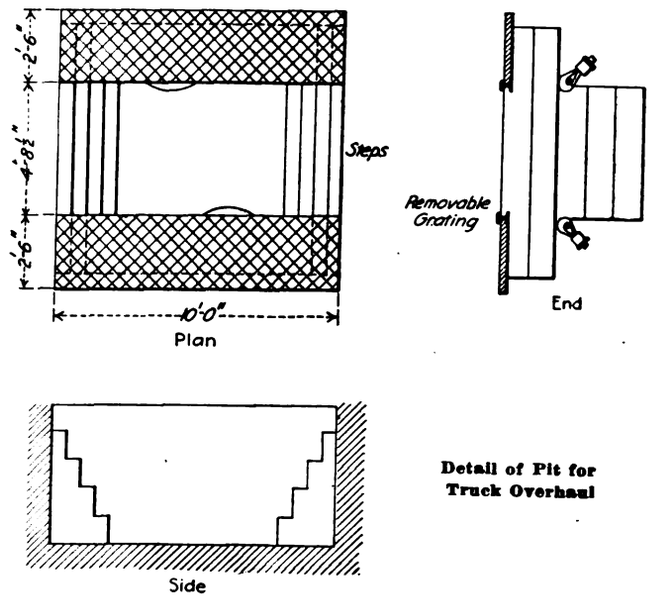
The entire shop would be floodlighted with the addition of individual lighting on all machine tools. Natural light would be from all available space for sash in all walls and swivel sash in the sawtooth roof.

A suggested organization is shown in the diagram. This differs from the average car-shop organization in that the departments are made up in three groups, each section of each group handling classes of work that are closely parallel. Each of these three groups is under an assistant shop superintendent who is a specialist in at least one of the classes of work under him, and who has had close associations with the other classes of work in his own group.

These three assistant superintendents would be individually a car builder, a machinist and an armature winder. They should be capable of using the right judgment and supervision over other classes of work very closely allied. This would eliminate a condition which often exists, of a machinist passing judgment on a paint job, which often happens when a machinist becomes a machine shop foreman and finally a general foreman.

With the suggested arrangement the three assistant shop superintendents carry on and are wholly responsible for the production. They report to a higher man who is primarily an executive, who controls the administration and keeps the production force supplied with cars, material and men, and the plant at all times in proper operating condition to perform the work.

Probably one of the first criticisms of this organization will be that it is too expensive and not necessary, but there is no better investment than plenty of the right kind of supervision. Manufacturers learned long ago that well-trained, well-paid specialized supervision was a requisite for successful manufacturing; and this is a parallel that can be drawn by the electric railway operator with sure results.



Detail of Pit for Truck Overhaul

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Machine Sorts Receipts from Locked Fare Boxes

Machine Designed and Built by Kansas City Railways Handles Cash, Tickets and Tokens in Denominations Up to Half Dollars

BY R. S. NEAL
Assistant Superintendent of Equipment Kansas City Railways

THE problem of counting the day's receipts, which became acute when the Kansas City Railways adopted locked fare boxes to receive cash fares, tokens and paper tickets, was facilitated greatly by the use of a machine for separating the various classes of coins and the paper tickets. When the system was changed, the total receipts for the day were put into the money counting room the morning after their receipt, instead of being handled on the same day, as heretofore.

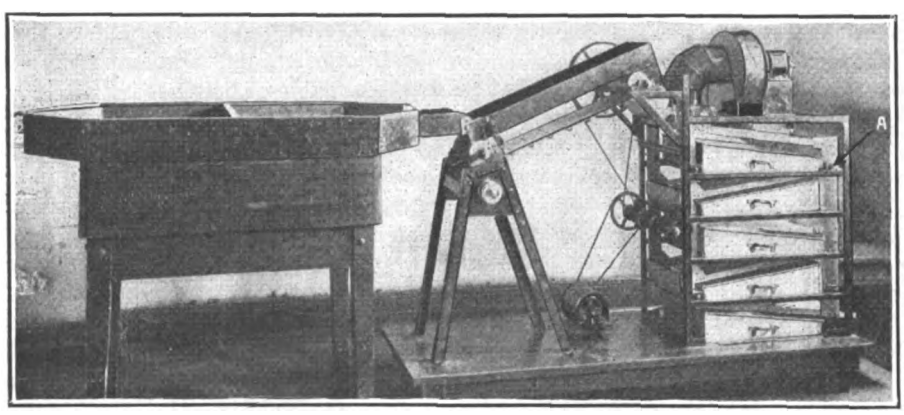
The fare box used is of the non-registering type and a separate check is not made of the individual conductor. The returns are considered as the receipts of the line or division from which they are collected. The magazine is removed from the fare box on the car at the end of each day and sent to the money room during the night or early the next day. There is a very large proportion of tickets and tokens. On account of this, it was necessary to design a machine that could handle the tickets and tokens, as well as the money.

A separating machine had been in use for several years, but it was not satisfactory. It had been necessary to change the design several times and also to run the machine much faster than the original plans called for in order to handle all the receipts in the required time.

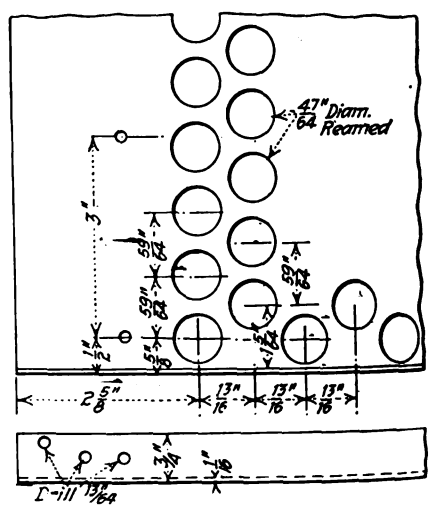
A complete study was made of the amount of money handled and a new machine was designed embracing quite a number of ideas that had not been used previously. For instance, special ball bearings were used on the traveling trays, which we knew would give absolute satisfaction. It was also decided that, on account of the high speed of the machine, with trays which have a reciprocating motion, it would be absolutely necessary to make this machine of the lightest possible material, taking into consideration that it also must have strength to withstand the severe service that would be given it each day.

The receipts, consisting of tickets, tokens and coins, are emptied into a large trough at the end of the separating machine. They are passed along on the traveling belt, which carries them up to the machine proper, dropping them into a small tray immediately under the pipe elbow. At this point, the air suction created by a fan connected to this pipe elbow picks up the paper tickets, but not any of the coins or tokens, carrying them through the fan into a receptacle not shown in this picture. This receptacle is cylindrical and its sides are perforated, which allows the air to escape while retaining the tickets. The coins fall through to the first tray, part of them dropping further into the pan underneath, and the remainder traveling across the tray to the end where they drop down to the next tray. The pan is stationary, and is supported by the frame of the machine.

The trays have a reciprocating motion, traveling on small ball bearings. One of these is marked with the letter *A* on the photograph. There are four of these bearings which support each tray frame. These trays are perforated suitably for the different sized coins. The whole lot of coins travel across the tray, part of them falling through and the remainder dropping at the end to the next tray. In that way there is a gradual separation of all the money that was started at the top. The money moves in a zigzag fashion from one side of the machine to the other as it travels down.



This Machine Sorts 180,000 Coins and 20,000 Paper Tickets an Hour. At the Right, Part of the Aluminum Tray for Separating Dimes



A portion of one of these trays, the one for handling dimes, is shown in the diagram. This tray is made of hard drawn aluminum, with holes of exact size to allow coins of the desired denomination to drop through, while larger ones must travel across the tray. The tray is 11½ in. wide and 23⅝ in. long.

The stationary pans into which the tokens or coins drop are removable. They usually are removed after each batch of money is put through the machine, and are emptied into the machines for wrapping and counting the coins.

The machine itself is driven by one 1/12-hp. shunt-wound motor, and the fan which picks up the tickets is driven by a 1/60-hp. shunt-wound motor.

In order to be absolutely protected two of these machines were put through the shop at the same time. The complete cost of these machines, including the motors and all material, was approximately $700.

In actual work, this machine handles in two and one-quarter hours 45,000 tickets, 275,000 tokens, 11,000 dimes, 90,000 pennies, 26,000 nickels, about seventy-five quarters and very few half dollars. It can be readily seen that a great saving is made in labor by the use of this machine.

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Electric Railway Passengers Increased 12 per Cent in Five Years

Preliminary Census Figures Compare 1922 with 1917—More Complete Statistics for Eight States Show a General Gain in Revenue, Although Track Mileage Decreased in Places

THE generally healthy condition of the electric railway industry throughout the United States is shown by the preliminary census figures recently announced by the Department of Commerce. Revenue passengers carried during the year 1922 numbered 12,665,300,050, as compared with 11,304,650,462 in 1917, when the last similar survey was made. This is an increase of 12 per cent for the five-year period, and an increase of 32.7 per cent compared with 1912, when the number was 9,545,554,667.

The total electric railway mileage in the country, however, as reported to the Census Bureau, has been somewhat reduced during the last five years. The survey shows that the miles of single track operated in 1922 aggregated 43,934 as compared with 44,808 miles in 1917, a decrease of 2 per cent. When the latter figure is compared with that for 1912, however, an increase of 7.1 per cent for the ten-year period is found. The largest recent trackage losses have occurred in Massachusetts and Ohio. In Massachusetts there was also a reduction in the number of passengers carried, but in Ohio the number increased more than 60,000,000 in spite of the smaller track mileage.

In most states where the trackage is less, there has been a change in operating methods, with consequent elimination of duplicate mileage, rather than suspension of service. This is shown by the fact that the largest falling off in trackage occurred in those states where the electric railway has been most highly developed, such as Pennsylvania, Ohio, Illinois, Massachusetts, Indiana, New Jersey, etc., whereas most of these states showed a decided increase in the number of revenue passengers carried.

Besides the encouraging aspect of the situation illustrated by the increase in traffic, there is also the fact that the railways in general had the advantage in 1922 of higher rates than they had in 1912, and this has further augmented their revenue. In spite of higher costs and higher taxes, the net income after all deductions has in many cases been more than 100 per cent greater in 1922 than it was five years before. These facts, therefore, point to the conclusion that the electric railway industry in the United States is today in a firmer position than ever before. More detailed figures for the individual states released follow:

	Revenue Passengers 1922	Revenue Passengers 1917	Miles of Single Track Operated 1922	Miles of Single Track Operated 1917
United States	*12,665,300,050	11,304,660,462	43,933.88	44,808.31
New York	3,087,744,368	2,492,325,233	4,792.35	4,773.36
Pennsylvania	1,415,924,112	1,300,087,044	4,423.08	4,462.11
Illinois	1,128,105,714	1,096,803,684	3,414.15	3,441.43
Ohio	872,974,191	811,912,634	3,975.84	4,236.11
California	755,126,337	494,165,724	3,075.75	3,022.08
Massachusetts	732,447,691	834,538,961	2,689.57	3,055.88
Michigan	557,899,672	447,780,173	1,813.94	1,768.37
New Jersey	466,818,827	432,874,767	1,342.93	1,368.06
Missouri	464,602,457	442,755,505	1,038.23	1,093.65
Minnesota	262,782,125	235,943,196	680.89	655.90
Maryland	248,593,711	228,633,563	758.38	774.62
Indiana	241,872,670	191,132,390	2,309.33	2,355.58
Texas	188,555,977	150,400,787	973.69	949.94
Connecticut	185,039,310	206,739,956	1,010.86	1,079.72
Wisconsin	181,374,525	164,995,818	919.44	901.28
District of Columbia	156,242,945	125,535,527	198.54	194.87
Washington	143,428,511	145,922,160	953.57	1,021.69
Rhode Island	143,008,903	113,191,055	402.54	453.61
Louisiana	128,336,883	105,753,068	304.80	330.59
Virginia	116,289,084	112,813,983	553.67	580.68
Kentucky	115,593,599	109,105,583	513.05	515.70
Tennessee	110,369,343	101,824,749	494.53	447.36
Georgia	105,957,665	93,640,506	450.60	449.69
Iowa	95,493,755	103,898,186	1,001.31	1,015.45
West Virginia	91,079,124	76,162,837	422.06	395.15
Colorado	81,613,515	84,623,896	430.81	467.15
Nebraska	76,845,760	74,560,104	206.05	210.99
Alabama	73,520,131	70,343,556	364.50	369.35
Oregon	71,803,754	67,222,935	612.01	603.13
Maine	50,010,345	55,463,285	566.08	571.52
Florida	41,316,572	32,771,128	197.04	83.03
Kansas	37,871,575	40,456,149	581.20	581.69
Oklahoma	35,402,037	30,766,522	323.81	301.51
Utah	33,622,564	40,890,741	477.60	469.40
Arkansas	29,954,017	26,283,177	120.32	121.83
North Carolina	29,619,319	26,915,221	215.55	227.63
Delaware	20,860,564	26,046,911	105.87	101.95
South Carolina	20,211,444	25,042,140	301.40	313.56
New Hampshire	19,650,000	23,405,151	263.46	269.34
Montana	15,254,913	22,196,885	111.26	120.92
Mississippi	8,412,372	10,730,801	97.91	124.17
Vermont	6,949,976	8,738,378	116.11	125.55
Arizona	5,473,890	7,482,895	44.12	52.89
North Dakota	3,378,686	2,840,840	20.66	24.42
Idaho	3,255,578	3,278,906	149.46	155.40
South Dakota	2,022,714	1,914,947	17.20	24.44
New Mexico	1,424,861	1,486,434	11.00	10.95
Wyoming	683,964	1,457,508	22.84	23.05
Nevada	480,000	804,863	4.52	1.56

* Includes 11,852,726 bus passengers carried by motor buses operated as parts of electric railway systems.

South Carolina.—The figures show a slight decrease in track mileage, which was accompanied by a decrease of 21.4 per cent in the number of passengers carried. However, on account of fare increases, gross railway operating revenues increased 21.5 per cent, aggregating $3,368,058 in 1922 as compared with $2,772,841 in 1917, but owing to a more rapid increase in expenses net income decreased from $563,791 in 1917 to only $2,009 in 1922.

	1922	1917	Per Cent of Increase 1917–1922
Number of operating companies	†6	7	.....
Miles of single track‡	332.12	335.73	*1.1
Number of cars, all types	395	458	*13.8
Electric locomotives	16	12	.....
Number of persons employed	1,298	1,499	*13.4
Salaries and wages	$1,497,988	$976,090	53.5
Primary horsepower, total	19,600	36,600	*46.4
Kilowatt capacity of generators	12,000	25,750	*53.4
Current generated, kilowatt-hours	35,895,050	40,878,930	*12.2
Current purchased, kilowatt-hours	30,011,513	62,985,134	*52.4
Passengers carried	22,338,616	28,408,318	*21.4
Revenue car mileage	7,718,687	8,235,764	*6.3
Railway operations, revenues	$3,368,658	$2,772,841	21.5
Railway operations, expenses	$2,721,956	$1,729,594	57.4
Net revenues, railway operations	$646,702	$1,043,247	*38.0
Auxiliary operations, revenues**	$637,628	$993,792	*35.8
Auxiliary operations, expenses	$290,160	$556,906	*47.9
Net revenues, auxiliary operations	$347,468	$436,886	*20.5
Net operating revenues	$994,170	$1,480,133	*32.8
Taxes assignable to railway operations	$227,652	$187,055	21.7
Operating income	$766,518	$1,293,078	*40.7
Non-operating income	$150,329	$137,838	9.1
Gross income	$916,847	$1,430,916	*35.9
Interest and other deductions from gross income	$914,838	$867,125	5.5
Net income	$2,009	$563,791	*99.6

*Indicates decrease.
†One company with 3 miles of track discontinued operations prior to 1922.
‡Includes 55.82 miles in 1922 and 53.91 miles in 1917 lying outside of the state but owned by companies within the state, and excludes 25.10 miles in 1922 and 31.74 miles in 1917 operated in the state but owned by companies outside of the state.
**Chiefly revenue from electric light and power departments of electric railways.

Florida.—The figures show an increase of 7.7 per cent in track mileage, and a gain in the number of passengers

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carried of 27.4 per cent. Gross railway operating revenues amounted to $2,466,367 in 1922, an increase of 46.5 per cent as compared with 1917, operating expenses increased 62.9 per cent, and net income from all sources made a gain of 102.1 per cent.

	1922	1917	Per Cent of Increase 1917-1922
Number of operating companies	†7	8	.....
Miles of single track	197.04	183.03	7.7
Number of cars, all types	415	333	24.6
Number of persons employed	1,166	1,029	13.3
Salaries and wages	$1,513,284	$886,192	70.8
Primary horsepower, total	32,849	33,905	*3.1
Kilowatt capacity of generators	22,645	24,300	*6.8
Current generated, kilowatt-hours	44,931,299	31,101,546	44.5
Current purchased, kilowatt-hours	4,042,400	971,610	316.1
Passengers carried	49,220,967	38,625,356	27.4
Revenue car mileage	9,057,700	7,208,883	25.6
Railway operations, revenues	$2,466,367	$1,683,350	46.5
Railway operations, expenses	$1,743,830	$1,070,254	62.9
Net revenues, railway operations	$722,537	$613,096	17.9
Auxiliary operations, revenues‡	$1,611,372	$759,604	112.1
Auxiliary operations, expenses	$638,813	$316,853	101.6
Net revenues, auxiliary operations	$972,559	$442,751	119.7
Net operating revenues	$1,695,096	$1,055,847	60.5
Taxes assignable to railway operations	$326,502	$157,561	107.2
Operating income	$1,368,594	$898,286	52.4
Non-operating income	$19,526	$1,560	1,151.7
Gross income	$1,388,120	$899,846	54.3
Interest and other deductions from gross income	$295,171	$358,995	*17.8
Net income	$1,092,949	$540,851	102.1

†One company with 4.04 miles of track discontinued operations prior to 1922.
‡Chiefly revenue from electric light and power departments of electric railways.

New Hampshire.—An increase of 6.2 per cent in track mileage was accompanied by a decrease of 15.5 per cent in passengers carried. However, owing to fare increases, operating revenues increased from $1,250,769 in 1917 to $1,666,029 in 1922, a gain of 33.2 per cent, and net income from all sources increased 28.7 per cent.

	1922	1917	Per Cent of Increase 1917-1922
Number of operating companies	14	13	.....
Miles of single track†	216.03	203.37	6.2
Number of cars, all types	346	307	12.7
Electric locomotives	1	2	.....
Number of persons employed	586	609	*3.8
Salaries and wages	$808,136	$481,000	68.0
Primary horsepower, total	2,250	3,982	*43.5
Kilowatt capacity of generators	1,250	2,675	*53.3
Current generated, kilowatt-hours	4,369,770	5,491,065	*20.4
Current purchased, kilowatt-hours	13,298,632	11,006,954	20.8
Passengers carried	22,270,122	26,341,020	*15.5
Revenue car mileage	4,005,831	3,890,158	3.0
Railway operations, revenues	$1,666,029	$1,250,769	33.2
Railway operations, expenses	$1,431,219	$999,087	43.3
Net operating revenues	$234,810	$251,682	*6.7
Taxes assignable to operations	$91,019	$67,404	35.0
Operating income	$143,791	$184,278	*22.0
Non-operating income	$23,887	$6,909	245.7
Gross income	$167,678	$191,187	*12.3
Deductions from gross income	$78,638	$122,011	*35.5
Net income	$89,040	$69,176	28.7

†Excludes 47.43 miles of track in 1922 and 65.97 miles in 1917 operated in the state but owned by companies outside of the state.

Kentucky.—There was a small increase in track mileage, and a gain of 4.4 per cent in the number of passengers carried. Gross railway operating revenues amounted to $8,027,986 in 1922, an increase of 27 per cent as compared with 1917, but on account of the more rapid increase in expenses both net revenue from railway operations and net revenue from all sources decreased by slightly over 13 per cent.

	1922	1917	Per Cent of Increase 1917-1922
Number of operating companies	9	11	.....
Miles of single track†	499.52	498.23	0.3
Number of cars, all types	992	1,059	*6.3
Number of persons employed	2,645	2,857	*7.4
Salaries and wages	$3,358,411	$2,233,878	50.3
Primary horsepower, total	44,550	41,710	6.8
Kilowatt capacity of generators	29,500	30,625	*3.7
Current generated, kilowatt-hours	52,192,809	71,257,192	*26.8
Current purchased, kilowatt-hours	28,784,647	30,516,586	*5.7
Passengers carried	147,490,154	141,218,932	4.4
Revenue car mileage	20,371,699	22,865,008	*10.9
Railway operations, revenues	$8,027,986	$6,319,418	27.0
Railway operations, expenses	$5,840,500	$3,789,486	54.1
Net operating revenues	$2,187,486	$2,529,932	*13.5
Taxes assignable to railway operations	$567,115	$517,515	9.6
Operating income	$1,620,371	$2,012,417	*19.5
Non-operating income	$234,704	$149,555	56.9
Gross income	$1,855,075	$2,161,972	*14.2
Deductions from gross income	$1,202,920	$1,410,815	*14.7
Net income	$652,155	$751,157	*13.2

†Includes 1.07 miles in 1922 lying outside of state, but owned by companies within the state, and excludes 22.74 miles in 1922 and 17.47 in 1917 operated in the state, but owned by companies outside of the state.

*Indicates decrease.

Tennessee.—Track mileage increased 9.1 per cent and there was a gain of 6.6 per cent in the number of passengers carried. Gross railway operating revenues amounted to $8,011,437 in 1922, an increase of 48.7 per cent as compared with 1917, and net income from all sources increased 101.8 per cent during the five-year period.

	1922	1917	Per Cent of Increase 1917-1922
Number of operating companies	13	14	.....
Miles of single track†	503.89	462.00	9.1
Number of cars, all types	844	840	0.5
Electric locomotives	3	1	.....
Number of persons employed	2,841	2,963	*4.1
Salaries and wages	$3,654,950	$2,238,014	63.3
Primary horsepower, total	35,200	53,533	*34.2
Kilowatt capacity of generators	25,450	38,205	*33.4
Current generated, kilowatt-hours	29,398,550	90,682,359	*67.6
Current purchased, kilowatt-hours	103,314,847	79,354,017	30.2
Passengers carried	130,767,681	122,655,470	6.6
Revenue car mileage	19,121,967	21,400,684	*10.6
Railway operations, revenues	$8,011,437	$5,386,465	48.7
Railway operations, expenses	$5,376,897	$3,694,943	45.5
Net revenues, railway operations	$2,634,540	$1,691,522	55.7
Auxiliary operations, revenues‡	$1,832,280	$2,132,199	*14.1
Auxiliary operations, expenses	$846,306	$899,831	*5.9
Net revenues, auxiliary operations	$985,974	$1,232,368	*20.0
Net operating revenues	$3,620,514	$2,923,890	23.8
Taxes assignable to railway operations	$944,376	$593,513	59.1
Operating income	$2,676,138	$2,330,377	14.8
Non-operating income	$143,537	$36,333	295.1
Gross income	$2,819,675	$2,366,710	19.1
Interest and other deductions from gross income	$1,561,212	$1,743,020	*10.4
Net income	$1,258,463	$623,690	101.8

†Includes 9.36 miles in 1922 and 14.64 miles in 1917 lying outside of the state but owned by companies within the state. Also includes in 1922, 46.70 miles of track (not equipped with electric power) over which gasoline motor cars are operated.
‡Chiefly revenue from electric light and power departments of electric railways.

Montana.—Gross railway operating revenues amounted to $969,213 in 1922 as compared with $1,178,755 in 1917, a decrease of 17.8 per cent, while the net income from all sources decreased 76.3 per cent. Track mileage shows a decline of 8 per cent, and passenger traffic decreased 32.5 per cent.

	1922	1917	Per Cent of Increase 1917-1922
Number of operating companies	†5	6	.....
Miles of single track	111.27	120.92	*8.0
Number of cars, all types	173	184	*6.0
Number of persons employed	334	486	*31.3
Salaries and wages	$556,106	$572,604	*2.9
Current purchased, kilowatt-hours	18,304,263	17,927,151	2.1
Passengers carried	17,522,464	25,948,387	*32.5
Revenue car mileage	2,979,323	3,591,815	*17.1
Railway operations, revenues	$969,213	$1,178,755	*17.8
Railway operations, expenses	$895,625	$961,128	*6.8
Net revenues, railway operations	$73,588	$217,627	*66.2
Auxiliary operations, revenues‡	$354,106	$322,628	9.8
Auxiliary operations, expenses	$171,984	$150,283	14.4
Net revenues, auxiliary operations	$182,122	$172,345	5.7
Net operating revenues	$255,710	$389,972	*34.4
Taxes assignable to railway operations	$96,386	$77,124	25.0
Operating income	$159,324	$312,848	*49.1
Non-operating income	$2,797	$18,500	*84.9
Gross income	$162,121	$331,348	*51.1
Deductions from gross income	$116,373	$138,681	*16.1
Net income	$45,748	$192,667	*76.3

†One company with 6.4 miles of track which reported in 1917 discontinued operations prior to 1922.
‡Chiefly revenues from electric light and power departments of electric railways.

Nevada and Utah.—The track mileage operated in these states in 1922 was practically the same as in 1917, but the number of passengers carried decreased 18.1 per cent. However, on account of fare increases, gross railway operating revenues made a gain of 26.8 per cent, aggregating $4,334,800 in 1922, while railway operating expenses increased 30 per cent.

	1922	1917	Per Cent of Increase 1917-1922
Number of operating companies	6	6	.....
Miles of single track†	488.93	488.97	.....
Number of cars, all types	722	518	39.4
Number of persons employed	1,130	1,552	*27.2
Salaries and wages	$1,700,174	$1,389,553	22.4
Current purchased, kilowatt-hours	42,588,598	40,349,995	5.5
Passengers carried	39,790,937	48,561,651	*18.1
Revenue car mileage	9,972,268	9,970,594	.....
Railway operations, revenues	$4,334,800	$3,418,967	26.8
Railway operations, expenses	$2,783,446	$2,141,169	30.0
Net operating revenues	$1,551,354	$1,277,798	21.4
Taxes assignable to railway operations	$322,609	$220,703	4.62
Operating income	$1,228,745	$1,057,095	16.2
Non-operating income	$428,342	$377,486	13.5
Gross income	$1,657,087	$1,434,581	15.5
Deductions from gross income	$1,638,498	$1,466,913	11.7
Net income	$18,589	‡$32,332	.....

†Includes 6.81 m'les in 1922 and 8.01 miles in 1917 operated outside of the state, but owned by companies within the state.
‡Deficit.

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The Readers' Forum

The Weekly Pass as a Simple Zoning Expedient

UNITED RAILWAYS OF ST. LOUIS, MO.

Oct. 16, 1923.

To the Editors:

Almost any street railway man will admit that the distance fare is right in principle, that it is more equitable between different passengers than the flat fare, and that from the company's standpoint it has the advantages of getting more revenue from the long-haul passenger without driving him away and of putting the cars in a better position to compete with the sidewalks and jitneys for the short-distance business. With all these advantages, however, distance or zone fares have been adopted in very few cities. Managements have hesitated to urge them on account of the difficulties introduced in fare collection. Doubtless, too, they would meet with opposition from a considerable part of the public.

The distance fare principle can, however, be introduced to a large degree without increasing fare collection troubles, and probably without marked public opposition, by means of the weekly pass. The method is applicable to any surface system on which fare collection is entirely pay-as-you-enter or entirely pay-as-you-leave and to any rapid transit system which collects its fares at the entrance to the stations. It is simply to divide the single fare area, which will remain a single fare area so far as cash and ticket fares are concerned, into pass sections, and issue a distinct pass for each section, good for transportation if presented within that section. Then the holder of a section pass could ride at will within the limits of the section designated. If he made a trip between a point within the zone and one without, he could use the pass only one way, and on the opposing trip would be obliged to pay the full cash or ticket fare, unless he also possessed a pass good in the section at the other end of the trip. If he had a pass good anywhere on the system he would not of course have any zone passes, and if such general passes were available there would be no point in his having two section passes, since the price of the latter would presumably be at least half of that of the former.

The section pass would then be a short-haul pass so far as its own section was concerned. On long trips it could be used only one way, and in consequence could be used only half as often as a pass of general acceptability. In view of these facts it could be sold at a less price than that required for the general pass, and so would help the company to get the short-haul business in spite of a high cash fare and a high-priced general pass.

In a circular city with its business district in the center, it might be well to have five primary sections, as follows: Central, northern, eastern, southern, western. The boundary between the central and other sections would be perhaps half way between the business center and the fare limits. Overlapping sections might be provided to care for short rides between points in adjacent primary sections. Or the primary sections might be made to overlap. The number of sections, overlapping or not, which can be provided is limited only by the possibility of printing the respective passes so that the conductors can readily distinguish them.

The plan here outlined is particularly applicable to systems in cities of large area, where the average haul is long, where the fare is consequently so high as to discourage short-haul riding or drive it to competitors and where a low-priced general pass would cut too deeply into the revenue derived from the long-haul business. In cities where these general conditions do not obtain, it may be found useful under some peculiar conditions.

This plan is believed to be original with the writer. Steady reading of the ELECTRIC RAILWAY JOURNAL has failed to bring to his attention any such suggestion. It is offered to the industry in the hope that it will prove useful in solving some of the many problems with which urban railways are confronted.

LAWRENCE H. DOOLITTLE.

Is the Electric Railway Industry Tottering?

NEW YORK, Oct. 29, 1923.

To the Editors:

Within the last five years, according to the Census Bureau, there has been a net loss of nearly 900 miles of electric railway track, or about 2 per cent. Is the electric railway industry tottering?

No. This is not a sign of tottering. Every industry gets overbuilt at times, and of course there has been much track that ought never to have been built.

Other statistics recently published by the Census Bureau show that between 1917 and 1922 there was a loss of traffic by electric railways in nineteen states of the Union. Is this an indication of tottering?

No. It will take more than this to make the industry totter. These passengers have largely deserted temporarily for an extravagant means of transport, namely, private automobile. This tendency is bound to have limits and is bound to correct itself to some extent.

Out of 850-odd electric railways in the United States and Canada only seventeen competed this year for the Coffin Award. Is this significant?

Yes. The industry is certainly dead from its ears up. Here is a practical proposition devised by the most enlightened and practical men in the industry. To qualify, it requires nothing but every-day good management. Or, rather, there is nothing required which should not be done by every management every year to improve its property, yet only seventeen tried. Have the other 833-odd "lain down," or have they failed in all their endeavors to make improvements, or are some of them too modest or lazy to compete? It may be that many have perfect properties and hence have no chance for improvement. It may be that many are too poor. It may be that many were really too busy to prepare elaborate briefs.

Is it too much to expect that every electric railway should go after this award? There is not a motion required that a good manager should not make and that will not show favorably in the income account. It is not necessary to expend capital. The award is made for human effort. The small roads need not be backward, for, like the parable, the man with two talents will not be scorned. What is wanted is good, active thinking, and good thinking action. When the industry gets such stuff, it will not totter. It may have to take some hard cracks, but it will take them standing up.

A FRIEND OF THE INDUSTRY.

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Association News & Discussions

Report of A.E.R.A. Committee on Valuation

Weight to Be Given Various Evidences of Value and Study of Present Price Trends Are Principal Aspects Considered—Committee Presents Bases for Determining "Present Value"—Report Is Printed in Full as Adopted by Atlantic City Convention

IN 1915 the committee on valuation presented a report on the general problem of valuation. In 1916 the committee presented a bibliography of valuation literature complete to Jan. 1, 1916, and a code of definitions of terms used in valuation work. For the years 1917-1918-1919 the committee reported that in its judgment fair value should include original cost, appreciation and going concern value, and that in those cases where original cost was not available reproduction cost new with proper overheads should be used as a basis, to which should be added going concern value and development cost. The committee also recommended that when a property was in good operating condition and properly maintained no deduction should be made for accrued depreciation in determining rate-making value.

In 1920 the report of the committee further developed the subjects of "cost of reproduction new" and "going value." The 1921 report discussed the rate of return and the importance of placing this rate high enough to attract new capital. The use of the yard stick method in appraisals was advised. Last year the committee further discussed and commended the use of the yardstick method.

For the current year the committee has devoted itself to a study of the weight which should be given to the various evidences of value and to a study of the present price trends. The report in full follows. The conclusions and recommendations are here summarized:

Conclusions

1. Courts of last resort have up to this time uniformly held that the basis of rate making is the present value of the property, that the ascertainment of that value is not controlled by artificial rules, is not a matter of formulas, but that there must be a reasonable judgment having its basis in a proper consideration of all relevant facts, and, in recent cases, that in the determination of present value the enhanced prices of labor and materials cannot be ignored, and further that present value is not necessarily either "prudent investment," "original cost" or reproduction cost at abnormal prices.

2. That trend prices *based on pre-war price investments* cannot be determined with sufficient accuracy to be used as the basis of valuation.

3. That a careful study of present economic conditions and the underlying causes of variations in the purchasing power of money do not indicate any early return to pre-war price levels, but rather a continuance of present prices with minor fluctuations and possibly a slow decline until the curve of general commodity prices again approximates closely its general trend as established in the period from 1899 to 1915, inclusive, and that, in particular, the conditions governing electric railway construction costs indicate that the curve which represents them will not for ten or fifteen years approximate the trend curve determined by the pre-war period, or, in other words, that construction costs for the next decade at least will remain well above rather than below 150 per cent of corresponding costs in 1913-1914.

Recommendations

1. Our member companies, in approaching the question of valuation before a commission or other regulatory body or before a court, should submit full evidence at least as to original cost, present-day reproduction cost, present and probable future trend of unit costs and direct testimony as to present-day fair value. They should endeavor to reach with the regulatory body a fair, equitable conclusion as to a reasonably stable level of unit costs and an equitable working figure as to such unit costs, if any, as may be admittably still unstable.

2. In the case of properties in serviceable condition and adapted to their purpose, our member companies, in view of controlling court decisions, should take a firm stand for a present plant value approximately equal to reproduction cost at stable unit prices as above and for a fair return upon that value, to which there should of course be added going concern value and other non-physical elements.

Weight to Be Attached to Various Evidences of Value

The Supreme Court of the United States in the leading case of Smyth vs. Ames established the principle that a public utility is entitled to receive from the public a fair return upon the fair value of its property and, the court, though it did not establish any definite rule for the determination of fair value, listed certain evidences of value which in its opinion should, with others, be considered and weighed before fair value can be determined.

The most important evidences of value are:

First—Original cost of construction plus subsequent net capital expenditures.

Second—Amount and market value of stocks and bonds.

Third—Present as compared with original cost of construction.

If the fairness of any particular set of rates is under consideration there must, of course, also be considered the estimated earnings of the utility under the proposed system of rates and the probable cost of operation.

In the gradual development of the theory of valuation since the case of Smyth vs. Ames the various state commissions, state Supreme Courts and various Federal courts, including the Supreme Court itself, have exhibited a growing tendency to ignore the second of these evidences of value and to focus attention more and more upon original cost plus subsequent net capital additions and reproduction cost as of the time of the inquiry.

During the pre-war period the difficulty or even the impossibility of determining the original cost of many properties, together with the fact that in many cases reproduction cost as of the time of the inquiry was not widely different from the normal construction cost as of the time when the property was originally built, led frequently to reliance in large degree upon cost to reproduce, using the unit prices as of the time of reproduction, unit prices averaged over a term of years prior to the valuation or unit prices determined by careful study of the trend of prices for the various basic commodities involved.

The coming of the war changed the situation materially. Wages and commodity prices rose by leaps and bounds, carrying up with them cost of reproduction at current prices, until, at the peak, cost of reproduction at current prices exceeded original cost or pre-war reproduction cost by 100 per cent or more. Regulatory bodies, therefore, found themselves suddenly confronted by two problems. In valuing a new property, which of the two measures of value, easily comparable in the pre-war period but now widely divergent, should be given controlling weight? In valuing a property which had previously been valued, should the new valuation be limited only to subsequent capital additions or should the whole problem

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be reopened and reconsidered on the basis of present-day conditions?

The problems thus presented were complicated by the fact that several minor questions, on the answers to which the main question must necessarily depend, could not be answered. For example, was the price increase permanent or merely temporary? If the former, had we entered upon a new price level, and if so, how high was it? If the latter, would prices promptly return to their pre-war level or would this return be long delayed?

Under these conditions we would naturally expect to find a wide divergence between the various regulatory bodies as to the weight which should be attached to the various evidences of value. This expectation is fully realized when we make a study of recent commission decisions. It is doubtful, in fact, whether any two state commissions hold exactly the same point of view toward the problem.

As indicated above, they pay practically no regard, however, to the amount or market value of securities, and the various differences which are found between them grow chiefly out of their treatment of the elements of original cost and reproduction cost.

Disregarding minor differences, however, it is possible to group the commissions under certain general classifications as listed below:

GROUP I. REPRODUCTION COST CONSIDERED

Class A.—Commissions belonging to this class refuse to recognize either original cost or reproduction cost as of the present date as controlling and have no definite method of relative weighting for these two evidences of value.

In general, they consider all evidences of value which are presented and all other matters or circumstances which they feel have any bearing upon the case, and then announce a value which they believe to be the fair value under all of the circumstances. Certain of the decisions rendered by the commissions in this class lean strongly toward original cost so far as the final value is concerned, and others lean strongly toward reproduction cost under present-day prices, but the commissions themselves disclaim any recognition of either element as, in general, controlling.

Class B.—The commissions in this class regard reproduction cost under present-day prices or those probably in force in the period while the rate is in effect as dominant or controlling.

Class C.—The commissions in this class recognize as dominant a reproduction cost based not upon present prices but upon average prices over a five-year or ten-year period prior to the time of the valuation.

Class D.—The commission in this class regards the investment value as controlling for new properties, but when a property is more than ten years old the commission is disposed to follow reproduction cost based on unit prices for the ten-year average.

Class E.—The commissions in this class hold that since rates are to be effective for a future period they should be related to the value as of that period, and that therefore fair value for rate making is reproduction cost with unit prices as of the time during which the rate will probably be in effect.

GROUP II. REPRODUCTION COST IGNORED

Class F.—The commissions in this class regard original cost or, in some cases, historical reproduction cost, by which they mean a reproduction cost using for each unit so far as possible the normal cost at the time when it was supposedly installed, as dominant or controlling.

Class G.—The commissions in this class hold that fair value should be the prudent investment.

GROUP III. SPECIAL THEORIES

Class H.—The commissions in this class use what is sometimes termed the split inventory method. Under this method property installed prior to the war is taken at its fair pre-war value, either as valued at that time by a commission or usually on a reproduction cost as of a definite date or as averaged over a period. To the sum so obtained there is added the actual cost of war and post-war additions, and the sum so secured is taken as fair present-day value.

Class I.—The commissions in this class vary the theory of Class H by allowing on the pre-war property an appreciation for change in price scale. This theory has been worked out most fully by the state of Virginia, which has built a definite working formula for valuation cases.

Class J.—The commissions in this class have taken the position in dealing with applications for revaluation that present fair value is the value formerly found plus the net capital additions to date.

Class K.—The commissions in this class have no general policy.

SUMMARY OF COMMISSION DECISIONS

The committee has digested the commission and court decisions as reported in P. U. R. for the years 1920, 1921, 1922 and 1923 to May and classified them under the above plan. The results, so far as the commissions are concerned, are shown in condensed form in Table I, giving for each year the number of commissions whose reports seem to put them in the class indicated and the percentage of the commissions in the class to the total number of commissions reported. Fractions were used where the decisions for a given year seemed to fall in more than one class.

The committee then wrote to each commission asking for an expression of opinion on this question. A number of commissions have made no valuation rulings and others felt that they should not express themselves except through official rulings, but twenty-six of the commissions replied with sufficient fullness to enable the committee to classify them.

The significant thing in this tabulation is the evidence it affords of a steady drift toward Group I and particularly toward Class A.

STATE COURT DECISIONS

The decisions of the state courts of last resort seem to show less variation than the decisions of the commissions, although there is, of course, a much smaller number of adjudicated cases.

Thus we find in Class A the Supreme Court of Illinois, the Supreme Court of Kansas, the Supreme Court of Missouri, the Supreme Court of New Jersey, the Supreme Court of Appeals of Virginia and the West Virginia Supreme Court of Appeals.

Still in Class A, but with a strong leaning toward Class F, we find the New York Supreme Court.

In Class B we find in 1920 the Michigan Supreme Court.

In Class J, on the question of the treatment to be given to a previous valuation, we find the Washington Supreme Court.

FEDERAL COURTS

The Federal courts also incline strongly toward Class A, as will be seen by an examination of the following cases:

United States Court of Appeals of the District of Columbia in re Potomac Electric Power Company vs. Public Utilities Commission, P. U. R. 1922 B, 680.

United States District Court of Min-

TABLE I—CLASSIFICATION OF COMMISSIONS

	By decisions in years noted								By Replies	
	1920		1921		1922		1923			
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Class A	1½	6	3	18	7½	30.55	4½	37.50	14	53.84
Class B	½	4	0	0	1½	5.56	2	16.67	½	1.92
Class C	3½	19	2	12	½	1.39	..	...	2	7.69
Class D	..	...	..	...	..	.....	..	.....	1	3.85
Class E	..	...	..	...	½	2.08	..	.....	½	1.92
Total Group I	5½	29	5	30	9½	39.58	6½	54.17	18	69.22
Class F	7½	39	5½	32	6½	27.08	1½	12.50	3	11.54
Class G	..	...	..	...	..	.....	..	.....	1	3.85
Total Group II	7½	39	5½	32	6½	27.08	1½	12.50	4	15.39
Class H	6½	32	4½	26	4½	18.75	2	16.67	2	7.69
Class I	..	...	1	6	2½	10.42	2	16.66	1	3.85
Class J	..	...	1	6	1	4.17	..	.....	..	...
Class K	..	...	..	...	..	.....	..	.....	1	3.85
Total Group III	6½	32	6½	38	8	33.34	4	33.33	4	15.39
Grand total	20	100	17	100	24	100.00	12	100.00	26	100.00

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nesota in re City of Winona vs. Wisconsin-Minnesota Light & Power Company, P. U. R. 1921 A, 146 and P. U. R. 1922 C. 461.

On the other hand we find in Class B:

United States District Court for Missouri, in St. Joseph Railway, Light & Power Company vs. Public Service Commission, P. U. R. 1921 A, 540.

Galveston Electric Company Cases

Galveston Electric Company vs. Galveston reported in P. U. R. 1922 D, 159, has been perhaps more frequently misinterpreted than any other recent case of the Supreme Court. The company and the municipality both abandoned the evidences of value approved by the case of Smyth vs. Ames and attempted to determine fair value on the reproduction method, using not current prices but the prices assumed as average prices for the future.

The value had been reached in the lower court, not by weighting the various measures of value recognized in Smyth vs. Ames, but by assuming that in the post-war period the country would settle down on a new price plateau and that the company should be allowed reproduction value determined by the unit prices of this new plateau.

The master and the lower court set this new plateau 33⅓ per cent above the pre-war level, while the company contended that it should be from 60 per cent to 70 per cent above the pre-war level.

Both contestants appealed on this point and others to the Supreme Court of the United States, and the question presented to that body was practically this:

Both contestants having agreed to ignore the usual evidences of value and to determine value by an estimate or prophecy as to future economic conditions, is there any thing in the record or anything of which the court shou'd take judicial notice which will make the action of the master in refusing to prophesy a level above 33⅓ per cent reversible error? The United States Supreme Court held that there was nothing which constituted reversible error in this action of the master, but it did not express an approval of the method or express any opinion as to the accuracy of the master's or the company's costs.

Southwestern Bell Case

The case of Houston vs. the Southwestern Bell Telephone Company, reported in P. U. R. 1922 D, 793, unquestionably takes the United States Supreme Court out of Class F, but it does not, as has been sometimes stated, put the Court in Class B. The decision is an unequivocal assertion that the company is allowed to earn a fair return upon its present value or upon the value of the property used and useful at the time when it is used, but there is nowhere in the decision any assertion that present-day reproduction cost and present-day value are identical.

The decision of the United States Supreme Court in the case of Missouri vs. Public Service Commission, dealing with the valuation of the Missouri properties of the Southwestern Bell Telephone Company, was handed down on May 21, 1923.

In this case below the company had put in a valuation showing a reproduction cost as of June 30, 1919, of $35,100,471 and an actual cost as shown by the books of $22,888,943. The latter figure, however, did not include the cost of establishing the business, included in the former figure at $5,594,816.

The commission had not valued the entire property of the company, but had valued the property at three of the exchanges in the state in 1913, 1914 and 1916, the last of these representing, however, less than 9 per cent of the total value of the three exchanges. The company's valuation was made up by exchanges and it was therefore a simple matter to compare the commission's value on these three exchanges with the company's value on the same property.

The commission added to its earlier value on the three exchanges the net capital additions and determined the ratio of the total so secured to the company's reproduction cost. This ratio they applied to the company's reproduction cost of the entire property and reached a value of $20,350,000 or, on a similar process for reproduction cost less depreciation, $20,400,000. This latter figure was fixed as the tentative value of the property.

It is evident that this, as the Supreme Court says, undertakes:

"to value the property without according any weight to the greatly enhanced costs of material, labor, supplies, etc., over those prevailing in 1913, 1914 and 1916."

The court then emphatically reaffirms its former ruling that present value and not cost is the determining factor and repudiates the methods that are followed by the commission in the following terms:

"It is impossible to ascertain what will amount to a fair return upon properties devoted to public service without giving consideration to the cost of labor, supplies, etc., at the time the investigation is made. An honest and intelligent forecast of probable future values, made upon review of all the relevant circumstances, is essential. If the highly important element of present costs is wholly disregarded such a forecast becomes impossible. Estimates for tomorrow cannot ignore prices of today."

From the viewpoint of the Supreme Court, therefore, there was evidently no finding of "present value," but there was in the record testimony (with no substantial evidence to the contrary) that the value was at least 25 per cent in excess of that found by the commission. The Supreme Court found that a value of $25,000,000, slightly less than that fixed by this uncontroverted testimony, would make the rates ordered by the commission confiscatory and therefore reversed the judgment of the lower court sustaining the commission.

This decision did not fix the value of the property of the company at $25,000,000, but merely determined that it was not, as judged by the record, less than that. It did not determine the weight to be given to reproduction cost, but did determine that it cannot be ignored. Finally, it is a demonstration of the importance of presenting testimony as to "present value" as distinct from costs, whether original or reproduction.

The case, however, is particularly important because of the dissenting opinion filed by Justices Brandeis and Holmes, which is a strong presentation of the prudent investment theory.

Atlanta and Bluefield Cases

The Atlanta Gas case and the Bluefield Water Works case were both decided on June 11, 1923.

To those who have regarded the Southwestern Bell Telephone case as holding that present-day reproduction costs are a controlling measure of present value the Atlanta Gas case came as a distinct shock, and many critics, including one justice of the Supreme Court itself, insist that these two cases cannot be reconciled. To those, however, who regarded the Southwestern Bell Telephone Case as holding merely that present-day reproduction prices must be considered and given reasonable weight, it does not seem impossible to reconcile the Atlanta Gas decision with that in the Southwestern Bell Telephone case.

In the Atlanta case the commission below claimed that it had given full consideration to present-day reproduction costs. Both the District Court and the United States Supreme Court found that "the opinion of the commission evinces a full and conscientious consideration of the evidence."

The lower court also held that the commission's statement of the applicable rules of law was sound, and that, while it might differ from the commission as to the application of those rules, the resulting changes in the final figures would not be sufficient to justify a reversal.

The commission in dealing with this case had taken the value of the portions of the plant in existence in January, 1914, and allowed original cost or reproduction cost as of that date undepreciated. To this sum it added $125,000 as a recognition of the appreciation in land values, and also added approximately $1,000,000 of additions made during the period from January, 1914, to September, 1919, at actual cost, although since the hearing came in the last three months of 1921 the strict application of the reproduction cost theory would have shown a reproduction loss upon a part at least of this investment.

The lower court held that this action in this particular case resulted in a figure which gave sufficient weight to present-day unit prices, and therefore sustained the commission, an action which the United States Supreme Court refused to reverse.

In the Southwestern Bell Telephone

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case, on the contrary, the commission's figures were based upon 1914 reproduction costs depreciated, no allowance was made for the appreciation of land during the war period, and the additions were entered at cost, which, since the hearing occurred at the end of 1919, was below reproduction cost as of that date. There was therefore no evidence of any consideration whatever of present-day unit prices in the determination of value, and the decision was accordingly reversed by the Supreme Court.

In the Bluefield Water Works case the commission ignored reproduction at present-day prices, ignored testimony as to present fair value, fixed a value below its own revision of the company's reproduction costs on pre-war basis depreciated, below its own engineer's reproduction costs at 1915 prices depreciated, and only 1 per cent to 2 per cent above a depreciated cash investment.

Under these circumstances the Supreme Court held that there had been no recognition of present-day costs in the determination of the value, and therefore reversed the commission.

General Summary of Decisions

If we attempt to examine the various conclusions reached by state commissions and Federal courts it becomes evident at once that there is no uniform rule and apparently no tendency toward a uniform rule by which one may determine the weight to be attached to the various evidences of value. If we attempt to generalize for the country as a whole, the conclusions which we can reach are extremely limited. They are, perhaps, as follows:

(a) The fair value of Smyth vs. Ames is present value.

(b) Original cost is not controlling.

(c) Reproduction cost at current prices is not controlling.

(d) No one of the various set rules by which commissions have reached reproduction cost on the basis of unit prices averaged over a period of years (Class C), or have reached fair value by a split inventory method (Class H), or by a combination of pre-war costs appreciated and subsequent capital investment, has been approved by any court of last resort. It is true that decisions resting upon these theories have been approved, but the approval has been an approval of the decisions because the formula took into consideration all of the evidences of value, rather than an approval of the formula.

(e) The so-called "prudent investment" theory, the "reproduction cost of equivalent plant" theory, and the "reproduction cost of unit prices during the time the rate will probable be in force" theory, while mentioned approvingly by various commissions, have not been approved by the courts.

(f) A commission which adopts a basis of value which clearly and demonstrably shows that it has considered and given reasonable weight to all of the elements of value seems to run little danger of reversal by the courts.

If we forget for a moment the decisions of the various commissions and courts and attempt to approach this subject from a practical economic viewpoint, we find at once that there are two distinct methods of approach to this important question, and that utilities and municipalities alike have shifted from method to method as change in economic conditions made first one and then the other advantageous to their particular ends.

Comparison of Valuation Methods

The first method asks for a return on the investment. It is argued that one of the prime requisites for a successful public utility in a growing American community is a constant and adequate supply of new capital; that new capital must be secured either upon a speculative or upon an investment basis; that the development of the theory of regulation by state and Federal governments has destroyed any chance of a speculative reward, and that therefore the business must be put upon an investment basis or have its supply of new capital dried up. But if the business is to be put upon an investment basis, the investor must be assured that the dollar which he invests in the business will remain in the business subject only to the chance of loss by mismanagement or to loss by such change in the prosperity or in the life and habits of the community as will make it impossible for the business to earn a fair return upon this investment at any charge under which business is possible.

In other words, the investor must be assured that the dollar which he places in the business will not be scaled down because later it proves possible to replace the business or equipment for a less sum. If the investor is given this assurance, however, he must consent on his part that he will not claim any increase in the dollar invested because of a changing scale of construction costs.

There still remain, however, the speculative elements of premature obsolescence, change in population drift or decrease in the investor's return due to a general change in the purchasing power of the dollar. Theoretically, these speculative elements may be compensated by allowing an amortization of obsolescence and by adjusting the rate of return to the change in the purchasing power of the dollar. The fact, however, that the obsolescence may be too great to be amortized by any rate economically possible, and the difficulty of securing commission or court approval of a rate of return which would compensate for the change in the purchasing power of the dollar, still leave a large speculative element in the business, which it would seem impossible to remove by anything short of an absolute governmental guarantee.

The investment theory as commonly discussed is, however, vitally weak in that investment is always expressed in terms of mixed dollars. Dollars invested before the war have an entirely different meaning and weight from dollars spent in the past five years, but they are all thrown in together on the books. The business of every day life is done in terms of the money of today and when the amount of an investment is stated it should be stated in terms of the money of today. The statement of an unweighted mixture of different kinds of money has not true meaning.

The second method does not look to a return upon investment, but to a return upon property or a return upon value. Logically, of course, if a man is to look for return upon value, it must be the value which he now has, not the value which he had at some time in the past or the value which he is to have at some time in the future, and the adherents of this method face at once the prime difficulty in its application, the necessity of determining present value.

If we eliminate for the moment the consideration of the value of the going concern and limit our thought to the idea of plant value, and if we measure value as in ordinary commercial transactions by the price or amount of money at which there will be a relatively free movement of property between a group of buyers and a group of sellers in an open market, neither group being under the compulsion of economic necessity, certain basic facts at once become evident:

First—Present value is not necessarily represented by cost. It may be above cost if construction prices have increased or if drift of population or other phenomena of community development have given an enhanced value to the location of the plant; it may be below cost if construction prices have decreased, if a change in the art has reduced the relative efficiency of the plant, or if drift of population or other phenomena of community development have left the plant in a disadvantageous situation or have destroyed or lessened the demand for its service.

Second—Present value is not necessarily represented by reproduction cost at present prices or at prices averaged over any number of years. If construction costs are temporarily abnormally low the seller will withdraw the property temporarily from the market, or the buyer, convinced that he could not complete the construction during the period of low costs, will offer a sum in advance of reconstruction cost at current prices. If reconstruction costs are temporarily abnormally high the buyer will withdraw from the market unless the seller makes a concession in price in order to move the property. If population drift has left the plant in a disadvantageous situation, if a change in the public habit has lessened the demand for its service, or if the plant itself is in bad condition, the seller must make a concession below reproduction cost in order to move the property.

Third—But if the plant is reasonably adapted to its purpose or by extensions and additions can be made so without scrapping any appreciable portion of it as it now exists, if it is in

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good repair, if there is a reasonable market for its service, and if construction costs (including therein cost of land and cost of money) are reasonably stable, present value as defined above is equal to or closely approximates reconstruction cost at current prices.

Abstractly considered, the debate between the adherents of these two methods of approach to the problem of fair return might continue indefinitely, since much is to be said in favor of each of them, but when we come to consider the subject from the practical side a new element enters.

The state or the municipality claims the right to regulate the charges made by a utility and the natural tendency of such regulation is downward. The only limit to this downward regulation is to be found in an appeal to the sense of fairness and good business judgment of the legislative authorities or, when this is not successful, to the restraining hand of the courts.

The power of the courts to restrain a legislative body is found only in the fundamental law, the constitutions of the states or the nation. An examination of these documents reveals the fact that the only restraints on such legislation lie in prohibitions against taking private property for public use without due compensation, or in the prohibition against depriving any person of his property without due process of law, which is construed to mean without a determination and payment of an adequate recompense. It follows, therefore, that so long as the courts continue as at present to hold that the taking of the property for public use comes at the time of the establishment of the rate, rather than at the time the property is first devoted to the public service, the "return on investment theory," whatever may be its economic virtues, has no legal standing or foundation in state or Federal constitutions and that the utility which attempts to base its rights upon this theory will find itself deprived of its final protection against legislative aggression, particularly in view of the recent action of the United States Supreme Court.

Even if the courts should in the future adopt the basis of valuation described under the heading of investment or original cost theory, they could not adequately protect the utilities at times when the price levels may have changed to a point where the property could be duplicated for any material amount under the original cost, because the courts could not, in the absence of appropriate legislation, prohibit either private or municipal competition.

We recommend, therefore:

1. Our member companies, in approaching the question of valuation before a commission or other regulatory body or before a court, should submit full evidence at least as to original cost, present-day reproduction cost, present and probable future trend of unit costs, and direct testimony as to present-day fair value. They should endeavor to reach with the regulatory body a fair, equitable conclusion as to a reasonably stable level of unit costs and an equitable working figure as to such unit costs, if any, as may be admittedly still unstable.

2. In the case of properties in serviceable condition and adapted to their purpose, our member companies, in view of controlling court decisions, should take a firm stand for a present plant value approximately equal to reproduction cost at stable unit prices as above and for a fair return upon that value, to which there should of course be added going concern value and other non-physical elements.

We recognize the fact that this conclusion, if followed, may be said to introduce into the public utility business a speculative element, which we regret, and that it may call for revaluations from time to time, but we recognize the fact that no agreement, even though it be made between the utility and the regulatory body, would be binding upon the successors of the present personnel of the latter, and that under the existing condition of the law such an agreement would not be enforced by the courts in the event of a marked change in price levels. The utility which enters into such an agreement, therefore, merely bars itself from any advantage in the case of an increase of unit costs, without protecting itself against the disadvantage that follows from a decrease of unit costs. Whatever our ideas may be, therefore, as to the soundest economic theory, and the desirability of maintaining the securities of our companies in the investment rather than in the speculative class, the protection of the properties in our care compels us to follow the only theory by which we can retain judicial protection against political aggression.

Price Trends

The 1922 committee on valuation embodied in its report a recommendation "that a study be made of price trends and a method worked out by which they may be used in determining the fair value of the property useful and used by the company at the time of the inquiry." In undertaking to carry out this recommendation the present committee understands that the "trends" in question had reference to pre-war prices and their general upward movement during a period of about twenty years preceding the World War, and that the recommendation was prompted primarily by the method adopted in a number of appraisals made during the period of war disturbances of using, not prices current at the time of the inquiry or at the time of actual construction, but those which might have prevailed at the time of the inquiry if the war had not occurred and pre-war price trends had continued. In accordance with this understanding the "trend prices" discussed herein are the prices obtained by projecting the trend of pre-war prices through the war period to the present or some future date.

The object which engineers who have used trend prices have sought to attain was doubtless to arrive at a value higher than pre-war levels, which some authorities sought to retain, yet lower than would be obtained by using current prices which, until two years ago, were undergoing violent fluctuations and which were commonly rejected by regulatory commissions as abnormal. There has been comparatively little recent use of trend prices in valuation work, but in a 1922 rate case in which the company's appraisal embodied such prices the commission pointed out the difficulties of determining correct trends and the errors which would result from lack of suitable skill and judgment in their selection.

It is the opinion of the committee that it should not report upon this subject without giving careful consideration to price movements and their causes covering a considerable period of time, and that it may include in its report comments as to current price movements and opinions as to future tendencies, as well as such statements as to past trends as it believes may be helpful. The subject, therefore, logically divides itself into three parts: (1) Pre-war prices; (2) war period prices; (3) future prices.

Pre-War Prices

There are available to the committee several carefully prepared wholesale price indexes which conform more closely to the cost of public utility construction than do other general compilation of prices. The most commonly used of these indexes is probably that of the United States Bureau of Labor Statistics covering a continuous series of figures since 1890, embracing at the present time more than four hundred commodities, the prices of which are weighted in proportion to their quantity production. The series from 1913 to date was revised in 1922; the basis of weighting used was the production data contained in the 1919 Census of Manufactures in place of 1909 data previously used. More recently the bureau has revised the balance of the series back to 1890, using 1919 weighting data. The changes from earlier index numbers are quite small prior to 1916, and so the full revised series has been used in the following discussion.

For a fifty-year period prior to this series similar but less extensive and probably less accurate figures were compiled by a congressional committee and embodied in Senate Document No. 1394, commonly known as the "Aldrich Report." Similar indexes have been sytematically compiled in other countries for a somewhat longer period, going back in England to about 1800. Special studies of prices in England have also been carried back for over five centuries prior to regular price compilations. Viewed in perspective these early data are of little value in connection with the present inquiry. They show, as is to be expected, an upward tendency throughout the centuries, the causes of which are too remote for helpful present analysis.

Wholesale prices in the United States

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for the entire period of their compilation, excluding the World War and previous war peaks, have shown no marked upward tendency. Prices in England, with similar exclusions, have been closely consistent with those in the United States. It is only during the last thirty years that an extended, definite upward trend has prevailed. During the preceding fifteen years an equally pronounced downward trend occurred. The extent to which such trends are now significant depends upon their fundamental causes. The downward movement ending in 1896 was in part the result of an unprecedented expansion of industry, the introduction of labor-saving machinery and a wide extension of agricultural activity, with corresponingly increased transportation facilities. This period also saw the origin and development of electric public utility service, including electric light and power, electric railways and telephones. The twenty years ending with the outbreak of the World War lacked such pioneer development and expansion but, instead witnessed a marked development of labor organization, attended by curtailment of working hours and restriction of production which to a large extent offset the growth in per capita production normally resulting from increasing labor-saving appliances and contributed to an increase in price levels. If, as it appears, industrial conditions which prevailed during the past thirty years, and which will probably continue in the future to a considerable extent, are substantially different from those previously existing, the usefulness of extending price trend studies beyond this period into the past is doubtful.

Bureau of Labor Index Chosen

After a study of the various price indexes available for this period, the committee has selected, for the purpose of illustrating trends, the all-commodity wholesale data of the Bureau of Labor Statistics as most representative of general price conditions. An index of the Harvard Economic Service covering a much more restricted but more sensitive group of basic materials shows wider fluctuations but almost exactly the same trend. The Dun and Bradstreet indexes show slightly greater and less upward trends, respectively, as should be expected from the different commodities and methods of computation employed.

The committee presents herewith a chart reproducing the all-commodity index of the Bureau of Labor Statistics from 1890 to 1922, inclusive, plotted on semi-logarithmic paper so that on any part of the price curve a certain vertical distance or slope of line represents a uniform percentage or rate of increase. The year 1913, which has been the conventional base of 100 for such curves, is assumed to be the logical point through which a projected trend line should pass. As shown on the accompanying chart, the committee has drawn a trend line following closely the price curve from 1899 to 1913. The line has not been extended through earlier years because of the disturbing effect of business depression and other factors in the preceding years. The projection of this trend line to 1923 gives an index of about 120. An index of 125 is shown in 1926 and of 150 in 1936. The actual wholesale price level is now substantially above this latter point, with an upward tendency, and so, in the absence of recessions in the meantime, the trend index would not equal the actual index until at least fifteen years hence.

In the long run it is to be expected that commodities of various kinds will have prices bearing a reasonably constant relation to each other. This is necessarily the case because otherwise the producers of commodities commanding only a comparatively low price would in time transfer their activities to other more profitable fields. The commodities which are used by the Bureau of Labor Statistics in its index computations are divided into nine general classes. A study of these different class indexes during the period under review shows material departures from the all-commodity average particularly during the war period.

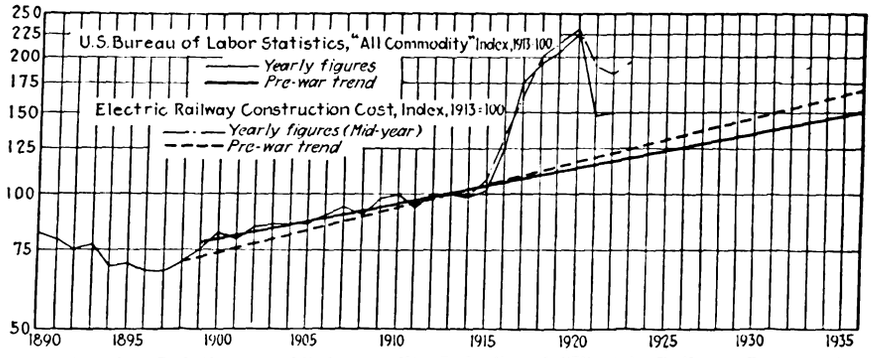

Chart Showing Relation of "All Commodity Index" and "Electric Railway Construction Index" as Compiled by Albert S. Richey

Electric Railway Material Costs

Having in mind that we are concerned primarily with the materials entering into electric railway construction, it is of interest to determine how closely the all-commodity index compares with the two classes of materials included in the Bureau of Labor Statistics series which are most closely associated with electric railway construction requirements. These two classes, building materials and metals and metal products, include about 13 per cent in value of all commodities produced in the United States. A study of the index data shows that during the past thirty years building material prices have followed very closely the all-commodity prices. Metals and metal products, the only other group extensively involved in electric railway construction, show less consistent movements, with an upward but irregular trend.

It is of interest to see how closely more specific indexes of electric railway material correspond with the price curve and trend line accompanying this report. Albert S. Richey, a member of this committee, has compiled an index of electric railway materials for a considerable number of years. For this index he has used fuel, lumber and metals, using the Bureau of Labor Statistics' figures for his combination. A comparison of Mr. Richey's curve from 1914 to date with the Bureau of Labor Statistics' all-commodity curve shows close agreement during the first four years, but materially lower prices for the following two and one-half years, and correspondingly higher levels thereafter. Mr. Richey's curve was not intended as an index to construction cost, having a more direct bearing upon operation and maintenance.

In 1922 Robert M. Feustel, a former member of this committee, completed an exhaustive study of price movements in connection with a valuation of a large railway system. This study included the computation of a series of valuation index numbers for the years from 1892 to 1921, inclusive, weighted in accordance with a recent inventory of the property. The trend of these index numbers shows a reasonable consistency with the all-commodity trend, being slightly less upward and reaching the 150 level at a later date. This particular trend study applies only to one large property, which in certain important respects differs from typical electric railway properties.

The committee has had opportunity to study price data compiled from extensive collections of appraisal and construction cost data made by organizations now represented on the committee, covering a very large proportion of the period under consideration. An analysis has been made of these data and the relation of prices prevailing in the different years determined through a careful weighting of all the various elements entering into public utility construction. In making these appraisals transient fluctuations in prices were commonly ignored, resulting in a curve of prices without the fluctuations shown in the all-commodity index. During the earlier part of the period studied electric railway materials or the labor employed in their assembly in railway properties were somewhat lower than the all-commodity average and a trend line constructed from the weighted indexes of such construction shows a sharper upward tendency than the all-commodity trend; in fact, it reaches 150 level several years earlier,

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as is shown by a broken line on the accompanying chart.

It should be pointed out that construction work such as buildings and other parts of electric railway properties requires labor of a different character from that employed in commodity fabrication, and subject to different wage movements. The wages of construction employees have increased more rapidly than those of factory workers and have recently continued at relatively higher levels. For this reason, the application of commodity indexes to construction work involving not only commodities but special labor may not yield reliable results, except after a considerable period of industrial stability.

It is obvious that if trend prices, based upon such different indexes as are herein considered, yield widely variable results when projected into the future, they cannot be used as the basis of accurate computations of property value. When it is further considered that objections may be raised to the limiting of trend studies to the specific period selected herein when the upward tendency has been unusually great, the limitations surrounding the usefulness of trend prices become apparent.

In determinations of property value in which neither historical prices nor those prevailing at the time of the inquiry are acceptable to the parties concerned, trend prices are sometimes used as the basis of a compromise. In cases where the expense of new appraisals is undesirable and appraisals of pre-war property at pre-war prices are available, this property might be valued at trend prices (about 25 per cent higher than pre-war prices), adding to such value the actual cost of subsequently acquired property, the total value thus obtained being somewhat below present cost of reproduction. The committee is of the opinion that such compromises have little scientific or economic justification, and it does not recommend any general use of such methods. The determination of fair value being a matter of sound judgment, the injection of evidence of value based upon complicated and uncertain factors is more apt to hinder than to aid the exercise of such judgment.

War Period Prices

While the violent fluctuations in prices since the beginning of the European war have no bearing upon the trend prices so far discussed, the movements in wholesale prices during the last two years are of interest in their bearing upon prices which may prevail in the future. It was more than a year after the beginning of the war when prices in the United States began to rise. There was a fairly steady increase up to the time the United States entered the war, then a slight recession incident to governmental price fixing, followed by another less uniform increase, continuing until May, 1920, when the maximum monthly level of 247 (Bureau of Labor Statistics, revised, 1913 = 100) was reached. From this peak a precipitate decline continued for one year. Since the middle of 1921 the marked downward movement has ceased, and for more than twelve months the tendency has again been definitely upward. The increase during 1922 was about 12 per cent.

The average of all wholesale prices now corresponds quite closely to the cost of living indexes compiled by the National Industrial Conference Board and others. Inconsistencies still exist between different classes of commodities, but, on the whole, the tendencies of the various groups and of single commodities have been toward the general average. This is particularly true of copper, so important in electrical industries, which, until a few months ago, was radically out of line with other public utility material, but has since moved toward consistency. On the other hand, other metals and building materials, already above the average, are moving further upward under the stimulus of construction activities. Such exceptions to the general trend will continue until demands originating from war-time restrictions are more fully satisfied than has so far been possible.

Electric railway construction costs followed the upward movement of all-commodity prices quite closely during the early part of the war period, but subsequent to the peak have not shown as great a decline, due to the continued high cost of construction materials and labor. A curve showing mid-year cost indexes is given on the chart already referred to.

Until the latter part of 1921 there was justification for designating the prices prevailing during the preceding five years as abnormal. Many people still believed that prices would go back to the pre-war so-called "normal" level, in spite of the active resistance of labor to wage reductions. The committee is not convinced that prices prevailing during and for some years prior to 1913 should now be considered normal any more than equally stable prices at quite different levels at other periods in our history, one of which we may now have entered.

Future Prices

The question as to whether or not future prices will continue on a level comparable with that prevailing during the past two years, or will gradually or abruptly fall toward the pre-war level, is one of great importance to public utilities, in their operating and construction programs and in rate proceedings. Valuations and rates are fixed by regulatory bodies for application to future periods of considerable length. If during such periods declines in operating and construction costs are to be expected, the regulatory commissions will probably take cognizance of such expectations in their decisions. If, on the other hand, prices for a considerable term of years are to remain at present or higher levels, more weight should be given to prevailing prices in valuation and rate determinations.

In spite of the vast amount of study which has been given to the causes of price movements, there is as yet no complete agreement as to what the fundamental causes are. The committee, within the limitations of this report, cannot enter into an extended consideration of this subject, but it appears desirable to discuss certain factors which are clearly pertinent and through which some approximate conclusions may be reached regarding future price movements.

The normal basis of money, in which prices are expressed, is gold. The gold standard has prevailed in the United States except for limited periods during and following the War of 1812 and the Civil War. It was also in effect in most other important nations prior to the World War, but has since been generally abandoned by the European participants in that war. It is commonly recognized that prices move up and down with the existing stock of monetary gold. Increases in prices have followed all such important discoveries of gold as the California, Klondike and Transvaal fields.

Money itself, however, plays only a minor part in commercial transactions. The bulk of our business is carried on through bank credits which do not necessarily bear a direct ratio to the money in circulation although based upon it. A large part of our monetary gold is not in actual circulation but is held in reserve to support issues of federal reserve notes, which, although limited by the reserve, are not otherwise directly related to it. Nearly one-half of our money now in circulation consists of these notes, and their amount is subject to wide variations at the discretion of the Federal Reserve authorities.

Prices are also affected by the speed with which operations involving the use of money or credit are carried on and by the efficiency with which commodities are produced and marketed. An increase in money turn-over has the same tendency to increase prices as an increase in quantity of money; on the other hand, an increase in efficiency of production tends to reduce prices. There are other factors, involved to some extent in those already stated, which will have at least temporary effects upon price levels in this country. They include our restrictive immigration policy, artificial wage levels maintained through labor organizations, foreign trade balances, high taxes and dwindling natural resources.

All these factors and others of less significance are constantly working to influence price levels. With respect to those tending to maintain high prices, it should be noted that our present stock of monetary gold is nearly double the 1913 amount and is still increasing, although at a steadily diminishing rate. Our European war allies owe us in gold more than the entire monetary supply of the world. In the absence of wholesale inter-allied debt cancellation and the development of unprecedented European trade balances, it is difficult to see how the United States can dispose of any large part of its

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gold. Bank credits may be expected to expand with steadily improving bank facilities, the turn-over of money may also increase and the issue of Federal Reserve notes may be enlarged—all to the extent that existing industrial activity may at any time require. The present insistent demands for higher wages, from existing levels well in excess of living cost indexes; renewed agitation for shorter hours and improved working conditions, and shortages of farm and industrial labor, with little relief in prospect through immigration, all work strongly against price recessions.

The possibilities of price reductions lie primarily in an increase in productivity through labor-saving machinery, more efficient and willing labor, more working hours and immigration. Wage reductions, desirable within certain limits in the interests of both workers and consumers, are not to be expected on any large scale. More extensive and efficient use of natural resources, such as water powers, is still possible and probable to a helpful extent. It may be possible to reduce our stock of gold or its effects through debt cancellation, increased imports, or by withholding note circulation based upon superfluous stock. The effect of these various factors tending to reduce prices, even in favorable combination, can hardly be expected for the present or in the near future to outweigh the opposing factors, particularly in the construction field where skilled labor is essential.

Present Prices Will Continue

It is, therefore, the opinion of the committee that price levels applicable to electric railway properties as a whole at least equal to those now prevailing will continue for a considerable number of years, after which some recessions may be expected, but not to pre-war levels or any close approach thereto.

It would not be unreasonable to expect that within ten or fifteen years the electric railway price level will approach the projected trend price as shown on the accompanying chart. The committee is of the opinion that more definite predictions are not warranted from the available data.

The committee is not unmindful of the price recessions which have occurred after the close of previous wars in this and other countries. Our Civil War is frequently cited to substantiate a claim that prices will gradually return to pre-war levels. A study of financial history shows that the Civil War price increases were largely due to the issue of greenbacks which were not redeemable in gold until 1879 (fourteen years after the close of the war), at which time prices returned to about the 1860 level. Prices based on gold showed comparatively little fluctuation during the Civil War. Similar reasons, or others showing no greater bearing of past war prices upon the present situation, could be given if further substantiation of present predictions were necessary.

The views with respect to future prices stated herein are shared by all qualified authorities known to the committee, at least to the extent of holding that substantial price recessions are not to be expected before 1930, and that pre-war prices are a closed book.

With the passing of years a steadily increasing proportion of the investment in electric railway property and renewals thereof will have been made on the present plateau of prices, and actual investment will approach more and more nearly the value found through appraisals based on the cost of reproduction at existing prices. The expectation of this future restoration of the consistency between investment and cost of reproduction which existed during the pre-war period of regulation, when the latter basis of value gave results which were generally acceptable, is a further justification for the conclusion stated elsewhere in this report that cost of reproduction based upon stabilized present prices is the most important basis of fair value which courts and commissions alike can use consistently and with justice to all interested parties.

The report was signed by E. G. Bechtel, H. A. Clarke, W. Findlay Downs, J. A. Emery, C. W. Gillespie, F. C. Hamilton, J. B. Klumpp, W. H. Maltbie, L. R. Nash, A. T. Perkins, A. S. Richey, W. H. Sawyer, Frank Silliman, W. B. Tuttle, E. D. Uhlendorf and James P. Barnes, chairman.

New England Club Opens Season with Worth-While Program

Some New Thoughts Brought Out on Light-Weight Cars, Standardization of Air-Brake Equipment, Automatic Substations, Track Construction, and Public Relations—Two Hundred Attend Evening Dinner at Boston

SOME very worth-while talks on practical subjects and an enthusiastic gathering marked the first of the season's meetings for the New England Street Railway Club at Boston on Oct. 25. It was presided over, both afternoon and evening, by the president, Ralph Hood, and there were about 200 present at the evening dinner.

J. C. Thirlwall, General Electric Company, discussed lightweight city and interurban cars and the results obtained. He recalled how some engineers had thought the original safety cars were too light, but he said actual experience has not borne out this fear. The present maintenance cost on the Birney safety cars installed five years ago in Fort Worth, Tex., the original installation, is less than 2 cents per car-mile. The average for all safety cars used in Texas is running about 1.75 cents per car-mile, as against 3.5 cents per car-mile for the older and heavier type cars on the same properties.

Speaking of the installation of light-weight one-man cars in interurban service in the Middle West, Mr. Thirlwall said that for the cars of the Cincinnati, Lawrenceburg & Aurora Railway, which have now been in operation five years and are operating 96,000 miles a year, the maintenance cost for the first six months of 1923 was 1.46 cents per car-mile, and that it has averaged 1.48 cents per car-mile for the five-year period. These cars have netted a total saving of $220,000 in five and a half years on an investment of $100,000, of which $60,000 was almost immediately returned through sale of the old cars and taking down of copper.

The first year of operation of the light-weight one-man cars of the Kentucky Traction & Terminal Company, Lexington, Ky., showed 38 per cent increase in car mileage, 30.5 per cent increase in passengers, 12.7 per cent increase in passenger revenue, a reduction of 37 per cent in expenses, a reduction in the power demand of 350 kw., and an increase in net income of 102 per cent.

The 32,000-lb. cars of the Western Ohio Railway, equipped with 35-hp. motors to maintain the same schedule speed as the heavier cars which they replaced, showed a maintenance cost for the first five months of 1923 of $2,893, compared with a maintenance cost for the old equipment of $5,070 for the first five months of 1922, and a corresponding reduction in power cost from $24,261 for the first five months of 1922, to $15,765 in 1923. These two items alone indicate a saving of more than $10,500 in five months.

He mentioned the cars soon to be delivered to the Indiana, Columbus & Eastern Traction Company, which represent a further development of the light-weight car idea. They will weigh 50,800 lb., seat fifty-six, and are equipped with four 60-hp. tap field motors geared for 55 m.p.h., which they will actually make. The cars which they displace weigh 86,000 lb. and while geared for 60 m.p.h., actually make only 54 m.p.h. on account of the voltage drop which will not prevail with the new cars because of their smaller energy consumption.

From these examples, Mr. Thirlwall commented that it is evident that very material weight reduction can be accomplished in practically all types of cars.

Standardization of Air Brakes for Light Cars Urged

E. W. Davis, Westinghouse Traction Brake Company, talked on the subject of brakes and safety devices as applied to light-weight cars. He spoke

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of the advantages which had accrued from the approach to standardization with the Birney safety cars, which enabled the air-brake manufacturers to furnish equipment from stock—a thing which has never been possible with any other electric cars. He said that the standardization of brake equipment had gone very much farther in the steam railroad field than in the electric. For example, one type of triple valve for passenger cars, another type for freight cars, and a third type for locomotives, have almost universal use. By contrast, a great number of different types are required for the electric railway field.

Mr. Davis then discussed briefly the variable load brake which has been found desirable for the light-weight cars where the live load may be a considerable per cent of the total load. The first application of these brakes has been made on double-truck cars, but Mr. Davis said that it was his hope that such brakes might soon be available for use on single-truck safety cars. He said this type of brake ought to be installed on all new cars of the lighter type purchased henceforth, and it might even be worth while to consider putting them on some of the older cars now in service.

In discussing the various types of braking and safety equipment, including door control, Mr. Davis pointed out that it is possible to meet practically any condition the railway may set up, but he urged that if the railway wants the best service from all of the manufacturing organizations, it will be more likely to get it by using something that they are making regularly in large quantities.

To give an idea of the lack of uniformity in equipment used in the electric railway field, Mr. Davis said that he had in mind ten or twelve different companies which had bought cars within the last year, all of which might be classed as light-weight double-truck cars largely for one-man operation, and there were no two cases in which the door operation was the same. In two cases the Brake Company even had to build special brake equipment, and in several other cases it built other parts of equipment which will probably have no application on other properties. Nearly all modern manufacture is conducted by large organizations, and while they can provide some flexibility in their operations, so many special developments are bound to be costly to the consumers.

Charles F. Johnson, of the J. G. Brill Company, spoke briefly on the various types of car bodies applied to light-weight cars.

Field of Automatic Substation Expanding

C. A. Butcher, Westinghouse Electric & Manufacturing Company, discussed the application of automatic substations and said that there are now in operation or on order some 500. He said that the Cleveland Railway is at present contemplating an expansion of its present automatic substation installation to include ultimately thirty automatic substations. There will be a supervisory control, by which it will be possible to open and close any feeder, start or stop any machine, transfer the load from one high-tension line to another at any station, and obtain a continuous graphic curve of the load at each station—all of which is done by means of a two-wire line to each substation, which can also be used as a telephone line.

In Baltimore, four automatic substations are shortly to be installed. An interesting development here is that not only does the location of substations at the load centers reduce materially the cable losses, but it is possible to regulate so as to provide that voltage which will be most economical for the traffic conditions prevailing in the district. By means of various taps on the transformers, the d.c. voltage may be varied from 500 to 600. It was impossible to calculate what the most economical voltage would be, and therefore various taps were provided and they will be tested out over a period of operation to find the most economical voltage for the particular traffic conditions in each district.

Mr. Butcher said that the advent of supervisory control has greatly expanded the field of automatic substations and automatic control of generating stations. He said it was possible now to picture in the future one man sitting in an office building who would have absolute control over the entire generation and utilization of energy in a community.

Referring to Mr. Butcher's comment on the advantage of being able to locate an automatic substation just where it was needed, J. C. Thirlwall said that this was sometimes very difficult on account of the objections to a substation in residential sections. He told how the Los Angeles Railway had overcome this difficulty and had built three automatic substations in high class residential districts and had succeeded in making them absolutely noiseless. He said you could put your ear against the door and could not tell whether the machine was running or not. It cost about $10,000 extra to accomplish this noiseless feature and to give the station a decorative appearance, but the interest on this added investment is earned in the first two months of each year as a result of savings from having the station where it is actually needed.

R. B. Fehr, Rail Welding & Bonding Company, Cleveland, gave a very interesting blackboard discussion of the technique of seam welding of rail joints. The possibilities for making these joints more efficient were outlined as: (1) Careful preparation of the joint at the rail ends and tight bolting to secure good alignment and some initial compression; (2) improved method of welding, including the hand feed method of applying the metal; (3) increasing the section modulus of the joint; (4) applying a thick seam; (5) interrupting the base seam for a distance of 6 in. at the center.

Railway Men Talk Operating Matters at Dinner

While all of the talks at the afternoon meeting were supplied by manufacturers' engineers, railway men occupied the platform entirely after dinner. Edward Dana, general manager Boston Elevated Railway, reported briefly on some aspects of the Atlantic City convention. He paid a tribute to former president C. D. Emmons, saying that a large measure of the success of the convention was attributable to his leadership. He thought it was a healthy sign, not a bad one, that the bus occupied 24 per cent of the exhibit space at the railway convention. He thought the convention marked the full realization that bus and street car will go together in future transportation. He proposed, and the convention voted, a resolution congratulating Britton I. Budd on the success of the Chicago, North Shore & Milwaukee Railroad in being awarded the Charles A. Coffin prize for 1923.

H. M. Steward, superintendent of maintenance Boston Elevated Railway, addressed the meeting on the subject of new track appliances and practice. He spoke of the new tie exhibited at the convention by the International Steel Tie Company, especially adapted for rebuilding concrete track, the tie being so shallow as to permit leaving in the old construction. He also spoke of the Sandsberg sorbitic process of treating rail, which it is claimed will make the rail last from four to six times as long as untreated rail. The Boston Elevated Railway is trying out some of this. He also spoke of the Barbey frictionless rail, consisting of a narrow head rail for use on the inside of curves. Some of this is being used on the Boston Elevated, and it appears to reduce noise and corrugation and give longer life.

Mr. Steward emphasized the great importance of using machines in track construction work to eliminate hand labor as far as possible. He said that this practice had made it possible to build track now at practically no greater cost per mile than twenty years ago. He outlined the practice of the Boston Elevated as follows:

Track construction is done with gangs of not over fifty men. A portable track is put in where possible, so that one track can be completely tied up. If it is necessary to use cross-overs, however, signals are installed to keep delays to traffic to a minimum.

A pavement plow is used to tear up the old pavement, but the blocks are still picked up by hand. The rails are cut up into convenient lengths by means of an acetylene torch. A crane car tears up the track bodily and lays it out to one side. Electric shovels do the excavating, and the newer ones, equipped with caterpillar tractors, are particularly effective. They excavate the material and dump it directly into motor trucks. A steam roller is used

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to roll the trench. The new track is assembled in the trench, the ballast distributed, the track aligned and then tamped with pneumatic tampers. Concrete mixers running on the rails are used, and each is accompanied by a loader. The use of loaders cuts the crew down to a minimum, and the scheme followed is to have one batch in the hopper, one in the mixer, and one in the loader simultaneously. The paving is then applied. Of course, welding machines, grinders and miscellaneous tools are used at the proper points in the course of construction.

Mr. Steward said it was only possible to do twelve to fifteen construction jobs in a season, and even this necessitated very quick movement of equipment from one job to another.

Each day the construction foreman on a job orders by 4 o'clock the material and machinery he will need the next day. One man is in the office and does nothing but see to it that his needs are supplied, when needed.

Speaking of rail joints, Mr. Steward mentioned the work of the committee on welded rail joints and said that he was convinced in his own mind that the seam-welded joints will be one of two types used on any property. The seam weld will be used very generally, but one of the other types will be used for special locations.

A Few Remarks on Safety

Fred A. Cummings, Eastern Massachusetts Street Railway, gave a very lively talk on safety and public relations, saying that he was going to talk from the point of view of "the man who is too poor to own an automobile and is obliged to ride on the street car." He said that the best way for a company to pursue the work of safety is to keep everlastingly at the small details of maintaining the cars and plant in perfect condition, and then bring it right home to the men just what it costs for accidents.

Mr. Cummings stated that nearly every railway assumes a niggardly attitude toward the claims department, but that there is no department which needs the inspiration and deserves the attention of the general manager so much. There is too much of the attitude of wanting to settle every claim, regardless of its merit, and not enough of fighting claims out in court, Mr. Cummings contended.

Referring to the proposed bill to come before the Massachusetts Legislature abolishing one-man operation of cars, he said that the various Massachusetts street railways have operated 55,845,819 miles of one-man operation, and that the accident record has been considerably improved, as compared with two-man operation. He said that this was largely due to the greater responsibility felt and discharged by the individual operator. This was attested by the argument he heard an operator make at a carbarn. The operator said, "This chariot is mine. Nobody gets on or off unless I know it. I'm the guy."

The Electric Railways Have Come Back*

Operating Revenue Greater than Five Years Ago—Net Income Two and a Half Times as Great—Buses Have Failed When Required to Give All Local Transportation

By James W. Welsh
Secretary American Electric Railway Association

It is a most encouraging sign that an invitation from the Investment Bankers' Association is extended to a representative of the electric railway industry to present a brief review of its status. It has not been long since the mere mention of electric railways in the presence of a banker produced a decided chill in the atmosphere. This disposition probably still exists to some extent, but there also seems to have come a feeling of curiosity as to just what is coming next. Apparently everything that could happen to dampen the enthusiasm of the investor in electric railways has already happened, but the cars still keep running.

They are running in New Jersey after an interruption of 50 days, although for a while the issue looked doubtful, but the damage to business and the inconvenience suffered by the public as a result of the stopping of service proved beyond all doubt the essentiality of street railway service. The authorities insisted upon their return, and the people were glad to get them back. They have been voted back overwhelmingly by three to one in Saginaw, Michigan, where service was suspended for two years while the people were misled with make-shift buses and would-be financial plans all of which failed dismally; they are running in Bridgeport, Conn., where service was suspended for 56 days in 1920; and in Toledo, Ohio, where an interruption of 27 days occurred in 1919, while an effort was made to dispense with their service. They are even running in New York City, where hopes of some have been high that, here, of all places, the great bus adventure might be tried.

From all this the conviction is growing that after all the electric railways are essential in providing transportation service. Everyone likes to have an advance tip, and it is rumored that investment bankers are not above this excusable trait of human nature—The tip is this: *The electric railways have come back!*

As you may be "from Missouri," I will ask you to bear with me through some statistics.

Census Figures Show Growth of 2.5 per Cent a Year

The U. S. Bureau of the Census is just completing its regular five-year census of the electric railway industry. So far the complete financial figures for the country are not available but the traffic figures are: In 1922 out of more than 15 billion passengers including transfers over 12½ billion pay passengers were carried by the electric railway companies in the United States, an increase of one and a quarter billion, or 12 per cent over the previous census of 1917. This is an increase of approximately 2.5 per cent per year while population has increased less than one per cent. Putting this on a unit basis to get the "riding habit," we find there were 117 revenue passengers carried per inhabitant the country over in 1922 as compared with 109 in 1917 and 100 in 1912. These figures definitely put aside the fear that taking the country as a whole, competition from the motor vehicle, either in the form of the common carrier bus and jitney, or the private automobile, is at the expense of the electric railways.

So much for the question of traffic. Now let us consider the matter of fares, for upon these two factors, fares and traffic, hang the revenues of the electric railway. In 1917 the average fare per passenger was 5.1 cents, today it is 7.3 cents and in 1921 it reached 7.5 cents. A trolley ride and a fixed fare no longer are synonomous and the public has come to realize that fares vary in accordance with the cost of service in different cities throughout the country.

Operating revenues of electric railway companies according to Association estimates have increased 47 per cent over 1917 and now are close to a billion dollars annually. The operating ratio which rose from 65 per cent in 1917 to 80 per cent in 1920 for a group of 225 companies fell to 73 per cent in 1922. The net income is approximately 2.5 times the 1917 figures.

The abandonment of electric railway trackage in certain parts of the country has been cited as evidence of the decadence of this mode of transportation and its replacement by another. The government census figures show a track mileage of 43,934 in 1922 as against 44,808 in 1917 or a net loss of 874 amounting to 2 per cent. It is not to be understood, however, that no new extensions have been made. Detail figures on file with our association show that new track developments to the amount of 1,450 miles have been made during the five years while abandonments aggregating 3,320 miles have occurred, the net loss being as above.

One reason for this was that the country was approaching the "saturation point" with respect to electric railways. Practically every community that offered the slightest possibility of successful operation had an electric railway system. And many that did not offer any possibility nevertheless had them anyway, financed usually by real estate speculators who expected to get their money back through increased

*Abstract of address at annual convention of Investment Bankers' Association of America, Washington, D. C., Oct. 29-31, 1923.

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land values rather than from the successful operation of the railway, though as to this they were not without hope. Another reason for the decline in construction was the rise in prices of all materials with the opening of the world war. This abandoned trackage represents construction in unprofitable districts where the traffic could not bear the cost of service. Every industry constantly experiences such changes and the sooner it recognizes it, the healthier it is for it.

In many of these places electric railways have installed a bus service rather than have the district without transportation service. A total of about 2,000 miles of bus route is now being operated by railway companies.

Coming to the question of car equipment, our records show that a total of over 13,000 new street cars have been purchased and put in service during this period out of 80,000 in regular operation. These include both replacements and additions to service but they always make friends for the railway. In 1921 there was expended $150,000,000 for improvements and betterments and for the current year it is estimated $250,000,000 in new capital is needed. All of the above facts establish the electric railway as a necessary business with increasing traffic, increasing revenues and increasing facilities.

Nothing to Fear from Bus

Those who fear that the motor bus will replace the electric railway might do well to consider the economic and legal principles involved. It has been definitely proved wherever a complete transportation system serving a whole community has been tried by motor bus that the cost is greater than by electric railway, except in instances where the service is infrequent and the density of traffic light.

Examples of profitable operation of the bus at lower fares are frequently quoted as evidences of its ability to undersell the trolley. The fallacy of this contention lies in comparing a rate of fare on one bus route or a group of favorable routes with that of a whole trolley system serving all parts of the community. It may not be generally understood that the earning capacity of various routes in a community vary through the widest possible range and that where a transportation company provides a universal service many long-haul and poorly patronized routes are carried at the expense of the short riders in the densely populated districts all for the great good of the greatest number.

The principle of co-ordinating all agencies of transportation serving the needs of each community rather than to permit a ruinous and destructive competition to develop has been promulgated by the American Electric Railway Association and is generally recognized as sound economic doctrine and in accordance with the principles of public utility regulation and control.

There is, however, one thing to which I wish to direct your attention as investment bankers. This is the type of prospectus frequently circulated for the purpose of attracting investors to this field. I might cite the results of a careful analysis I recently had made of one of these prospectuses. The figures showed that with a small payment down a bus could be paid for out of earnings in 18 months. The life of a bus was estimated at four years and, during the last two and one-half years, a reserve was set up to replace the vehicle. The plan was cleverly conceived and is exceptionally plausible, except that the earnings of the bus are tremendously exaggerated.

This prospectus states that the average daily earning power of a 26-passenger bus is conservatively estimated at $75. I have good reasons to doubt this. Figures compiled by us, from the operating records of 12 electric railways using buses as adjuncts to their rail cars, show that the average daily gross earnings are approximately $29. It may be said, and with some reasonableness, that these operations do not truly reflect the true earning capacity of a bus, as these buses are used in some cases in the less remunerative territories. However, an investigation of the earnings per bus of some of the most successful independent bus companies in the country, confirms our beliefs that the earnings given in the prospectus are entirely misleading.

For example, the average daily earnings per bus on the Fifth Avenue Coach Company's lines in 1922 were approximately $52. It should be noted that these vehicles are of the double-deck type having almost twice the capacity of those referred to in the prospectus and furthermore a 10-cent fare is charged. Also, the traffic density and other operating features combine to assure to the Fifth Avenue Coach Company a maximum earning power for its buses.

In this connection. it might be pointed out that the operating statement of the Fifth Avenue Coach Company indicated that it would be impossible for it to operate on a 5-cent fare, as the operating cost per passenger exclusive of investment charges and taxes for the year ending June 30, 1922 was approximately 7 cents.

Obviously, the whole argument set up in the prospectus referred to, falls like a house of cards when proper figures are substituted in the operating statement presented.

Buses Regulated in Most States

Let us next consider the attitude of the regulating commissions with respect to responsibility for furnishing transportation services.

Twenty-five states and the District of Columbia have enacted legislation requiring motor vehicle common carriers to obtain a certificate of public convenience and necessity from the state commission as a prerequisite to the establishment of any kind of service.

A distinct trend from a policy of encouraging motor bus lines wherever possible to one of affording adequate protection to existing carriers can be traced in the decisions of eleven commissions on petitions for certificates.

In only two states, Illinois and Nebraska, where the commission has authority to grant certificates of public convenience and necessity, have they shown a tendency to encourage development of bus lines at the expense of the railways, and in the state of Illinois at least the courts have stepped in and reversed the decision of the commission.

In many states the commissions have as complete jurisdiction over bus operations as they have over other public utilities, including electric railways. For instance in nineteen states the commission has authority to investigate and fix the rates of fare charged by bus lines; in fourteen states it prescribes routes and in sixteen states it prescribes schedules for bus lines. Seventeen of the state commissions have issued general orders promulgating rules and regulations for the operation of buses. Thirty-six states have imposed a gasoline tax. There are, in fact, only six states in the union which have taken no official action whatever with regard to the buses.

Other Favorable Conditions

Another fear that at times impairs the credit of the industry is the threat of political oppression. Probably the most effective weapon against the antagonist is the building up of good public relations. Telling the industry's story to the public, however, has become a national watch-word. This is not a spasmodic campaign but is a continuing activity in keeping the public advised of its responsibility in maintaining its transportation service. Coupled with this has been the introduction of all known means of economical operation. This included one-man cars and for the industry there are now 10.000 in operation as compared with less than 1,000 in 1917. Organized safety methods are resulting in a material reduction in the cost of accidents, which for the industry have fallen from 3.24 per cent of gross receipts in 1917 to 2.68 per cent in 1922.

The use of automatic and remotely controlled sub-station equipment as a factor in reducing power costs has received wide application. This together with the use of power saving devices and a more intelligent use of electricity are resulting in material reduction in the total cost of power. The use of electric and metal composition welding processes has effected material savings in the maintenance and repair departments.

Improved relations with labor have been effected in many places with a corresponding increase in efficiency and elimination of loss through strikes. These are but a few of the economies typical of what wide-awake and progressive companies are doing and which are winning for them success beyond their fondest hopes.

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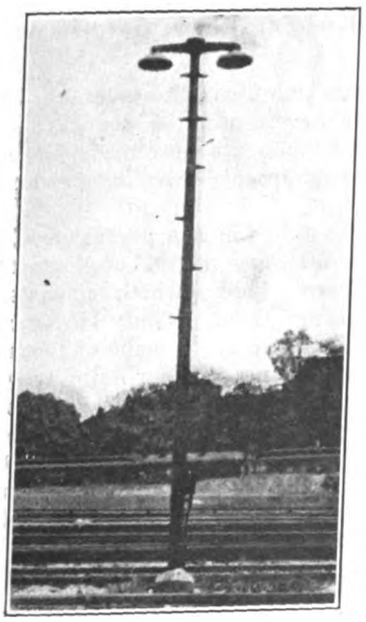
Maintenance of Equipment

Old Trolley Poles for Yard Lighting

THE accompanying illustration shows a trolley pole used to support lights in one of the yards of the New York Rapid Transit Corporation. A few years ago, when building its new subway and elevated lines in Brooklyn, this company constructed elevated structures on several streets which had previously been occupied by surface lines. As the trolley poles of the surface companies could not be used to support the overhead work after the elevated structures had been built, they were taken down and were given to the Rapid Transit Corporation in return for the right to attach the wires of the surface lines to the new elevated structures.



By Adding Steps and Bracket, Old Steel Pole Is Utilized for Supporting Lights

This arrangement gave the Rapid Transit Corporation several hundred trolley poles for which it had no use. While some of these poles could be sold, there were still many left on the hands of the new company and the price received for them was not great. Therefore, when it was desired to light the yards where the subway and elevated cars are stored, a number of these poles were set to support the lighting fixtures and were provided with steps for the cleaning and renewal of the incandescent lamps which were installed, under suitable reflectors, on them. A casting was fitted to the top of the pole to act as a bracket and the whole made a very neat and strong layout at a cost that would not equal that of new pipe of much smaller section if it had had to be purchased especially for this purpose.

Cleaning Motor Parts with an Alkali Bath

By O. A. Norene
Assistant Master Mechanic Omaha & Council Bluffs Street Railway

AN INEXPENSIVE way of thoroughly cleaning armature housings, armature and axle boxings, field coil flanges, spring pads, etc., is to immerse them in a solution of steam-heated industrial alkali cleaner. After remaining in this solution for from one and one-half to two hours the parts are removed and washed with a hose. Field flanges and spring pads, after being passed through the alkali bath, are dipped in insulating varnish and baked.

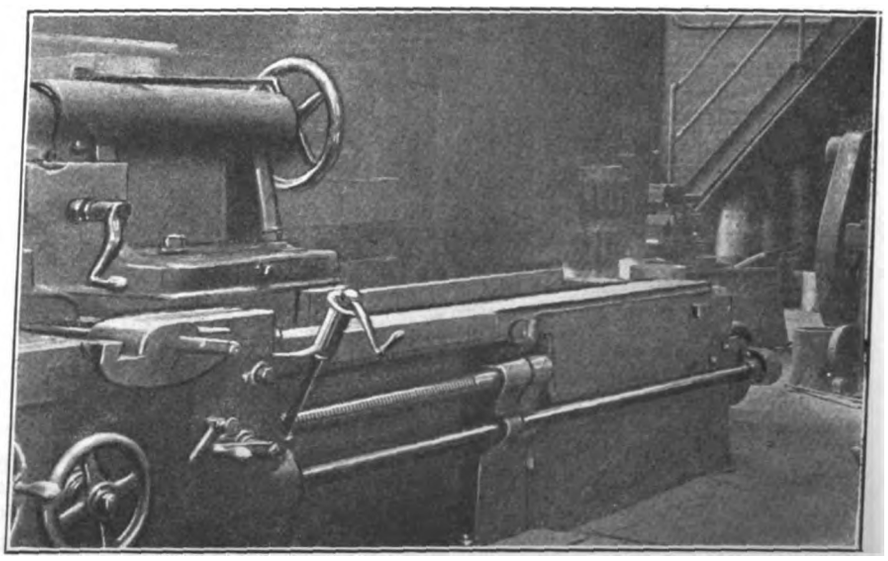
As we are not at the present time equipped in Omaha with large tanks and equipment for handling the heavier parts of motor frames, they are cleaned by compresed air, which removes the loose particles, and the balance is removed with a revolving steel brush operated by the use of a small air grinder motor. This does a much better and cleaner job than the use of gasoline and brush.

Lathe Bed Lengthened on Concrete Support

REQUIRING a few feet extra of bed length on a 36-in. lathe in the machine shop section of the Norfolk & Western repair shops at Bluestone Junction, W. Va., the foreman in charge adopted the unusual expedient shown in the accompanying illustration. Two steel plates, 1¾ in. thick, of the desired length, and of a width corresponding to that of the rails of the lathe bed, were bolted to substantial brackets mounted on the end of the lathe bed. A concrete block was then cast under the extension of the lathe bed, holding the rails firmly in place by means of countersunk anchor bolts in the concrete.

The motor controller, previously removed from the end of the lathe, was mounted on the outer end of the concrete block, the operating rod connecting it with the lathe carriage being lengthened accordingly.

This construction is called into service only occasionally, but it is substantial and serves its purpose.



The Norfolk & Western Railway Found This an Economical Method for Lengthening a Lathe Bed in the Bluestone Junction Shops

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New Equipment Available

Small Size Air Motor Hoist

A NEW air motor hoist of small and compact construction is being marketed by the Ingersoll-Rand Company, New York, N. Y. The outstanding characteristics of the new size A hoist are compactness of design, resulting in low headroom and relatively light weight; an automatic brake, which holds the load under all circumstances, even if the air supply be

Air Motor Hoist

disconnected or fail, and a graduated throttle which permits a very close regulation of both the lifting and the lowering speeds.

A balanced three-cylinder air motor is used which operates in either direction and without vibration at any speed or load within the rated capacity of the machine. The throttle graduation on this new hoist is very fine and insures instant and complete control of the hoist at any speed. A safety stop lever is provided which closes the throttle and stops the motor whenever the load is by chance raised to the top of the hoist lift.

The automatic brake is a new feature as it holds the load at any desired position for any length of time regardless of air pressure. The brake consists of a disk attached to the motor shaft and of a brake plunger with a friction face, which is held in contact with the disk by springs whenever the hoist is not operating, i.e., whenever the air supply to the motor is cut off either by throttling or otherwise. It is entirely automatic in its action and requires no attention from the operator.

The motor and gears are both inclosed. The motor operates in a bath of oil and the gears turn in a heavy grease. Oil passages lead to all bearings. Ball bearings or bronze bushings are provided at all points where experience has indicated that they will add to the efficiency or life of the hoist. If the hoist be overloaded, it is only necessary to remove the overload, after which the hoist will start up and work again.

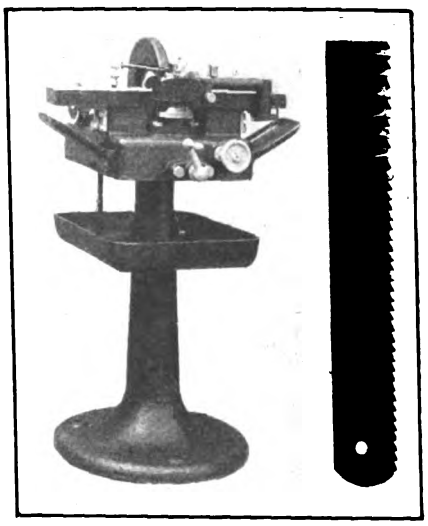
A roller bearing monorail trolley can be provided in place of the top hook if desired. The trolley mounting reduces the headroom necessary for installing and because of its rigidity enables an operator to start a loaded hoist along a runway without difficulty.

Development in Hack Saw Blades and Metal Cutting Machines

THREE new improvements in equipment for sawing metal have been placed on the market by Edward G. Herbert, Ltd., Manchester, England. These include a special hacksaw blade, a saw sharpening machine and a metal sawing machine. All are being marketed under the trade name of "Rapidor."

The saw blades are made of high speed steel containing 18 per cent tungsten, and are hardened in a special way to make them tough and durable. A special feature of the blade is a patent set, which extends beyond the root of the tooth. Blades can be sharpened until the original teeth have been entirely ground away and can be sharpened in any suitable grinding machine, but the manufacturers recommend using the new type "Rapidor" machine.

In a test made of this new hacksaw blade a 4-in. diameter mild steel bar was sawed in a machine making 170 strokes per minute. The quickest cut was made in four and three-quarter minutes and the longest cut

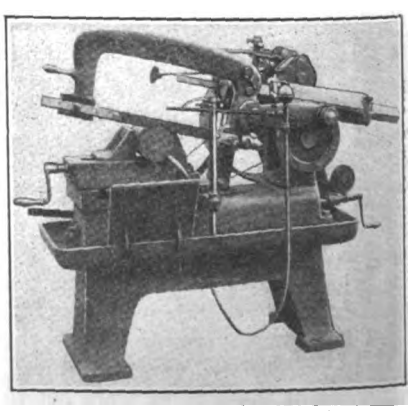


Left—Machine for Sharpening Hacksaw Blades. Right—New Type Hacksaw Blade

in ten minutes, the average time being seven minutes per cut. A total of 367 cuts were made, the saw being sharpened nine times during the test.

The Rapidor sharpening machine provides a new method of sharpening hacksaw blades, which consists of grinding them exactly to models having the correct shape of teeth for quick cutting. The grinding wheel is stationary and the blade moves toward the wheel in contact with the model. Teeth are ground on both faces and the machine will sharpen any size or make of hacksaw blade.

The third development is in a new type of sawing machine. These are made in two sizes, one with a capacity of 6-in. rounds or squares and the other having a capacity up to 10 in. rounds and other sections to 12 in. x 18 in. The saw holders have an indicator to show when the blade is strained sufficiently. This prevents breakage of blades through incorrect tension. A dashpot is fitted with a device which enables a start to be made on a sharp corner or square bar without danger of breaking the teeth of the saw.



High Speed Sawing Machine

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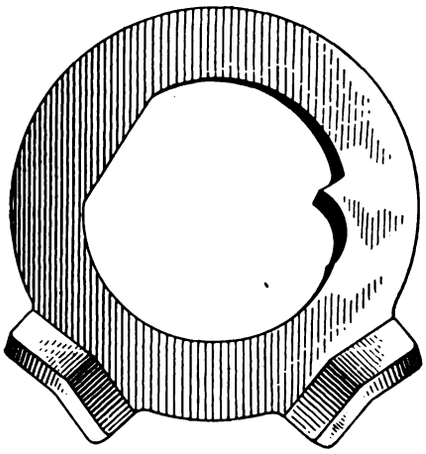
Safety Nut Lock for Rail Joints

A NEW type of nut lock which has been given the name of "Bull Dog" has been placed on the electric railway market by the Waynesboro Nut Lock Company, Waynesboro, Pa. This nut lock has two projecting lugs on the outside circumference and a dog projection on the inside.



New Type of Nut Lock

As the nut is screwed down on the bolt, a corner of the nut comes between the lugs. Four different angles are provided on the faces of the lugs, and as the nut is screwed into place the washer turns up, so that the lugs do not need to be bent over in order to hold the nut.

The lock operates on the principle of an alligator wrench. The nut can be tightened but not unscrewed as the dog engages the metal and the greater the force applied the deeper will be the grip of the dog. In order to remove the nut, the lugs are knocked off by a cold chisel or screw driver.

Oil Burner for Car Heating

A SELF-GENERATING oil burner for installation in stoves now used for hot air and hot water heating systems in passenger cars is being marketed by the Chausse Oil Burner Company, Detroit, Mich. A number of equipments have already been completed and installed on electric railway cars for a period of testing.

A collar is furnished to go between the door and the firepot of the ordinary stove. This makes the door about ½ in. further away than usual from the firepot and gives room for pipe to be run into the stove. Under the body of the car a 30-gal. high-pressure oil tank is installed. This size tank is sufficient for about thirty hours continuous service, and from 5 to 20 lb. air pressure is required to force the oil up through the piping to the burner in the car. Air pressure is obtained from the ordinary compressor tank through a reducing valve, but in case of compressor failure enough pressure will remain in the tank to operate the heater for several hours.

The oil is forced up through a series of pipes to the gas-generating burner in the stove. To light the burner it is necessary only to open a valve and throw a piece of burning newspaper into the fire pot. A feature of this system is that the regulating valve is not on the fuel pipe, but on the gas pipe. This makes it possible for the burner to be turned down in mild weather without causing carbonization. Distillate or furnace oil is ordinarily used, but old transformer oil, crankcase and compressor drainings or kerosene may be used.

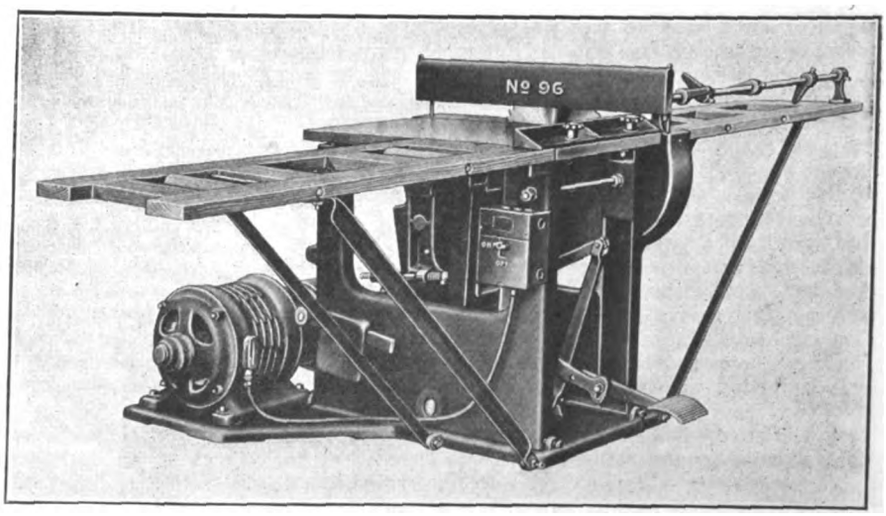
An important item is the safety valve to extinguish the flame instantly in case of collision, derailment or overturning of the car. It operates also in case the car catches on fire. This valve, however, is not affected by ordinary coupling shock. In case the fire in the burner goes out, a valve automatically shuts off the flow of oil, which will not commence again until the burner is lighted.

In one recent test the burner is said to have raised the temperature of a cold car to 76 deg. F. in twenty-one minutes. The complete outfit, without fuel, weighs 70 lb., of which 45 lb. is in the tank and 25 lb. in the burner and safety devices.

High-Speed Under-Swing Cut-Off Saw

THE general method of mounting cut-off saws is to suspend them either from the wall or ceiling. A radical departure from this is now being marketed by the Oliver Machinery Company, Grand Rapids, Mich., in its new No. 96 high-speed under-swing cut-off saw. This saw is of the under-slung type and is made for either belt or motor drive. By pressing a foot treadle the saw is brought forward to cut up 2-in. material up to 22 in. wide or 4-in. up to 16 in. wide. The saw returns by releasing the pressure on the treadle. A spring is used in connection with the foot treadle to give a quick return and insure rapid operation.

The saw is guarded by an adjustable guard and has an inclosed sawdust chute. The main part of the table is cast iron, 22 in. x 36 in. and is 33 in. high. Two auxiliary tables or extensions are furnished, fitted with two rollers each, and the right hand section is fitted with a positive stop gage with three adjustable stops. The forward and back stroke of the saw arbor is adjustable for short or long strokes and the spring mechanism prevents jerking and jarring on both the forward and return adjustment of the saw.



Under-Slung Cut-Off Saw with Self-Contained Motor Drive

For belt drive a countershaft is furnished and for motor drive an extended sole plate in place of the countershaft. The saw arbor itself can be locked in a stationary position, so that it can be used as a rip saw, and by using the miter gage it can be made to serve like the ordinary stationary arbor cut-off saw for cross-cutting work.

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The News of the Industry

One-Man Operation Attacked

City of Oakland Repudiates Previous Action and Seeks to Coerce Local Railway

The city of Oakland, Cal., through its elected officials, is up in arms against the San Francisco-Oakland Terminal Railways. There is no doubt that most of the moves made against the railway are political in character, but they have nevertheless had the effect of embarrassing the company. The railway has been made the butt in disputes over service, fares and one-man cars. As a matter of fact, however, the one-man car has been singled out by the city as most vulnerable for attack. Accordingly the one-man cars have been banned, as was indicated in the ELECTRIC RAILWAY JOURNAL for Oct. 20, page 722, the city would do.

On its part, the railway has refused to comply with the order and continues to operate this type of equipment. In fact, the company has challenged the city with respect to its authority in this matter, jurisdiction over the operation of the railway having been transferred to the State Railroad Commission in 1914.

It had been anticipated that perhaps the city would seek to use its police power to enforce its one-man car order, but instead it retaliated by literally declaring war on the railway. The city started at once to negotiate with the Peerless Stage Company for a franchised bus service, indicated that it would revoke the jitney prohibitory ordinance and then purchased and put into operation a twenty-nine-passenger Fageol safety coach on Telegraph Avenue. Two more buses have been ordered for early delivery, and the Council has declared that as soon as funds can be made available more buses will be added paralleling the railway lines and serving new districts. The fare on the city bus is 1 cent less than that charged by the railway.

The railway is telling its side of the controversy to the public through the *Key Route News* and in large newspaper space. The company says that the Railroad Commission after receiving a favorable report on the one-man safety cars from W. J. Handford, its service inspector, recommended on Aug. 13, 1918, the purchase of twenty-five Birney one-man safety cars as a matter of economy in the company's operations. At that time there was an ordinance which prohibited the operation of cars by one man, but the company, desiring to act upon the recommendation of the Railroad Commission, presented the entire matter to the City Council, indicating that it contemplated the purchase of twenty-five Birney one-man safety cars. As a result the ordinance which prohibited operation of cars by one man was repealed. This was in the fall of 1918. Among those who voted favorably on the repeal measure when it was before the Council was the present Mayor, Mr. Davis.

The railway, with the approval of the Railroad Commission and the consent of the City Council, proceeded to purchase the cars at a cost of $168,445. This purchase and its financing were approved by the Railroad Commission on June 7, 1920. These are the cars against which protest is now made. As the company explains:

> These cars were put in service in August, 1920, and have been operated more than 2,600,000 miles and have carried more than 13,700,000 passengers, in safety, without protest or complaint, until, politically, they were claimed to be unsafe, by the passage of the last ordinance, a few days ago.

In a subsequent statement the company said:

> From what we have said it sufficiently appears that the company has made investments approaching $1,000,000 in cars of this character. It has operated cars of this type upon the streets of Oakland for more than three years without protest or opposition. This has been done with the consent and approval of the Railroad Commission of the State of California, to which the citizens of Oakland surrendered the powers to consider and act upon such matters. The company cannot surrender the right to operate this equipment, thereby submitting to the confiscation of this property, without a judicial determination of the question whether its operation is to be carried on in accord with the regulations and subject to the approval of the Railroad Commission of the State of California, or the City Council of the city of Oakland.
>
> Our company cannot operate under two masters. The law vests jurisdiction in one or the other. The question is: Which?
>
> All parties in interest will be benefited by the determination of this question, and until such determination is had, the company must insist upon its right to continue to operate as heretofore.

With its case thus presented the company explains that it leaves with the public for decision the question of which side to the controversy has acted in good faith.

Although strong appeal had been made for the repeal of the ordinance prohibiting the operation of jitneys the latest advices indicate that the Council has rejected by a vote of three to two the idea of giving the jitneys free rein again.

In the heat of the controversy over the question of the operation of one-man cars, the matter of service and fares has been relegated to the background for the time being, although the fare matter has come up incidentally at the recent hearings in connection with the proceedings before the Railroad Commission looking toward approval by that body of the recently submitted financial reorganization plan.

$36,874,951 Traction Fund

Chicago Re-establishes Relations With Railways, Broken When Thompson Was Mayor

Chicago's traction fund now totals $36,874,951. It was increased to this amount on Oct. 20, when city officials accepted checks totaling $8,189,158 from the railway officials.

Acceptance of this sum, the city's 55 per cent of the net receipts of the railways for four years, was the last step in Mayor Dever's re-establishment of relations with the traction companies which were broken off during former Mayor Thompson's administration.

The checks offered and accepted by the city were the same tendered to and refused by former Mayor Thompson, who had caused the franchise of the Chicago Surface Lines to be canceled by the City Council and who feared that acceptance of the money would prejudice suits pending in the courts to enforce the cancellation. The Chicago City Railway paid $2,809,379, while the Chicago Railways turned over $5,379,758. These two companies are comprised in the Chicago Surface Lines.

Fourteen checks in all were accepted by City Comptroller Martin J. O'Brien. They represented the city's share of the companies' profits payable each year from 1920. The dates and amounts of each check follow:

From the Chicago City Railway:	
April 10, 1920	$442,991
April 9, 1921	737,989
April 10, 1922	685,373
April 10, 1922	390,372
April 10, 1923	276,327
April 10, 1923	276,327
Total	$2,809,379
From the Chicago Railways:	
April 9, 1920	$1,004,372
April 9, 1921	706,626
April 9, 1921	700,000
April 10, 1922	858,367
April 10, 1922	500,000
April 10, 1922	500,000
April 10, 1923	610,393
April 10, 1923	500,000
Total	$5,379,758

Whether the city is entitled to interest on the funds which were held in trust by the companies after the former administration's refusal to accept the checks may still be the subject of controversy. The traction fund was created for subway construction by the terms of the 1907 franchise ordinances under which the companies operate.

The forfeiture suits filed against the railways during the administration of former Mayor Thompson have been dismissed on the motion of Corporation Counsel Busch.

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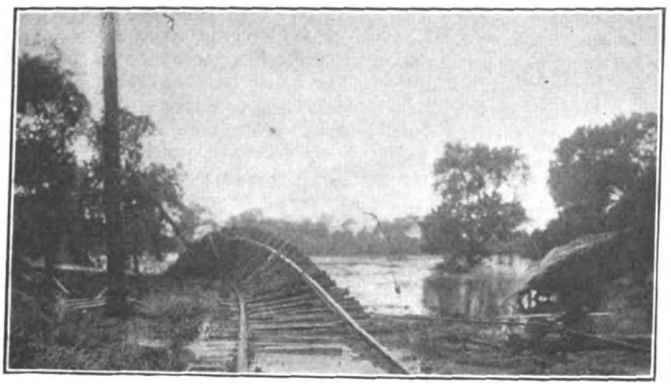


Oklahoma Road Damaged

Canadian River on Rampage Washes Out Track of Interurban—Water Unusually High

Heavy losses to track and roadway were sustained during October by the Oklahoma Railway due to the flood waters of the north fork of the Canadian River. On the morning of Oct. 15 water covered a mile of track on the El Reno Division just east of Banner, Okla., and all through traffic between Oklahoma City and El Reno was discontinued. On the evening of Oct. 15 the flood again struck the El Reno Division and took out 280 ft. of trestle and 100 ft. of dump at the crossing of the Canadian near stop 17. This same rising of the river washed 1,500 ft. of track off the fill near stop 20 and cut out 500 ft. of fill to a maximum depth of 18 ft. at stop 21. The crest of the flood reached Oklahoma City early in the morning of Oct. 16, bringing with it the water loosed by the cutting away of the core wall at the City Reservoir, 8 miles west of the city. The river reached a stage of 22.5 ft., which was 6.2 ft. higher than the record set by the flood of June, 1923.

The Stock Yards line was under water for a distance of ¾ of a mile and badly washed out. The Walker Street line used jointly for city and Norman Division traffic was washed out, 380 ft. of trestle and 1,400 ft. of dump being taken. The Central Avenue Line was under water for ¾ of a mile, track lined off the dump, 140 ft. of trestle washed out and heavy cutting made at various places.

Traffic between Oklahoma City and El Reno was resumed on Oct. 20 after a ferry had been installed at the river crossing at stop 17, the track at stop 20 replaced, a shoo fly constructed around the washout at stop 21, and high-line trolley and feeder line restored. While the tracks on Exchange Avenue were still under water, gangs were put to work, the outbound track was raised on sand bags and light cars were operated on Oct. 21. Traffic between the north and south part of the city was shut down six days. Due to the river changing its course, on South Walker Street and Central Avenue Line, additional trestles will be necessary before traffic can be restored on these two lines. A total of 800 ft. of trestle and approximately 1 mile of track will have to be rebuilt there.

Gerard Swope to Give First Aldred Lecture

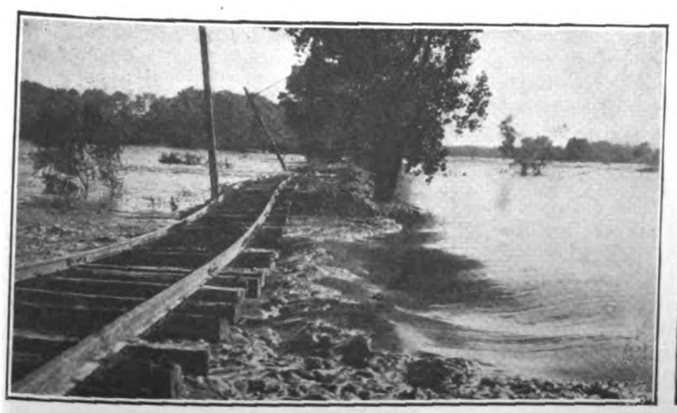
Gerard Swope, president of the General Electric Company, has accepted the appointment of first Aldred lecturer at the Massachusetts Institute of Technology, Cambridge. The opening day of the course is Nov. 9. These lectures have been established by J. E. Aldred of Baltimore, who has been responsible for similar lectures bringing leaders in science and industry into other educational curricula, thus tying the interests of engineering students more closely into those of the business world. Other eminent industrialists and engineers are to complete the Cambridge program for the first year, which will consist of twelve lectures. This year's lectures will be open to the faculty, seniors and graduate students of the Institute and to a limited number of outsiders, and will probably be published for general distribution next spring. President Stratton has appointed Prof. D. C. Jackson, head of the department of electrical engineering, and Prof. V. Bush, in charge of graduate work in electrical engineering, to co-operate with Mr. Aldred in this work.

Subway Program Promised by Chicago Mayor

Mayor Dever of Chicago has announced that a committee of experts is making a study of a plan to begin construction of subways soon without waiting the outcome of negotiations for municipal ownership of the local transportation systems. In explaining his position, Mayor Dever said:

> I have never said that subways would have to await a solution of the surface and elevated lines question. Subways will be an integral part of any solution of the transportation problem and as such are now being considered by my advisory staff in its study of plans for the unification of transportation facilities.
>
> A subway system and a comprehensive subway system are two different things. We have enough money in the traction fund, or will have when the Surface Lines' $8,000,000 is added, bringing the total to approximately $40,000,000, to build all the subways necessary for Chicago.
>
> If the only question involved was a financial one we could being tomorrow to dig subways and build 20 miles of rapid transit lines with the money in hand. But other problems enter into any discussion of the subway question. For instance, it must be determined what we will do with the subways when built. Shall the city operate them or would it be well to lease them to private enterprise? And, if they are leased to an operating company, would it be possible for it to guarantee the city against loss and still maintain a low, reasonable fare?

The Mayor has promised as soon as a conclusion is reached to announce a program which will give Chicago the best possible transportation with the most practical subway system.



Havoc and Destruction Wrought by Flood Waters on Oklahoma Property

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New Plan Promised

Five-Cent Fare Inadequate Under Existing Conditions in Jersey—Modified Settlement Plan Coming

Within a short time the Public Service Railway of New Jersey will offer a modified plan for the settlement of the present transportation problem there, free from the objections that were raised to the former plan. Announcement to this effect was made by President T. N. McCarter of the company on Nov. 1. Mr. McCarter said that a month's trial of the 5-cent fare in local areas in the more important municipalities has shown that under existing conditions the 5-cent rate will not produce "the cost of service." His statement follows:

The experimental 5-cent rate of fare adopted by Public Service Railway at the suggestion of the Board of Public Utility Commissioners has now been in effect in the populous centers of the state for one month. The public, generally, has shown an appreciation of the 5-cent fare plan and a desire that it be made permanent. The results, however, indicate that this will be impossible if the street railway and the buses continue to operate in competition with each other. The number of passengers on the street cars has increased, but not in sufficient numbers to make up for the reduction in fate. Consequently the rate is not producing the revenue received from the former rate before the cessation of service and is not providing the cost of service.

Co-ordination of street railway and bus service under one management with proper state and municipal supervision will furnish the only possible solution of the transportation problem. Such a plan will end uneconomic and wasteful congestion and provide the only hope for the continuance of the 5-cent fare on both cars and buses. The present situation cannot be indefinitely continued.

The railway will undertake to furnish such a co-ordinated railway and bus service and will operate both cars and buses to the extent found necessary to accommodate the traffic. If this requires the acquisition of the buses now legally operating the company is prepared to act. Within a short time the company will offer a modified plan, free from objections that were raised to its former plan, to accomplish the result so necessary for the public convenience. To bring such a plan to a successful consummation will require the active co-operation and assistance of the state and municipal authorities.

The original plan of settlement for the transportation difficulties was suggested by President McCarter on Aug. 21. Very briefly, the company offered to take over competing buses at their then existing physical value and run a co-ordinated bus and car service at a 7-cent fare. City officials opposed increasing the bus fare to 7 cents, as would be done under the Public Service plan. The trolleys continued idle until the chancellor ordered the company to restore operation at the 8-cent rate. At about the same time the cars started, the Public Service filed with the Public Utilities Commission a 10-cent fare schedule. The commission suggested to the company that it try a 5-cent rate within city limits. After deliberation the company announced that it would give the plan a four-month trial beginning on Oct. 1.

New Proposition Submitted.—In accordance with votes recorded by the carmen's unions recently a new proposition has been submitted to the Worcester Consolidated Street Railway and the Springfield Street Railway. It includes demands for wage increases, change to the day rate pay basis and changes in working conditions, all to take effect on Jan. 1. Details of the demands have not been made public, but public conferences will be arranged soon.

Conditions Can't Continue in Youngstown

"A continued deficit in this fund without probability of payment from operating receipts would naturally result in the discontinuance of the street railway service, unless some other means may be found by the city or company of working out the original plan." This is the finding of a special legal committee appointed by the legislative committee of the Chamber of Commerce of Youngstown, Ohio, to make an investigation into the financial condition of the Youngstown Municipal Railway. The abstract of the service-at-cost plan which was in preparation for several months by the committee was submitted and approved at a meeting of the legislative committee. It will be used by the latter committee in the preparation of an exhaustive report on the transportation situation.

The findings refer to the ordinance which gives the company the right to operate under a guarantee on behalf of the city to charge a rate of fare which will earn sufficient revenue to pay the operating allowance and maintenance, repairs and renewals. The report states that this amounts at the present time to 25 cents per car-mile for operating allowance and 7.83 cents for maintenance, repairs and renewals. In addition the gross revenue should pay taxes and a return. The company is further permitted when the stabilizing fund is below $50,000 to increase its rate of fare and when the fund is increased to $150,000 to decrease its fare. The report points out, however, that the guarantee of the city does not impose upon it an obligation that at the rate of fare charged the gross income will be sufficient to pay the stipulated return on its capital value or in fact even to pay the operating cost. Further, the city merely contracts and agrees that the company may operate on this plan, and that in case the stabilizing fund should be found insufficient then the preservation of the stabilizing fund would be purely a company matter.

From the fact that there now exists in the stabilizing fund a deficit of $900,000, it would appear that results under the rates charged have not accorded with the original purpose of the ordinance which was to earn enough from operation to preserve the service at cost without permanently depleting the stabilizing fund.

Kewanee Pays the Price of Neglect

RESIDENTS of Galva and Kewanee, Ill., are paying the price of their neglect of the Galesburg & Kewanee Electric Railway. Like many other humans they didn't recognize a good thing when they had it. Closeness to the object destroyed their sense of appreciation. And so the electric railway, after making a vain fight to keep going, quit and then sold out. The second-hand man has the road now. His husky disciples of destruction are expected to begin their work of demolition most any day. In a sense, the road's problems have been solved for it. But former patrons are beginning to pay the price of their neglect. They are now paying 76 cents to ride one way by bus between Galva and Kewanee instead of 36 cents charged on the defunct interurban. And they are howling. Although service has been shut down only a short time petitions are being circulated beseeching the local Chambers of Commerce to see what they can do about having the service restored.

Improves Service.—The Eastern Wisconsin Electric Company has practically doubled its service accommodations for patrons between Sheboygan and Plymouth.

Truth About Utilities.—The American Development Publicity Association recently published a series of articles in the New York *Evening Mail* on the truth about public utilities.

Wants Statement Corrected.—W. E. Wood, manager of the Houston Electric Company, wishes to correct a statement of John A. Beeler which appeared in the Sept. 22 issue of the ELECTRIC RAILWAY JOURNAL to the effect that the average speed for cars in Houston was 6 m.p.h. Mr. Wood says the correct figure is 9 m.p.h. and has been for some time.

Asks to Remove Tracks.—The Philadelphia Rapid Transit Company has petitioned the commissioners for permission to remove tracks and wires from Christian Street between Sixth and Eighth and from Filbert between Eighth and Ninth. The removal is requested to permit new paving of the streets. An ordinance recently passed by the City Council providing for the removal contains also a clause providing for the relaying of the tracks in the future, if found necessary.

Richmond Committee Ready to Proceed.—Petitions are before the committee on streets of the City Council of Richmond, Va., from practically every civic and commercial organization in the city, asking the committee to proceed with the consideration of the proposed new blanket franchise for the Virginia Railway & Power Company. According to the chairman, the committee is ready to do this, "provided other matters are not injected into the deliberations of the committee by citizens themselves."

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Financial and Corporate

$938,467 Earned by Detroit Municipal

The gross revenue of the Department of Street Railways of the City of Detroit for the fiscal year ended June 30, 1923, was $20,196,163 and the operating expenses exclusive of taxes were $14,450,613, leaving a net revenue of $5,745,550. As the charter specifies that taxes shall be levied on the physical property of the entire system the same as though privately owned, a deduction of $639,745 was made for this purpose, leaving an operating income of $5,105,805, which was augmented by non-operating income to $5,178,707. Interest, sinking fund and amortization payments reduced this gross income to $938,467 which was transferred to the profit and loss account. These figures, shown in an accompanying table, are all contained in the department's first annual report, just issued.

The deficit of $2,369 in motor bus operations is stated to be due to the payment of $600 per month rental on the two buses, which however may be applied on the purchase price.

The status of the city's investment is shown in the balance sheet, reproduced herewith. The city has spent over $15,000,000 in new construction and over $21,000,000 represents the property secured from the Detroit United Railways. Against a total of $38,307,785 investment in the property obligations to a total of $34,419,304 are outstanding, of which $15,880,000 represents the outstanding amount of the D. U. R. purchase contract, which has been reduced by payments which will retire the debt by Dec. 31, 1931.

The city is now operating 373 miles of single track and 1,673 passenger cars, of which 1,603 are owned and seventy leased. Of the total 1,171 are two-man motor cars, 252 trailers and 250 one-man. The average number of cars in the shop for repairs, painting and cleaning is 140.

The city operated 49,334,286 revenue passenger car-miles and 86,916 non-

DETROIT DEPARTMENT OF STREET RAILWAYS
CONDENSED INCOME STATEMENT FOR THE FISCAL YEAR ENDED JUNE 30, 1923

Revenue from transportation:		
Passenger revenue	$19,080,465	
Parlor chair and special car revenue	1,817	
		$19,082,282
Revenue from other railway operations:		
Rent of tracks and facilities	$968,657	
Other transportation revenue	145,224	
		1,113,881
Total operating revenue		$20,196,163
Operating expenses:		
Ways and structures	$1,967,576	
Equipment	1,258,988	
Power	2,061,595	
Conducting transportation	7,641,196	
Traffic	1,841	
General and miscellaneous	1,519,417	
Total operating expenses		14,450,613
Net revenue from railway operations		$5,745,550
Deduct taxes assignable to railway:		
Operations	$633,797	
Miscellaneous rents	5,948	
		639,745
Operating income		$5,105,805
Non-operating income:		
Net income from miscellaneous property (rent)	$15,194	
Income from unfunded securities and accounts	52,616	
Income from sinking fund and reserves	5,092	
		72,902
Gross income		$5,178,707
Deductions:		
Interest on bonds and notes	$1,856,496	
Sinking funds on bonds and purchase contract	2,381,294	
Amortization of discount on funded debt	2,450	
Total deduction from gross income		4,240,240
Net income		$938,467
Ratio operating expenses to revenue from transportation		0.7573
Ratio operating expenses to total operating revenue		0.7155
Ratio net income to operating revenue		0.0465

INCOME STATEMENT OF MOTOR BUS OPERATION FOR 7½ MONTHS ENDED JUNE 30, 1923

Revenue from operation		$10,942
Expenses:		
Wages of operators	$5,762	
Other expenses	7,549	
		13,311
Net loss		$2,369

CONDENSED YEARLY PAYROLL SUMMARY

Executive	$75,300
General office	27,208
Claims	64,286
Employment	6,346
Intelligence bureau	24,035
Auditing	123,649
Transportation	6,691,037
Tracks	1,160,257
Electrical	561,263
Equipment	1,254,839
Supplies	607,903
Building construction	256,849
Total	$10,852,972

DETROIT DEPARTMENT OF STREET RAILWAYS
CONDENSED BALANCE SHEET—JUNE 30, 1923

Assets

Road and equipment:		
Ways and structures	$15,618,137	
Ways and structures purchased from D.U.R. (day-to-day lines)	1,605,000	
Ways and structures secured from D.U.R. on purchase contract	19,850,000	
Investments:		
D.S.R. purchase sinking fund and interest reserve account	377,598	
D.S.R. purchase sinking fund and interest reserve account and purchase fund, City of Detroit special assessment bonds	857,050	
Total investment		$38,307,785
Current assets:		
Cash, construction fund	$260,586	
Cash, operation and maintenance fund	385,294	
Cash, purchase fund	560	
Cash, additions and betterments fund	20,895	
Accounts receivable	305,194	
Accrued accounts receivable	1,104,179	
Material, supplies, and uninstalled machinery and equipment	1,882,880	
Interest, dividends, and rents receivable	1,000	
Miscellaneous funds	92,774	
		4,053,362
Unadjusted debits:		
Accrued sinking fund, construction period	233,368	
Prepaid operating expense	5,000	
Prepaid insurance	198,880	
Prepaid taxes	24,684	
		462,932
Total assets		$42,824,079

Liabilities

Long term obligations:		
Construction bonds	$15,000,000	
Less: payment to city sinking fund commission to retire bonds at maturity	416,191	
		14,583,809
Purchase bonds	$4,000,000	
Less: payment to city sinking fund commission to retire bonds at maturity	44,505	
		3,955,495
Additions and betterments bonds	$5,000,000	
Less: bonds authorized unissued	5,000,000	
D.U.R. purchase contract		15,880,000
		$34,419,304
Debt retirements from operation:		
Construction and purchase bonds	$290,071	
Paid D.U.R. on purchase contract	1,200,000	
		$1,490,071
Current liabilities:		
Notes and accounts payable	$883,385	
Inventory of material and supplies and uninstalled machinery purchased from D.U.R.	975,000	
Accrued accounts payable	242,728	
Accrued wages payable	524,422	
Miscellaneous current liabilities	17,746	
		2,643,281
Unadjusted credits:		
City interest fund, construction bonds	276,695	
City sinking fund, construction bonds	233,368	
		510,063
Reserves:		
Injuries and damages	$566,047	
Sinking fund and interest payments	1,486,220	
		2,052,267
Surplus:		
Balance as of June 30, 1922	$510,318	
Net profit for fiscal year ending June 30, 1923	1,198,775	
		1,709,093
Total liabilities		$42,824,079

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revenue, making a total of 49,421,202. The passengers carried totaled 471,070,493, of which 357,386,437 were revenue and 113,684,056 transfer.

The total number of employees on the payroll was 6,525. A summary of the payroll is given by departments in an accompanying table which is condensed from that given in the report.

Regarding depreciation, the report states:

> A depreciation charge, as such, was not made during the year, but the gross income was reduced by sinking fund charges which it is believed were larger than any reasonable estimated basis for depreciation, with the result that the net income as here shown affords a proper and accurate basis of comparison with the reports of privately operated utilities.

Considerable attention is given in the report to ways and means for speeding up street car passenger travel in the city of Detroit. By actual riding and timing it takes, during the evening rush hour, from fifteen to eighteen minutes to travel 1 mile in the central business area. It is imperative, states the report, that street car service in this district be placed underground in surface car dips at the earliest possible date.

The "Journal's" Analysis of the Detroit Figures

High Traffic Density a Major Factor in Success of Department of Street Railways—Low Taxes and Interest Rates and Assistance of Other City Departments Also Help to Make a Favorable Showing

THE interest that exists in the railway field regarding the operation of the street railway system of Detroit by the municipality has prompted the ELECTRIC RAILWAY JOURNAL to make a hurried analysis of the figures submitted in the first annual report of the Department of Street Railways, City of Detroit, just issued for the year ended June 30, 1923, as shown on the preceding pages.

Several factors stand out as contributing materially to the measure of success that has been attained. There has been a remarkable increase in population. This, in the absence of any important extensions of track for several years, has resulted in an exceedingly high traffic density—a most favorable situation for the railway. Taxes charged against the railway are much lower in proportion to earnings than for private companies. The street railway department receives favorable treatment as compared with the private company in the matters of paving and rate of interest, and obtains the services of the city legal, purchasing and accounting departments for a large amount of work normally charged against the car rider instead of the taxpayer.

On the factor of growth in population, it may be noted that prior to the acquisition of the car lines in the city by the Department of Street Railways, the Detroit United Railway operated an extensive system, comprising interurban lines extending across Michigan and into Ohio, in addition to the city lines. For 1921, the last year of full operation, the total gross earnings of the entire D.U.R. system were $23,329,067, or only 22 per cent in excess of the revenue of the department for the city lines in Detroit alone in the fiscal year ended June 30, 1923.

POPULATION GROWTH IN DETROIT REMARKABLE

This remarkable growth is due to favorable industrial conditions in the Detroit area which have made the city the fourth in size in the United Sta es and have resulted in a great amount of added street car riding along with the increase in population. This growth in business has not been met with a corresponding increase in track mileage, although a program has been laid out by the city that will increase the trackage materially. The result is that the rate of earning on the existing permanent investment is much higher than the average for street railways in the United States. This is indicated in Table I, which gives a comparison between the Detroit figures and corresponding figures for 121 privately owned urban electric railways reporting to the American Electric Railway Association. The operating revenue per mile of track in Detroit is at the rate of $54,145, as compared with $28,310 for these roads, or more than 90 per cent above the average.

The density of street car travel is indicated by the number of revenue passengers per car-mile, which is 7.2, as compared with 6.6 for the 121 railways. The total passengers per car-mile is 9.5, as compared with 8.4 for the 121 roads. These two ratios average about 10 per cent higher for Detroit. This explains why, with an average fare of 5¼ cents, as against 6.7 cents for the other roads, the passenger revenue per car-mile for Detroit was 40.8 cents, as compared with 44.6

OPERATING EXPENSES IN DETAIL OF DETROIT MUNICIPAL RAILWAY FOR THE FISCAL YEAR ENDED JUNE 30, 1923

Group I—Way and Strcutures			
1	Superintendence of way and structures	$156,973	
2	Ballast	55,672	
3	Ties	17,835	
4	Rails	14,146	
5	Rail fastenings and joints	27,011	
6	Special work	209,042	
8	Track and roadway labor	572,261	
9	Miscellaneous track and roadway expenses	99,888	
10	Paving	224,022	
11	Cleaning and sanding track	73,219	
12	Removal of snow and ice	59,490	
16	Crossings, fences and signs	7,813	
17	Signal and interlocking apparatus	9,839	
18	Telephone and telegraph lines	771	
19	Miscellaneous way expenses	12,967	
20	Poles and fixtures	33,139	
22	Distribution system	134,722	
23	Miscellaneous electric line expenses	89,380	
24	Buildings, fixtures and grounds	130,386	
28	Equalization—Way and structures	39,000	
	Total		$1,967,576
Group II—Equipment			
29	Superintendence of equipment	$63,245	
30	Passenger and combination cars	734,443	
32	Service equipment	17,244	
33	Electric equipment of cars	281,400	
36	Shop equipment	43,396	
37	Shop expenses	67,876	
38	Vehicles and horses	6,316	
39	Miscellaneous equipment expenses	68	
44	Equalization—equipment	45,000	
	Total		$1,258,988
Group III—Power			
45	Superintendence of power	$29,531	
46	Power plant buildings, fixtures and grounds	10,177	
47	Power plant equipment	72,798	
48	Substation equipment	16,282	
49	Transmission system	282	
52	Power plant employees	147,803	
53	Fuel for power	539,021	
55	Lubricants for power	8,253	
56	Miscellaneous power plant supplies and expenses	8,595	
57	Substation employees	16,467	
58	Substation supplies and expenses	1,919	
59	Power purchased	1,210,466	
	Total		$2,061,594
Group IV—Conducting Transportation			
63	Superintendence of transportation	$279,620	
64	Passenger conductors, motormen and trainmen	6,064,111	
66	Miscellaneous car-service employes	65,939	
67	Miscellaneous car-service expenses	263,839	
69	Station expenses	28	
70	Carhouse employees	856,362	
71	Carhouse expenses	37,253	
72	Operation of signal and interlocking apparatus	39,886	
73	Operation of telephone and telegraph lines	9,469	
76	Freight and express collection and delivery	154	
78	Other transportation expenses	24,534	
	Total		7,641,195
Group V—Traffic			
80	Advertising	$1,842	
	Total		1,842
Group VI—General and Miscellaneous			
83	Salaries and expenses of general officers	$36,542	
84	Salaries and expenses of general office clerks	152,491	
85	General office supplies and expenses	54,304	
86	Law expenses	1,119	
89	Miscellaneous general expenses	24,217	
92	Injuries and damages	684,693	
93	Insurance	48,522	
94	Stationery and printing	88,444	
95	Stores expense	280,632	
96	Garage and stable expenses	60,670	
97	Rent of tracks and facilities	66,901	
98	Rent of equipment	20,882	
	Total		1,519,417
	Grand Total		$14,450,612

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cents. While the base fare was 5 cents in Detroit during the period, an additional cent was charged for a transfer. This charge brought in a material added revenue and offset to some extent the lower base fare.

Analysis of Operating Costs

A comparison of the operations for Detroit with those of the other companies has been worked out on the basis of per cent of gross in Table II. It shows some striking differences. The operating ratio is almost the same for the two, being 71.6 per cent for Detroit as compared with 71.7 per cent for the others. The distribution of the operating costs is quite different, however. In Detroit less was spent proportionally for all items except transportation, which was 6.4 per cent higher. The way and structures expenditures were not materially different in the two cases, although Detroit must have been relieved of a considerable amount of the paving burden, judging by the fact that only $224,022 was spent on this item with 373 miles of track. To offset this, a considerable amount of track in the system taken over from the D.U.R. was in bad condition and has needed excessive repairs. Expenditures for equipment are considerably lower for Detroit, probably due to the large number of new cars that have been placed in service within the year, and on which repairs should be light. Power cost is slightly less in Detroit than for the average. The streets are fairly level, stops are well spaced out, and a large number of trailers and safety cars are in use.

TABLE I—OPERATING STATISTICS OF 121 PRIVATE URBAN ELECTRIC RAILWAYS FOR CALENDAR YEAR 1922 COMPARED WITH DETROIT FOR FISCAL YEAR ENDED JUNE 30, 1923.

	121 Railways	Detroit
Railway operating revenue per mile of single track	$28,310	$54,145
Passenger revenue per mile of single track	$27,593	$51,154
Passenger revenue per car-mile, cents	44.6	40.8
Revenue passengers per mile of single-track	408,968	958,140
Revenue passenger per car-mile	6.6	7.2
Total passengers per mile of single track	522,078	1,262,923
Total passengers per car-mile	8.4	9.5
Transfer passengers, per cent of revenue passengers	26.5	31.8
Car miles per mile of single track	61,828	132,496

The general and miscellaneous expenditures are materially lower in Detroit, being 7.5 cents as compared with 9.4 cents for the 121 private roads. This is due to several things. In the first place, the accident record has been good, and the accruals to the injuries and damages fund have been kept down accordingly. The legal work in connection with claims is handled almost entirely by the city's legal department and is not charged against street railway operations, the total law expenses charged being only $1,111. Then, too, persons are not so likely to bring suit against the city as against a private corporation, either because they feel the cost will come back in the form of taxes, or because they fear that it is useless to expect large judgments against the city. In addition to the accident situation, other city departments are called on to give service to the street railway department as occasion demands. For instance, all purchases are made through the city's purchasing department except in the case of special items.

It is patent that the amount charged to taxes, 3.2 per cent of the gross, is much less than for the usual street railway, being only 43 per cent of that for the other companies. In the charter of the city it is provided that taxes on the physical property of the entire street car system be levied, the same as if privately owned. This does not, however, include taxes at the rate charged in many other cities, which frequently runs 5 to 7 per cent of gross. Furthermore, no federal taxation at all has to be included, as this is a department of the municipality, and hence exempt under the law.

The auxiliary operations of the private companies as reported provided net revenues just about sufficient to offset the lower rate of taxation enjoyed by the city, so that the net operating income is not far different in the two cases. The non-operating income of the private companies is considerably the greater, so that the gross income applicable to bond interest, dividends and surplus is somewhat higher for the 121 roads.

The income deductions in the case of Detroit are considerably more. The city is paying interest on bonds covering the entire investment made in the property. Certain critics have claimed that this is less than the real value of the system, and that the D.U.R. was forced to sell at a loss. Be that as it may, the city is paying interest at the current rate for municipal loans, averaging about 5¼ per cent as against 6 to 8 per cent demanded today from private railways. It is also applying earnings to a sinking fund to retire the bonds over a period of about thirty years. Since the investment will be wiped off the books at the end of that time, the city states that it does not need to set up a depreciation fund in addition.

TABLE II—OPERATING RESULTS OF 121 PRIVATE RAILWAYS FOR 1922 COMPARED WITH DETROIT FOR FISCAL YEAR ENDED JUNE 30, 1923

	Per Cent of Gross 1921		Cents per Car-Mile 121	
	Railways	Detroit	Railways	Detroit
Operating revenue	100	100	45.7	40.8
Operating expenses	71.7	71.6	32.8	29.2
Net operating revenue	28.3	28.4	12.9	11.6
Net revenue, auxiliary operations	3.7	0.0	1.7	0.0
Taxes	7.4	3.2	3.4	1.3
Operating income	24.6	25.2	11.2	10.3
Non-operating income	1.7	0.4	0.8	0.2
Gross income	26.3	25.6	12.0	10.5
Income deductions	17.8	21.0	8.2	8.6
Net income	8.5	4.6	3.8	1.9
Operating expenses:				
Way and structures	10.0	9.8	4.6	4.0
Equipment	8.7	6.2	4.0	2.5
Power	10.5	10.2	4.8	4.2
Conducting transportation	31.4	37.9	14.3	15.4
Traffic	0.2	0.0	0.1	0.0
General and miscellaneous	9.4	7.5	4.3	3.1
Undistributed	1.5	4.3	0.7	0.0
Total	71.7	71.6	32.8	29.2

Auction Sales in New York.—At the public auction rooms in New York there were sold on Oct. 31 $2,000 Des Moines & Central Iowa Electric Company 5 per cent bonds due 1937, interest March and September 84 per cent; and forty shares Interborough Consolidated Corporation $11 lot.

Files Judgment. — Judgment for $7,832 has been taken by the Fowler State Bank at Rantoul against the Kankakee & Urbana Traction Company, Urbana, Ill., in Circuit Court during a special session of the court. The sum represented money advanced to the company by the bank.

Partial Abandonment Permitted. — By permission of the State Public Utilities Commission, the Fort Collins Street Railway, owned by the city of Fort Collins, Col., will abandon and dismantle that part of its roadbed which extends beyond the corporate limits of the city. There was no opposition.

Stockholders Approve Abandonment. —Abandonment of that part of the road from Garden and Stevenson Streets, Seneca Falls, to Cayuga Lake Park, has been voted by the stockholders of the Geneva, Seneca Falls & Auburn Railroad, Seneca Falls, N. Y. Application for the abandonment will be made of the Public Service Commission.

Files Abandonment Petition. — The Buffalo & Lake Erie Traction Company, through its attorneys, has filed a certificate of abandonment in the office of the Secretary of State, of that portion of its line or road known as the Dunkirk and Point Gratiot line. The line is operated in the city of Dunkirk. It is alleged that the further operation of this line is not considered necessary for the public convenience.

Bonds Issued in Exchange. — The Board of Public Utility Commissioners has granted permission to the Trenton & Princeton Traction Company to issue its 6 per cent gold bonds to the amount of $500,000 to be used in exchange for the 4 per cent bonds of the New Jersey & Pennsylvania Traction Company. The board also approved a mortgage given by the former company to the Northern Trust Company, as trustee.

Initial Preferred Dividend. — The United Gas & Electric Company, New York, N. Y., has declared a dividend of thirty-five-thirty-sixths of 1 per cent on the new preferred stock for the period

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of July 20 to Oct. 1, putting the stock on a 5 per cent annual basis. The dividend was paid on Oct. 1 to stock of record Sept. 27. The dividend is equivalent to approximately 97 cents on the 64,994 shares of new preferred outstanding.

Considers Abandonment Request.—The Georgia Public Service Commission has taken under advisement a recent request by the Chattanooga Rapid Transit Company, a subsidiary organization of the Chattanooga Railway & Light Company, of Chattanooga, Tenn., to abandon the interurban line operated by the former company between Rossville and Fort Oglethorpe, Ga. Members of the commission visited the line to investigate the advisability of permitting its abandonment.

Property Sold.—The property of the Henderson Traction Company was sold on Oct. 27 by court order to W. H. McCurdy, of Evansville, Ind., for $6,800. Attorney A. H. Funkhouser, of Evansville made the highest bid. The city of Henderson held prior lien on the property for $4,588 for street oiling tax. The purchaser would not make a statement as to his intentions, but it is understood that he will remove the rails and other equipment and sell it for junk.

Bus Lines Unprofitable.—Street Railway Commissioner Engle of Youngstown, Ohio, recently stated that the buses operated by the Pennsylvania-Ohio Electric Company do not pay. For the month of September the earnings were $21,327, which represented a loss of 2.84 cents per car-mile. The mileage for September was 91,043, with earnings per car-mile of 23.42 cents. According to Mr. Engle's figures the Hillman Street bus is the only line that shows a profit.

Reports a Gain.—For its first quarter of 1923 ended Sept. 30 the Brooklyn-Manhattan Transit Corporation reports a gain of approximately $50.000 in the net operating income compared with the corresponding quarter of 1922. The company received in operating revenue $9,681,053. This was $544,920 more than the Brooklyn Rapid Transit Company received in the same period last year. Operating expenses were $6,485,725 compared with $5,994,057 in 1922. The net income for the period ending Sept. 30 of this year was $814,696.

Denies Abandonment Application.—At a recent hearing before the California Railroad Commission it was brought out that the Nevada County Traction Company operating an electric line between Grass Valley, Calif., and Nevada City since 1901 was insolvent. It was stated that the company had defaulted interest on $60,000 of outstanding bonds since 1921. The loss of revenue was ascribed to the rapid increase of private automobiles. It was stated, however, that the directors had not authorized any application for abandonment or substitution of service and that no application was before the commission. Bus franchises are being sought.

Improvement in Securities Noted.—Public utility securities have improved greatly their investment position in the first half of 1923 as is shown by the decline in the average yield of public utility bonds and in the decrease of the average disparity between municipal credit and public utility credit. This conclusion is based on an analysis by Herbert B. Dorau of the Wisconsin University Research Institute staff of the comparative borrowing power of twenty-five public utility companies and fifteen municipalities.

Lines Sold.—The Galesburg & Kewanee Electric Railway, Galesburg, Ill., has been purchased by Dave Wine, Kewanee, for $50,000. Service on the line has already ceased. While the road was acquired by Mr. Wine primarily for its value as scrap, he announced that he would give the citizens an opportunity to retain the service if arrangements could be made. Immediate cessation of operation was necessitated, he said, in view of the fact that no arrangement had been made by him for protection from liability in case of accidents.

Assessment Left as Recommended.—The Missouri State Board of Equalization has completed final figures on the tax assessments of public service corporations operating in Missouri. The grand total is $381,503,313, which is nearly $2,000,000 less than the total for the same class of property in 1922, and $4,128,945 less than the total recommended by the State Tax Commission. The valuation on street and electric railways amounted to $65,987,881.

The assessment of the United Railways, St. Louis, was left at $44,085,208 as recommended by the State Tax Commission. This is slightly less than the 1922 total.

Property at Newburgh Foreclosed.—The line of the Orange County Traction Company, running from Newburgh to Walden, N. Y., has been sold under the foreclosure of the mortgage against it. The property was bid in by ex-Governor Benjamin B. Odell, president of the company, acting for a committee representing the security holders.

His bid was for $10,000 in addition to liens prior to the mortgage which was being foreclosed. This was held by the National Commercial Bank of Albany as trustee. The prior liens, including mortgage, judgment, interest, taxes, &c., amounted to $579,192. The mortgage foreclosed was to secure $750,000 bonds, of which $324,000 had been issued under the mortgage and on which was due a total of $378,748.

Record for Passenger Traffic.—The Chicago Surface Lines broke all records for passengers carried and receipts on Oct. 20. The receipts for the day were $180,141, the previous high record having been $178,487 on Dec. 23, 1922.

There were carried 2,611,532 cash fare passengers on that day, and it is officially estimated that there were 1,828,060 transfer passengers, so that there was a total of 4,439,592 people transported by the surface lines, or more than the entire population of the city of Chicago. It is probable that the surface lines will break all records for passengers carried this year. Up to Oct. 20 the Surface Lines had carried approximately 587,371,135 cash fare passengers, or 9.37 per cent more than in the same period of 1922.

Increase in Capital Stock Proposed.—The stockholders of the Carolina Power & Light Company Raleigh, N. C., met on Oct. 22 to consider resolutions providing for increase in capital stock from $8,500,000 to $12,000,000, and changing common and preferred stock to a "non-par" basis. The present authorized capitalization is 50,000 shares of common stock and 35,000 shares of preferred stock, par value $100. Under the proposed amendment of the charter there will be an increase of 10,000 shares of common stock and 25,000 shares of preferred stock, making 60,000 shares of each stock. The increase in capital is considered necessary in order to provide in part the cost of further additions in plants and equipment contemplated. The property of the company includes 15 miles of electric railway.

Proposes Bond Issue for Reconstruction.—An issue of $200,000 in utility bonds to finance reconstruction of the Seattle Municipal Railway tracks, trolley wires and special work in the district bounded by Jackson and James Streets and First Avenue South and Third Avenue South is proposed in an ordinance recently introduced in the City Council. The issue is proposed as a substitute for the $150,000 issue passed a few weeks ago, which was found to be insufficient. The bonds will be a lien against the railway, payable out of revenues. Plans for repaving the district have been held up because of lack of funds with which to rebuild the railway. The Seattle Municipal Railway has returned to the light and water department a loan of $175,000 made three months ago, when the railway lacked funds to meet payrolls because of losses accrued under the 5-cent fare experiment.

Opposes Abandonment.—The International Railway, Buffalo, has applied to the Public Service Commission for permission to abandon the Niagara Falls Sugar Street line, with the result that the petition has become a matter of concern to the City Council, city manager, corporation counsel and other officials. Much opposition has been expressed on the proposed abandonment. President Walter McCulloh of the Chamber of Commerce says that the abandonment of this important cross-town car thoroughfare would be deplorable, in view of the fact that the upbuilding of that territory will be but a matter of a short time, when the paving of the streets as now planned is finished. In a rate hearing before the Public Service Commission several months ago, the International Railway set forth figures to show that the company's lines in Niagara Falls had been operating at a loss of some $103,000 a year.

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Traffic and Transportation

Change Made in Token Rate

Commission Orders District of Columbia Companies to Sell Three Tokens for Twenty Cents

Electric railways operating in the District of Columbia have been ordered by the Public Utilities Commission to sell three tokens for 20 cents at their carhouses, offices, substations, power station, "and other points convenient to the public," but not on their cars, effective on Nov. 1.

The order modifies to this extent the previous order for the general sale of six tokens for 40 cents. A general sale, by conductors on cars and elsewhere, of three tokens for 20 cents was asked by the Federation of Citizens' Associations on the ground that many persons did not find it convenient to purchase six tokens at a time. In the arguments at the hearing, counsel for the federation asked that if the three-for-20-cents order be denied, a cash fare of 7 cents instead of 8 cents be ordered. This phase was disregarded in the ruling of the commission as being outside the original petition.

While no official estimate has been made of the effect of the new order upon the revenues of the companies, it is not believed that it will be of much consequence, as most purchases of tokens are made on street cars and these are not affected by the order. Tokens heretofore have been sold at the company offices, carhouses and at certain banks in Washington and it is at such places only that three tokens for 20 cents may be purchased hereafter.

Testimony before the commission showed that about 20 per cent of the passengers of the Washington Railway & Electric Company pay the cash fare of 8 cents and it was estimated that if three tokens for 20 cents were sold on cars half of these cash riders would buy tokens and that the resultant loss in revenue to the company would be $104,000 a year, based on the number of passengers carried in the twelve months ended Aug. 31, last. Similar testimony was not introduced for the Capital Traction Company, but the Utilities Commission itself made an estimate that 24 per cent of the passengers of that company pay the cash fare and that, on the same basis of estimates, loss of revenue by a general change in the quantity of tokens sold would be $109,000 a year.

"The evidence submitted indicates that the returns now enjoyed by the railways are no greater than what is considered fair, and are decreasing," the commission asserted in its decision in the case. This sentence is considered especially significant as forecasting the attitude of the commission regarding the general question of railway fares in the District of Columbia, as there has been agitation in Congress and elsewhere for a return to the 5-cent fare.

The effect of the sale of tokens in smaller quantities by the conductors would be to delay traffic movement "to a small extent," the commission asserted, because of the increased number of transactions between conductors and passengers.

"The riders who are in a position to spend 20 cents for three tokens and cannot spend 40 cents for six are probably few in number," the commission concluded in its opinion.

Injunction to Prohibit Buses Denied

An injunction to prohibit the operation of buses along the route of the Maumee Valley Railway, Toledo, was denied in the Lucas County Common Pleas Court on Oct. 25. The court in denying the injunction said that it was opposed to government by injunction proceedings.

The suit, which was brought by Attorney Leroy L. Eastman, representing the railway, charged that the bus companies were operating without first complying with the provisions of the Collister bus law. The Maumee Valley Railway, of which L. G. Van Ness is president, operates on both sides of the Maumee River, south of Toledo. Mr. Van Ness said that the matter would be taken to the Court of Appeals immediately.

Last year the village of Perrysburg, through which the interurban operates, passed an ordinance prohibiting buses from stopping to take on passengers within the corporate limits of the municipality. The bus companies went into court and obtained an injunction against the city. The matter was taken to the Ohio Supreme Court by Attorney Eastman, where he succeeded in having the injunction dissolved.

Will Start Auxiliary Bus Service in Springfield

Following the threat of the City Commission to repeal its anti-bus ordinance and permit general operation of buses on Springfield, Ohio, streets unless the Springfield Street Railway started some kind of service to the Melrose addition in accordance with its franchise terms the company recently notified the commission in special session that it would start auxiliary bus service to connect with cars on Nov. 5. The commission at a regular meeting on Oct. 29 gave the company twenty-four hours to make final reply to its ultimatum demanding service.

A resolution ordering the building of the new track was passed some time ago without a dissenting vote. When the company was approached on the subject it declared it would be impossible to build the extension as a loss of $10,000 had been incurred so far. The matter rested until a delegation of citizens from the Melrose addition appeared before the commission and pressed for action, with the resultant passage of the resolution threatening revocation of the franchise and repeal of the anti-bus statute.

Rehearing Called on Mail Pay

The Interstate Commerce Commission will begin a hearing at Washington on Nov. 19 on the application of the Post Office Department to readjust the compensation of electric railways for handling United States mails. This is a reopening of the case started in July, 1918, when the commission, on its own motion and following the suggestion of a bill enacted by Congress, ordered an investigation to determine reasonable rates for transporting mail by urban and interurban electric railroads and for the incident service.

It will be recalled that in August, 1920, the commission handed down an order which had the effect of increasing the compensation to the carriers, but the results were not satisfactory to the American Electric Railway Association, which filed an application for a rehearing. The Post Office Department in 1922 filed a petition for reopening of the case, on the grounds that conditions had changed since the 1920 order of the commission so as to justify revision downward of the rates.

Testimony and evidence in the case will be presented before an examiner for the commission, beginning Nov. 19, and the proceedings are expected to occupy several weeks. Eventually, arguments will be heard before the commission itself, after the examiner's report has been submitted.

Wisconsin Commission Authorizes Use of More One-Man Cars

The Wisconsin Railroad Commission has granted formal permission to the Wisconsin Public Service Corporation to continue the operation of one-man cars on its Green Bay-Kaukauna interurban line. The company pleaded the need of the strictest economy in operation, and submitted to the commission statements showing the difference in cost of operation that resulted from the change to one-man car operation and also data on accidents.

C. E. Kohlhepp, auditor for the company, said the railway department in Green Bay, including the city and interurban lines, had incurred a deficit of $190,159 in 1922 and a deficit of $94,818 in the first seven months of 1923.

C. E. Warwick, representing the company, testified that the one-man cars with the new safety appliances were as safe as the two-men cars. J. P. Pulliam, vice-president and general manager of the company, said that accidents have been materially reduced the last two years and that step accidents to passengers have practically

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ceased with the operation of one-man cars. He said further that the saving resulting from the one-man cars would forestall an increase in rates.

This ruling of the commission followed close on the heels of its decision permitting the Eastern Wisconsin Electric Company to operate one-man cars between Neenah and Fond du Lac.

Traffic Signals to Be Installed in New Orleans

The sum of $17,000 will be spent by the city of New Orleans for the installation of fifty additional electric traffic signals, in the near future, specifications for which are now being prepared by City Engineer Klorer. A traffic tower will be erected at Rampart Street and traffic signals installed from that point at all intersections of Canal Street to Peters Street and at other intersections. This improvement is based upon an agreement reached by the Commission Council of New Orleans with the Canal Street Merchants' Association, which is urging the adoption of that portion of the Beeler report governing regulation of traffic on Canal Street, thereby increasing the parking space for cars and relieving present congestion. The Canal Street Merchants' Association will bear $7,000 of the expense of improvement.

Traffic Solution Prizes Total $1,500

Prizes totaling $1,500 were recently awarded in the traffic problem contest started in the Keith, Proctor & Moss vaudeville theaters, as a constructive contribution to the recent Silver Jubilee celebration of New York City. The winning suggestions were the best of more than 1,200 plans entered in the eliminating contests in twenty vaudeville theaters. All the capital prize-winners submitted their plans through the Palace Theater.

The winner of the first prize, who was the chief engineer of the Board of Estimate, offered three suggestions for the traffic solution in New York City. Among these was the substantial relief for the section adjoining Forty-second Street by making all north and south streets one-way streets, and introducing the block system of traffic control. The winner of the second prize suggested doing away with all sidewalks on principal streets and making arcades in front of stores. Another suggestion included vehicular subways, and still another proposed removing all trolley lines on streets running east and west, and constructing ramp bridges at all east to west crossings.

Taking Action on One-Man Cars

Representatives of local unions in Massachusetts associated with the Amalgamated Association were present at a recent special meeting for the purpose of formulating action on the elimination of one-man cars. They will back a law which provides that no car of any railway shall be operated with fewer than two employees. Further, that the act if enacted by the Legislature shall be submitted for acceptance to the voters of each city and town in which a car is operated by one man and shall take effect in such cities and towns thirty days after acceptance.

Public Told About New Fort Wayne Cars

Letters to all automobile owners in the city, placards posted in practically all garages of the city, car cards and full page advertisements in the local newspapers are being utilized by the Indiana Service Corporation to announce a new type of street car now being placed on the Fort Wayne, Ind., city lines.

"There was a time when we put new types of cars in service and let the general public find out about them as best they could," says J. A. Greenland, superintendent of transportation and traffic. "That day is past, however, and now when we contemplate a change in service, especially such as at present, when the change will affect other street traffic, we make it a point to tell the public all about it."

The announcements are occasioned by the purchase of new type cars, with front entrance and rear exit. Cars now in use have front entrance and exit only.

Cars now in use on the city lines are single truck, front entrance and exit. As Mr. Greenland explains, the rear exit cars are expected to speed up traffic. They are also operated by one man.

There are twenty-five cars of the new type now being added to the city service. Of these, fifteen are new and ten have been rebuilt from double-truck cars formerly in operation and on which two men had been used. All city street cars are now in one-man operation.

Petition for Abolition of One-Man Cars.—Three hundred property owners living along the route of the June Street line of the Worcester Consolidated Street Railway have petitioned the Mayor and Aldermen for the abolition of one-man car service which was started recently.

Grants Bus Franchise.—A franchise has been granted the Monogahela-West Penn Public Service Company, operating lines in northern West Virginia, to operate a bus line between Morgantown and Rivesville. At the latter point connection will be made with the trolley cars for Fairmont. The company is expected to start this service as soon as the necessary equipment can be secured.

School Attendance Helps Railway.—Increased attendance at Teachers' College, resulting in greater patronage of its railway lines, caused a reduction in fare from 8 to 7 cents on the lines of the Waterloo, Cedar Falls & Northern Railway. C. D. Cass, general manager of the company, has promised further cuts "if patronage warrants."

Colored Lights Standardized.—The Tacoma Railway & Power Company has completed standardization of colored lights on the front of the various car lines of the company designed to make it easier for patrons to recognize their cars at night. Each color combination represents a particular car line and the company has advertised the change, so that all may familiarize themselves with their particular light.

Seek Fee Refund. — The Michigan Public Utilities Commission is investigating the operation of a large number of motor buses which have recently discontinued business whose operators are now seeking to get their application fee refunded to them. Most of them operated in a former resort territory and have been operating under a permit issued by the commission requiring their filing of necessary insurance and other papers.

Hears Petition for Increased Fares.—The Public Service Commission late in September held a hearing on the application of the City Railways, Wheeling, W. Va., for an increase in fare on its Mozart Park line in Wheeling. It was claimed by the company that the line was operating at a loss and was used to little extent. There were none present to contest the proposed increase of the company, which was represented by one of the management and Attorney John J. Coniff.

Perfect Thirty-one Days.—Keokuk car operators made their slogan "Thirty-one Days Without an Accident" a reality when they completed their safety first drive for the month of August. Telegrams of congratulation were received by the men shortly after from H. T. Edgar, division manager, and David Daly, district manager of Stone & Webster. Walter H. Burke, local manager of the Keokuk Electric Company, has given the men a dinner in recognition of their achievement. The drive was planned and directed entirely by the car operators.

More One-Man Lines Planned.—Five divisions of the Louisville & Interurban Railway lines will have one-man safety cars in use by Jan. 1, according to Richard H. Wyatt, general superintendent of the Kentucky company. One-man safety cars are to be placed in use on the Orell division Nov. 11 and on the Fern Creek division some time in December, Mr. Wyatt said. The safety cars are now in use on the Jeffersontown, Prospect and Okolona divisions.

Will Use One-Man Cars.—The Galveston Electric will soon install one-man safety cars in Galveston, according to an announcement by Raymond G. Carroll, vice-president and general manager. The installation of the one-man cars will be gradual, Mr. Carroll said, only one or two cars being put in service at first. It is planned, however, to convert the entire system to the one-man car. Mr. Carroll said that the number of automobiles in use in Galveston is the direct cause of the installation of one-man cars.

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New Pass Plan.—Effective Nov. 5, the Pennsylvania-Ohio Electric Company will place in use on its interurban line between Youngstown, Ohio, and New Castle, Pa., two forms of the unlimited-ride weekly pass. One form, selling at $3.75, will be used for transportation from terminal to terminal, or intermediate points, a distance of 19 miles. The other will sell at $1.75 and will be used for transportation between New Castle and Edenburg, or intermediate points. This pass will be of advantage to suburban dwellers going to and from work and also for shopping in New Castle. It also will be of advantage to industrial riders from New Castle to Edenburg.

Dining Chair Coaches Ready.—The Interstate Public Service Company, Indianapolis, Ind., will put into service during the next few weeks Pullman combination dining and chair cars between Louisville and Indianapolis. The cars will be operated during the usual meal hours, and more will be put on as the patronage demands. First definite announcement of this improved service was made by L. M. Brown, general superintendent of the division. The cars, some of which already have been ordered, will be like standard equipment of the kind used on steam roads with the dining room at one end and the chairs at the other, with the kitchen separating them. The order has been referred to previously.

Fare Lowered.—A new fare schedule recently approved by the Public Service Commission authorizes a minimum charge in the fifty-trip commutation book reduced from $5 to $3.75 on the Auburn & Syracuse Electric Railroad. The order became effective Oct. 20. Fares heretofore applying for the sale of such commutation books for transportation to and from Auburn and to and from Syracuse are canceled. Fares to and from Auburn will be obtained by using the interurban commutation fare to and from Soule plus fifty times the regular one-way fare between Soule and Auburn. Fares to and from Syracuse will be obtained by using the interurban commutation fare to and from the city line plus fifty times the one-way city fare.

Petition for Old System.—All night service into Tremont Street subway in Boston was started Oct. 14. Petitions bearing 1,400 names of night workers have been presented to the railway protesting against the early morning car service and petitioning to put the night cars back on Adams Square. It is claimed that only those who work in the immediate neighborhood of Scollay Square, Park Street and Boylston Street stations are at all benefited by the new order. All the others who were used to getting the cars at their doors are forced to walk. It is their contention that conditions would be improved if the old service were restored, because most of them, tired after a night's work, might go from their work to the street and get the cars without a long walk being necessary.

Personal Items

F. de Lancker Heads International Tramways Union

General Manager of the Brussels Tramways Is Elected to Succeed Mr. de Burlet

C. de Burlet, honorary director general of the Société Nationale des Chemins de fer vicinaux of Belgium, resigned on Oct. 9 as president of the Union Internationale de Tramways de Chemins de fer d'intêret local et de Transports Publics Automobiles. Mr. de Burlet has been president of the organization for the last eleven years. In his letter of resignation Mr. de Burlet says that it is with great regret that he retires from the presidency after an active association with the organization for more than forty years, but his advancing years and obligations of health compel him to do so. He feels that the recent convention in Brussels proves that in spite of the war, the association is as important and necessary to the industry as ever, and that the large attendance and notable success of that meeting show that it has taken on a new life and that the crisis in its existence has passed.

Although organized in 1885, the Union Internationale de Tramways de Chemins de fer d'intêret local et de Transports Publics Automobiles has had only three presidents. The first was Gustave Michelet, then general manager of the Brussels Tramways, who was elected president at the organization meeting in Brussels. He continued in the office of president until his death in 1897. He was succeeded by Baron Janssen, then president of the Brussels Tramways, who occupied the office for fifteen years, when he was elected honorary president. Mr. de Burlet at the time of his election was general manager of the Société Nationale des Chemins de fer vicinaux, a large interurban railway property in Belgium under partial government ownership.

Mr. de Lancker, the new president, is general manager of the Brussels Tramways. His election has just been ratified by ballot by the members.

Messrs. Vance and Hendricks in Charge of Purchases of Merged Companies

Harry J. Vance, purchasing agent for the Illinois Power & Light Corporation, with headquarters at Peoria, Ill., has been made purchasing agent for the Illinois Traction, Inc. Mr. Vance will have his headquarters at Chicago.

W. P. Hendricks, for a number of years associated with the William A. Baehr Organization, consulting engineers, Chicago, will be the new purchasing agent for the Illinois Power & Light Corporation, with headquarters at Chicago.

Harry Vance is well known throughout Illinois, having for many years been purchasing agent for the Illinois Traction System, which company became a subsidiary of the Illinois Power & Light Corporation last June.

Otto M. Rau Appointed on Power Survey

Otto M. Rau, an engineering specialist in hydraulics, power generation and natural resources, has been appointed in a consulting capacity on the staff of the Giant Power Survey of the Commonwealth of Pennsylvania. This survey has been started in Pennsylvania at the suggestion of Governor Pinchot. Mr. Rau will be located in a Philadelphia office which has been opened in the Fuller Building and will have charge of studies of power requirements, stations and transmission lines.

Mr. Rau's early experience was gained with the engineering department of the Edison General Electric Company, New York. He later became identified with the Milwaukee Electric Railway & Light Company as chief electrician and general superintendent of the lighting and power department. During the war Mr. Rau acted as consulting engineer to the power section of the Emergency Fleet Corporation. At the close of the war he became connected with Day & Zimmermann of Philadelphia in charge of public utility management and was later with the Stotesbury-Mitten management of the Philadelphia Rapid Transit Company where he did specialized work on pulverized fuels and making superpower studies. His appointment, together with that of Dr. Frederick H. Newell of Braddock, Pa., was made by Morris L. Cooke, director of the power survey and former director of public works in Philadelphia.

Mr. Doerr Leaves Connecticut Company

J. H. Doerr has resigned as roadmaster of the Connecticut Company, effective on Nov. 1, to become Western representative of the Railway Trackwork Company, Philadelphia, Pa. He will be located in Los Angeles, Cal. For the past three years Mr. Doerr has been stationed in Waterbury for the Connecticut Company.

Mr. Doerr was graduated from Sheffield Scientific School, Yale, in 1912, and entered the employ of the Connecticut Company in its maintenance of way engineering department. During his first four years with the Connecticut Company Mr. Doerr's work covered all branches of track engineering from layout to installation. At the completion

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of this term of service he left the company and during the following four years engineered and supervised the construction of many industrial and power transportation projects. This work completed, he again associated himself with the Connecticut Company as roadmaster.

William S. Hamilton has resigned as general superintendent of the Schenectady Railway.

Thomas J. Lynch has been appointed general manager of the Schenectady Railway, Schenectady, N. Y.

Nat Ozmon has been appointed to succeed Harry W. Cushman as assistant superintendent of the Tri-City Railway, Davenport.

W. H. Rudisill is superintendent of engineering of the Manila Electric Company and Maurice W. Toby, formerly roadmaster, has now the title of engineer of maintenance of way.

E. Dobson is roadmaster of the Sarnia Street Railway, Sarnia, Ont., replacing in that capacity William Bolton.

C. W. Lightner is superintendent of line construction of the Bakersfield & Kern Electric Railway, Bakersfield, Calif.

F. M. Warnken has succeeded B. K. Noble as superintendent of the West Helena Consolidated Company, Helena, Ark.

R. M. Hannaford is acting chief engineer of the Montreal Tramways. W. F. Graves was formerly chief engineer.

George W. Scott has succeeded Ralph Chandler as second vice-president of the Phoenix Railway, Phoenix, Arizona. L. M. Ford is now treasurer, replacing A. D. Haskell, acting treasurer.

Loren Barton is vice-president of the Glendale & Montrose Railway, Glendale, Calif., succeeding John Treanor. Mr. Barton's office is located in the Corporation Building, Los Angeles.

Huey P. Long, chairman of the Louisiana Public Service Commission, has announced his candidacy for Governor of Lousiana subject to the action of the Democratic voters in the election to be held in January, 1924.

Dan. C. Smith, for seven years manager of the Fort Smith Light & Traction Company, has resigned and accepted a position with the Byllesby Engineering Company of Chicago, operating managers of the local utilities at Fort Smith. Ark.

Arthur E. Scott, manager of the Louisville branch of the Atlantic Tank & Barrel Corporation, Louisville, for a number of years, has recently accepted a position with the Interstate Public Service Company, Indianapolis, as director of public relations.

E. J. Rosenauer, formerly general auditor of the Southern Colorado Power Company, has resigned to become assistant treasurer and general auditor of the Wisconsin-Minnesota Light & Power Company, with headquarters at Eau Claire, Wis. Mr. Rosenauer has been connected with the Byllesby interests for sixteen years, the last ten of which he held the position from which he just resigned.

Obituary

R. J. Morrisson

R. J. Morrisson, general manager of the Poughkeepsie & Wappingers Falls Railway, Poughkeepsie, N. Y., died on Oct. 29. Mr. Morrisson had been playing golf that afternoon with Charles Brooks, his predecessor as manager of the property, and left Mr. Brooks to prepare for dinner at Mr. Brooks' residence. When he did not appear Mr. Brooks made inquiries which led to the discovery of Mr. Morrisson's body in the bathroom of his apartment, where it was later established he had been accidentally overcome by carbon monoxide gas.

Mr. Morrisson has been in the public utility business since 1914. At the age of 17 he was secretary to Charles S. Banghart when Mr. Banghart was vice-president and manager of the Binghamton Railway, Binghamton, N. Y. This position he held until May, 1917, when he enlisted in the Eleventh Engineers. He went to France in July, 1917, with that organization. He was there for a period of twenty-two months. After his return from France Mr. Morrisson went to Augusta, Ga., as assistant manager of the Augusta-Aiken Railway & Electric Corporation under Mr. Banghart. This position he held until the fall of 1920. He was then promoted to private secretary to James H. Pardee, president of the J. G. White Management Corporation. This position he held until October, 1922, when he was made manager of the Poughkeepsie & Wappingers Falls Railway. Although Mr. Morrission was a very young man his work indicated that a career lay ahead of him that would have reflected great credit upon him personally and probably would have been a source of pride to the industry itself.

George H. Moseman, for the past twenty-five years New England sales agent for the Weston Electrical Instrument Company, Newark, N. J., with headquarters at Boston, died suddenly Oct. 28 at his home in Brighton. Mr. Moseman was born at Bridgeport, Conn., about seventy years ago.

Harry R. Rochester, Western sales manager of Hale-Kilburn Company, died on Oct. 28, at Atlantic City, after an illness of several weeks. Mr. Rochester was born in Ontario on April 10, 1872. He had been with Hale-Kilburn, with offices in Chicago, since 1912. Funeral services were held in Dayton on Oct. 31.

Charles A. Merrill, in the employ of the Brooklyn-Manhattan Transit Company for twenty-two years, died recently at the age of seventy-one. In 1901 he started serving the Brooklyn company as a conductor. In 1906 he was made a dispatcher. He was night dispatcher at the Franklin Avenue depot at the time of his death.

Lewis Otto Hayes, assistant superintendent of the subway division of the Interborough Rapid Transit Company, New York, N. Y., died recently. He had held the position of assistant superintendent since Jan. 15, 1921. His first railway work was with the Chicago Elevated Railway as train clerk. In 1904 he entered the service of the Interborough Rapid Transit Company as trainmaster on the subway division, holding this position until 1921, when he became assistant superintendent, which position he held at the time of his death. Mr. Hayes was born in Edinburg, Ind., on Dec. 16, 1875.

R. L. Woeber, who crossed the plains in an ox cart and arrived in Denver in 1867, is dead. Mr. Woeber saw the need for better transportation and with his brother organized the Woeber Brothers Carriage Company, one of the first businesses of its kind in the West. The name was later changed to the Woeber Car & Manufacturing Company. Practically every car that traverses the streets of Denver today is marked: "Made by Woeber Car & Manufacturing Company." Mr. Woeber had been sick since last February, when he suffered a paralytic stroke. He was eighty-six years of age.

M. E. Stark, general supervisor of tracks of the Connecticut Company, died recently while on a vacation at Niagara Falls, N. Y. Mr. Stark had been in the employ of the company about twenty-three years. He was born at Silver Creek, Mich., in 1856. He started on railroad work in 1882 at Kennebunkport, Me. In 1885 he went to work for the New York Central at Oswego, N. Y. From Oswego he went to Hudson, N. Y., and entered the employ of the Connecticut Railway & Light Company at Waterbury in 1900. In 1902 Mr. Stark was transferred to Bridgeport as superintendent of tracks of that division, in which capacity he served until Aug. 1, 1923, when he was appointed general supervisor of tracks of the entire system of 802 miles.

Fred J. Green, pioneer Ohio electric railway man, died in Springfield Oct. 4. Mr. Green was born at Stevens Point, Wis., in 1861 and went to Ohio about twenty-five years ago. Former Governor Asa Bushnell of Springfield helped Mr. Green in financing and building the old Dayton, Springfield & Urbana line, now a part of the Indiana, Columbus & Eastern Traction Company. Later they built the Columbus-Springfield line, which eventually was sold to the Indiana, Columbus & Eastern. Then came the construction of the Springfield, Troy & Piqua Traction Company, of which Mr. Green remained president until the sale of the road about three years ago and its subsequent junking by the Schoenthal Company of Columbus. Mr. Green was a member of several fraternal orders which participated in the funeral services held Oct. 6 in Springfield.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

$1,250,000 Transmission Line from Keokuk

An electric, double-circuit, steel-tower transmission line, carrying 66,000 volts, will be built from the big power dam at Keokuk, Iowa, to Galesburg, Ill., by the Illinois Power & Light Corporation, which controls the city and interurban lines formerly included in the Illinois Traction system. The improvement will cost $1,250,000. Work will begin at once under the direction of the engineering department of the Illinois Power & Light Corporation. The engineers expect to have the line finished within a year.

An extension of the line, carrying 33,000 volts, will also be built from Galesburg to Galva, a distance of 23 miles. The entire length of the new line development will be approximately 96 miles.

The new line starts at the dam, owned by the Mississippi River Power Company, Keokuk, Iowa. It will run up the Iowa side of the Mississippi River to Fort Madison, cross the river at this point and then extend in a northeasterly direction to Galesburg, following generally the main line of the Santa Fé Railway.

The Galesburg power plant of the company is now up to its full capacity of 4,500 kw. The new line will be capable of furnishing Galesburg electric users with a capacity of 10,000 kw., sufficient, it is believed, for the next ten years.

The Galesburg and Galva power houses will be kept intact as standby plants for use in times of emergency.

Prices Becoming Stabilized; Manufacturing Active

Market conditions at the present time show a tendency in the direction of more stable prices. The decline which occurred during the early part of the year has apparently ended and there has been a moderate upward movement. However, the earlier tendency was not without its advantages, in that it has produced a more sound price structure today than existed six months ago. It is thought that there is little or no chance of returning to the price level of 1913, and those familiar with economic conditions incline to the belief that the present stabilized price level will continue for some time to come.

Pig iron and copper continue to be weak spots in the metal market. The price of pig iron has declined considerably since last spring and there is no reason to expect improvement in the immediate future. This is not surprising, perhaps, in view of the very high level to which the price of pig iron rose last summer. In spite of the decline, its present price bears about the normal relation to the pre-war price.

Movements in copper prices have had a general downward tendency. Lately, however, the domestic demand has been a little larger. Hope is expressed that with users coming again into the market after holding back for some time, prices may go up. Export prices have risen a little, but no great change in this situation can well be expected until European conditions improve and the copper export trade regains something of its former volume.

Manufacturing activity continues at a healthy rate. Stocks are normal in most lines, and future demands are likely to be for immediate consumption rather than for the upbuilding of reserve stocks. The prevalence of hand-to-mouth buying has produced a situation which appears superficially unsatisfactory. Under the circumstances, however, the volume of forward orders can hardly be taken as a safe guide to market conditions. The consumption of raw materials and the production of finished goods indicate that the present situation is fundamentally sound. The fact that there is relatively little unemployment at present, although the seasonal peak of labor requirements for construction and agriculture has now past, is another indication of a healthy condition of industry.

One important steel company is operating at nearly 90 per cent of capacity, and the rate of operation for the steel industry as a whole is approximately 85 per cent. The United States Steel Corporation has increased its current dividend one-quarter of 1 per cent, or from the established rate of 1¼ per cent to 1½ per cent, quarterly.

Creditors Vote to Extend Payment of Outstanding Accounts

At a special meeting of the creditors of the Missouri Car Company in the Columbia Building, St. Louis, on Oct. 26 a motion was carried to extend half the outstanding accounts until Jan. 1, 1924, and the other half until March 1, 1924. Notes will be made out for the amounts due to the creditors, to whom they will be sent in exchange for the old notes. The plant of the company is covered by a blanket mortgage having precedence over other claims. Creditors are to be taxed 4 per cent of their claims in order to assist Orrin Merry, president of the company, in his program for rehabilitating the company. A committee of three creditors, appointed on Aug. 6, is now working with Mr. Merry in the interest of all the creditors.

Westinghouse Official Decorated. — Guy E. Tripp, chairman of the Westinghouse Electric Company, who is in the Far East in connection with reconstruction work in Japanese cities destroyed by the earthquake, has been decorated by the Japanese government.

ELECTRIC RAILWAY MATERIAL PRICES—OCT. 30, 1923

Metals—New York

Copper, electrolytic, cents per lb.	12.562
Lead, cents per lb.	6.45
Nickel, cents per lb.	29.50
Zinc, cents per lb.	7.00
Tin Straits, cents per lb.	41.50
Aluminum, 98 to 99 per cent, cents per lb.	25.20
Babbitt metal, warehouse, cents per lb.:	
Fair grade	52.00
Commercial	25.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$4.425
Somerset mine run, Boston	2.50
Pittsburgh mine run, Pittsburgh	1.925
Franklin, Ill., screenings, Chicago	1.45
Central, Ill., screenings, Chicago	1.05
Kansas screenings, Kansas City	2.25

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	3.15
Tie plates (flat type), cents per lb.	2.575
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.125
Steel bars, cents per lb.	2.40
Ties, white oak, Chicago, 6 in.x8 in.x8½ ft.	$1.30

Hardware—Pittsburgh

Wire nails, base per keg	3.00
Sheet iron (28 gage), cents per lb.	3.75
Sheet iron, galvanized (28 gage), cents per lb.	5.00
Galvanized barbed wire, cents per lb.	3.80
Galvanized wire, ordinary, cents per lb.	3.35

Waste—New York

Waste, wool, cents per lb.	13–17
Waste, cotton (100 lb. bale), cents per lb.:	
White	12–14.50
Colored	9–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal.	$0.95
White lead (100 lb. keg), cents per lb.	11.375
Turpentine (bbl. lots), per gal.	$0.98
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4–6

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	14.625
Rubber-covered wire, No. 14, per 1,000 ft.	$6.60
Weatherproof wire base, cents per lb.	18.00

Paving Materials

Paving stone, granite, 4x8x4, f.o.b. Chicago, dressed, per sq.yd.	$3.60
Common, per sq.yd.	3.20
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.79
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	54.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.75
Cement, Chicago consumers net prices, without bags	2.20
Gravel, ¾-in., cu.yd., f. o. b. N. Y.	1.75
Sand, cu.yd., N. Y.	1.25

Old Metals—New York and Chicago

Heavy copper, cents per lb.	9.75
Light copper, cents per lb.	8.75
Heavy brass, cents per lb.	5.25
Zinc, old scrap, cents per lb.	4.125
Yellow brass, cents per lb. (heavy)	5.75
Lead, heavy, cents per lb.	5.50
Steel car axles, Chicago, net ton	$15.25
Old car wheels, Chicago, gross ton	17.75
Rails (short), Chicago, gross ton	19.75
Rails, (relaying), Chicago, gross ton	33.50
Machine turnings, Chicago, net ton	6.75

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Rolling Stock

Nic Le Grand, Inc., is installing safety devices on one-man cars of the Saginaw Transit Company.

Eastern Wisconsin Electric Company, Sheboygan, Wis., has placed an order with the St. Louis Car Company for four new Birney safety single-truck cars equipped with the latest safety appliances. Delivery is expected before Jan. 1. The new equipment is planned to give better and speedier service in Sheboygan.

Los Angeles Railway will construct twenty more cars in the main shops at Fifty-fourth Street and South Park Avenue, according to an order of General Manager Kuhrts in the 1924 program of company work. The twenty cars will be similar to the fifty-five cars that are being built in the 1923 program. They will be four-motor cars and equipped for single unit or train operation.

Track and Line

Philadelphia Rapid Transit Company has placed on order with the Lorain Steel Company for 4,000 tons of light rails.

New Jersey & Pennsylvania Traction Company, Trenton, N. J., will lay new rails on West Hanover Street, Trenton, between Willow Street and Green's Place.

Chicago & Joliet Electric Railway, Joliet, Ill., is engaged in eliminating a large grade crossing. The trolley track will pass over both the state highway and a steam railroad.

Hattiesburg Traction Company, Hattiesburg, Miss., is overhauling Hardy Street. The roadbed has been graded, new cross ties placed and the right of way cleaned.

Altoona & Logan Valley Electric Railway, Altoona, Pa., is lengthening all switches for passing purposes between Altoona and Tipton. This is because of the greater traffic that is expected through the opening of a motor speedway at Tipton.

City Railway, Dayton, Ohio, has asked the City Commission for permission to extend its lines several squares beyond the present loop. The company desires to extend the Third Street line from its present terminus at the Dayton and Eaton pike.

Mobile Light & Railroad, Mobile, Ala., will be requested to extend its line down Government Street or nearer to the Louisville & Nashville depot so that persons leaving and arriving by train may have better service and also so that women and children will have protection while traveling

Chattanooga, Tenn.—The public utilities in Chattanooga, exclusive of the railroads, are spending approximately $952,000 on improvements and additions during the current year. The largest expenditure is by the Tennessee Electric Power Company, which is estimated at $582,000.

Los Angeles Railway started construction of the track on Evergreen Avenue between First Street and Brooklyn, at the Brooklyn Avenue end. This will give a cross-town service for Hollenbeck Heights. The company is also extending its Vermont Avenue line from First to Monroe Street.

Washington Railway & Electric Company has completed physical improvements on its Columbia, or H Street, line at a cost of $361,653, which includes new and heavier rails, a concrete roadbed, new switches and new third rail. The new track extends from Fifteenth and H Streets Northeast to Twelfth Street and New York Avenue Northwest. Heavy rails of especial design were used to carry the trains of the Washington, Baltimore & Annapolis interurban, which reaches its Washington terminal over this route.

Monongahela-West Penn Public Service Company will repair its tracks on Eighth Street from Juliana to Ann Streets in Parkersburg. The present tracks will be replaced with new ones and will probably be laid in a concrete base. A 9-ft. right of way for the tracks extending over the block from Juliana to Ann on Eighth Street has been arranged. The tracks have been in bad condition for some time and arrangements have been made to repair them, but several difficulties were encountered which delayed starting the work.

Power Houses, Shops and Buildings

Empire State Railroad Corporation, Syracuse, N. Y., has awarded a contract for a new station at Minetto and the Public Service Commission has dismissed complaint by residents of Minetto asking for the station facilities.

Public Service Railway, Newark, has informed the City Commission of Trenton that it is now seeking a new site on which to erect a modern terminal for the cars of the Newark-Elizabeth and Camden divisions. Some time ago the company endeavored to secure the old Trenton Bank in the heart of Trenton, but this was taken over for other purposes.

Trade Notes

E. I. Du Pont de Nemours & Company, Fabrikoid Division, Newburgh, N. Y., has appointed Ross F. Hayes, 2 Rector Street, New York City, as Eastern sales agent, railway department, for sale of its Fabrikoid products. Mr. Hayes' territory includes New England, southern and middle Atlantic States.

Traffic Signal Corporation of New York City has filed an amended certificate in the office of the Secretary of State at Albany increasing its capital stock from 500 shares, of which 400 are preferred $100 par value and 100 common non-par value, to 600 shares, of which 200 are preferred $100 par value and 400 shares common no-par value.

F. C. Richmond Machinery Company, representative for the Conveyors Corporation of America, Chicago, has moved its offices and salesrooms to 320 West Second South Street, Salt Lake City. The F. C. Richmond Machinery Company is one of the largest mill supply houses in the West.

Eccles & Smith Company has sold out and is retiring from business both in San Francisco and Los Angeles. Its machine tool business was sold to the Waterhouse & Lester Company and the railway supply business is being taken over by Robert W. Jamison, 637 Mission Street, San Francisco, and C. Eccles in Los Angeles.

The Society for Electrical Development through its directors has authorized the establishment of an office at 527 Rialto Building, San Francisco, in order to render a more personal and intimate service to the electrical industry of the Pacific Coast. Samuel H. Taylor, formerly president, Electric Railway & Manufacturers Supply Company of San Francisco, has been appointed Pacific Coast manager. Mr. Taylor will continue to serve as secretary of the Pacific Coast Electrical Association.

New Advertising Literature

Conveyors Corporation of America, Chicago, Ill., has issued a folder entitled "American Air-Tight Doors."

Wagner Electric Corporation, St. Louis, Mo., has issued Bulletin 134 entitled the Fynn-Weichsel Motor.

Crouse-Hinds Company, Syracuse, N. Y., has issued folder No. 7 entitled "Flanged Obround Condulets." The folder contains a full page spread of the obround condulets, covers and wiring devices.

Reo Motor Car Company, Lansing, Mich., has issued a thirty-five-page book on passenger buses on the speed wagon chassis. The company has also issued in pamphlet form a report of a special investigation on the installation of the Richmond Rapid Transit Company, the Detroit City Motor Transportation Company, the Owosso-Flint Bus Line, Inc., the Mason-Lansing Bus Line and Cain Brothers interurban line.

Pioneer High-Speed Machine Knife & Tool Company, Cleveland, has issued a pamphlet announcing the establishment of a new company of craftsmen concentrating on the production of cutting tools of improved quality and marked economy. The company is headed by A. W. Ericson, who has specialized in the manufacture of sheer blades and knives for thirty-one years. The organization is called Pioneer High Speed Machine Knife & Tool Company "because of the years invested in attaining the requisite experience and skill."

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New York, Saturday, November 10, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 19

A Basis for Getting the Merchants to Accept Traffic Regulation

WE ARE all familiar with the phenomenon of a small commercial district springing up almost overnight where only residences used to be. At first thought this may be considered an inevitable accompaniment of the growth of the community. This is partly true, but the neighborhood store is growing at a very much faster rate than the population. Even in cities of moderate size it is now possible to purchase nearly all the necessities of life and most of the luxuries, including high-class entertainment, without going more than a few blocks from one's own home.

The greatest losers by this development are the downtown merchants. But another loser is the electric railway, which is deprived of two fares every time a customer buys at the neighborhood store instead of riding downtown and back. The trolley company and these merchants thus have a common interest in centralized trading.

A contributing reason for this development has been the slowing up of surface transportation systems. The longer it takes to reach the center of the city and return again, the more people get away from the habit of shopping downtown. The modern electric car is faster than its predecessors, but it is being seriously handicapped because of vehicular congestion.

We have been deluged with figures concerning the number of automobiles in this country, totaling some 14,000,000, or about one to every seven inhabitants, and many people have come to believe that the population in its daily comings and goings uses the automobile to the almost entire exclusion of all other means of transportation. This idea has led merchants to make tremendous efforts to attract the automobile trade. But the falsity of this theory can be very easily demonstrated. For example, the recent traffic survey of Los Angeles showed that on one street during a single hour there were more than 14,000 passengers in street cars and only 1,169 riders in automobiles. It is ridiculous to assume that there is more potential purchasing power in 1,100 automobilists than there is in 14,000 trolley riders. The truth is that few merchants could survive on the automobile trade alone. Their prosperity depends upon the proper functioning of the whole transportation system.

This idea is not new to the electric railways, but it is just beginning to be appreciated by the merchants. They have thought that cars parked around their stores meant increased trade. This was true once, but the limit was soon reached. Now only part of those who would shop can find places to park near the store, and the general congestion resulting, added to the other street traffic, tends to close off the easy access to the shops for the multitudes who ride the street cars. And it is in reality these car riders who support the stores, not the automobile owners. Thus, whatever makes it easier and quicker for the street car rider to get to the downtown store is of material interest to the merchant, and if appealed to on this basis, the latter would probably want to support, rather than oppose, as he has often done, the anti-parking and other traffic regulations that would help to speed up street car operation.

Objections to One-Man Cars Are Largely Political in Character

IT IS hard to see the philosophy of demanding the withdrawal of one-man cars, as has been proposed in various cities and states. The most recent cases are those of the state of Massachusetts and the city of Oakland, Cal. The objection to the use of cars of this type seems to come mainly from certain politicians, who use this as a means of keeping an issue before the public in order to line up prospective votes.

The one-man car is not an experiment, and it has been used in so many different localities and under so many different conditions that it has been proved out thoroughly. The annual statistical review published by this paper in the issue for Jan. 6, 1923, showed that approximately 7,500 cars of this type were then in use, and 785 cars were remodeled for one-man service during 1922. A later study made for the annual convention number published Sept. 29, 1923, shows that out of a total of 1,385 cars ordered in the first six months of this year, 1,206, or 87 per cent of the total, were arranged for operation by one man. Surely this does not indicate that the one-man car cannot be depended on for service.

With the use of one-man cars the railways have found it possible to meet rising expenses of operation to some extent and to handle the business at costs not so much above those existing prior to the war, as would be the case without their use. This has kept fares down below what they would have been without such help. The basic fact in this connection that cannot be overlooked is that wages of today are twice as great as they were when the companies were making money on a 5-cent fare, and the account "conducting transportation," which is principally platform labor, amounts to about 50 per cent of the total operating expenses

In Massachusetts, where a bill to abolish one-man cars has been introduced in the Legislature, it has been stated that the electric railways have operated some 56,000,000 car-miles with one-man cars, and that the accident record has been considerably improved as compared with two-man operation. This has been held

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due largely to the greater responsibility felt and discharged by the individual operator.

In Oakland the San Francisco-Oakland Terminal Railways has made an investment of upward of a million dollars in cars of this type, with the approval of the City Council that now wants to prohibit them. The purchase and the operation of the cars also have the sanction of the State Railroad Commission. The company states that these cars, which were put in service in 1920, have made more than 2,000,000 miles and carried 13,700,000 passengers in safety without protest or complaint. This certainly does not give any valid argument for the present agitation in the City Council.

It is just such actions of politicians as this that lead to many of the financial difficulties of electric railways. It is not an easy matter for the management to do its best to give adequate service under adverse conditions and then have all its labor go for naught at the whim of a group of politicians. Nothing is gained by such moves, as the only persons who may benefit, the car operators, may lose their jobs entirely instead of getting additions to their ranks. As a matter of fact, the best way to make the trainmen prosperous is to make the railway prosperous, and this cannot be done by limiting the productivity of the individual.

Building Traffic— or Driving It Away

HOW MANY of us appreciate the possibility for application of the practice expressed in the much-used words "merchandising transportation"? There is some basis for feeling that the difficulties of many electric railway properties are attributable, in part at least, to a very limited conception of what may be done to sell transportation. Two instances illustrate the point.

The first happened to a man who tried the experiment of traveling from Chicago to Rochester, New York, via electric. He, with several other travelers who cover this territory frequently, were informed by one electric railway property along this route that a connection would be made with another company's car at the terminus of the first line. Coming up the main street of the town, one minute late, the party saw the outgoing car leave the terminal. Apparently no effort was being made by either company to make this very desirable connection.

Compare this example of the way in which this group of regular patrons of the line were accommodated with the details of the second case.

A passenger informed the agent at the station at which he boarded a high-grade limited train of an electric line that he was very anxious to make connection with a through steam railway train at a station some distance from the electric line's terminus in a large city. The agent and then the traffic department quickly responded to the situation. Arrangements were made to hold the steam train for this passenger. The electric train was brought into the terminal several minutes ahead of schedule. A taxicab provided by the electric line was waiting to transport the passenger to the steam road station. Tickets had been secured for him in the meantime by the electric railway traffic department. Needless to say, a delighted passenger boarded the steam train.

The details of the methods used to accomplish this connection are of no particular interest. However, the spirit back of the organization is worthy of imitation.

The two cases cited are extreme, although they are both actual incidents. Imagine the frame of mind toward the electric railways in which these two passengers completed their respective trips and you have a striking example of what it means to merchandise electric railway transportation. If the names of the two railways concerned could be divulged, their respective condition would well illustrate the results of the spirit underlying the incidents related.

Earning Power Is Key to New York Railways Reorganization Plan

TO A reorganization committee, the value of any property lies in its earning power. Capital to build up a property may or may not have been wisely used in that process and may or may not exceed the value of the physical plant, but the net earnings after paying all charges are the usual measure taken of prosperity of an enterprise. It is this consideration probably that has led the committee in charge of the work of preparing a plan for the reorganization of the New York Railways to recommend the wiping out of $17,495,060 of stock of that company, and a change in the remaining financial structure so as to cut fixed charges by $720,000, annual contingent charges by $650,000 and rentals of leased lines by $350,000.

Peculiar circumstances surround the operation of this property. The question of the pursuit of a wise or unwise policy in connection with its operation in the past does not enter into the picture now. With escape from the fixed 5-cent fare apparently impossible, with the competition of the rapid transit lines confronting it and with other factors entering, the entire economic status of the company has changed. All these things the majority representatives of the various security holders have taken into account, and they have submitted for the approval of the court and commission a plan which would appear to make it possible for the company to carry on indefinitely without the likelihood of future disturbance of its credit. Thus the only bonds which it is proposed to leave undisturbed in the reorganization are those which have earned their interest in the past. As the New York *Times* remarked, the lines and leases, the stocks and bonds, which fail to produce dividends or interest are sentenced to capital punishment. To those who are always clamoring for regulation and more regulation, the same paper says that the punishment proposed to be meted out exceeds anything which toothless statutes could inflict. In short, they are economic regulations. The fact that a minority report was presented to the court differing in some of its points from the majority opinion does not alter the main facts, for the ends sought in both reports are essentially the same.

However hard the terms of the reorganization may appear, they could hardly in this instance be less drastic and not invite a repetition of disaster in the future. In this respect they are particularly in the interest of the public, which in the future will be represented on the board of directors under the provision to that end suggested by the committee. This provision is in line with recent thought in New York as shown by the adoption of the same plan by the Interborough Rapid Transit Company and its inclusion in the proposed "consolidation" plan of the Transit Commission.

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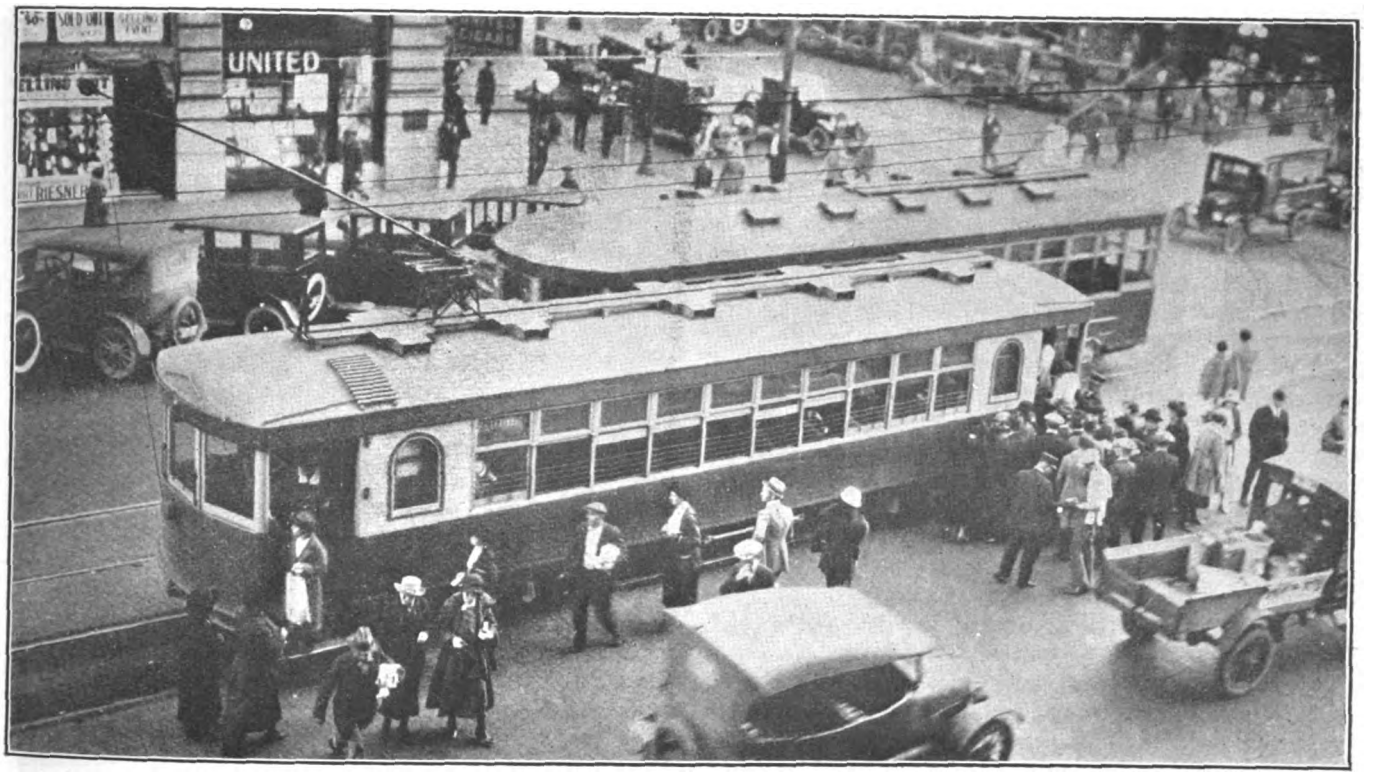
One Hundred per Cent One-Man Operation Proves Successful in Dayton

Improved Service at a Lower Fare with Double-Truck Cars Has Increased Traffic and Reduced Operating Expenses in Spite of Higher Wages on the City Railway System

By H. C. DeCamp
Formerly Assistant General Manager City Railway, Dayton, Ohio



On One of the Main Streets of Dayton Passengers Are Seen Boarding the One-Man Cars at the Front Door and Leaving at the Rear Door. An Extra Man on the Street at the Front End Is Making Change

DURING the strike of the platform men of the City Railway in July, 1921, a large number of jitneys made their appearance in Dayton. On this account, after the strike was settled, it was necessary for the company to take vigorous action to regain its lost traffic. Prior to July the fare had been 7 cents or four tickets for a quarter, but it was decided after the strike to reduce the cash fare to 5 cents, with a 1-cent transfer charge.

So much money had been expended during the strike that it was necessary also to cut down the operating expense in order to put the equipment in shape and improve the service. The railway was then operating fifty-six double-truck and several single-truck two-man cars to fill the schedule. Investigation was made in numerous cities where double-truck one-man cars were in use, to determine the feasibility of applying this remedy to the situation in Dayton. This led to the conclusion that if the City Railway could attain 100 per cent one-man operation with double-truck cars the financial problem would be solved.

As a result of the study of one-man operation elsewhere, the company decided to adopt the front-entrance rear-exit plan. There were several reasons for this, the most important being the desire to get the money first, so that in case of any delay on the line, there would be no opportunity for disputes because passengers were not carried through to their destinations. Owing to the layout of the various lines in the city, it was thought that there would be less chance for transfer abuse if transfers were issued when the passengers boarded the cars. Another reason for the adoption of the front-entrance plan was the desire to eliminate boarding accidents which might occur in case the car was crowded and the operator at the front end did not have a clear view of the rear door.

Under the plan being followed in Dayton, after the car has come to a stop, the operator looks into an inside mirror located on the right-hand window post, notes the number of passengers wishing to alight, and when the last one has got off the car, as shown by an outside mirror, he gives a second glance at the inside mirror to note if any other person may suddenly have decided to get off, and if not, closes the rear door and starts the car.

Both front and rear doors are operated by pneu-

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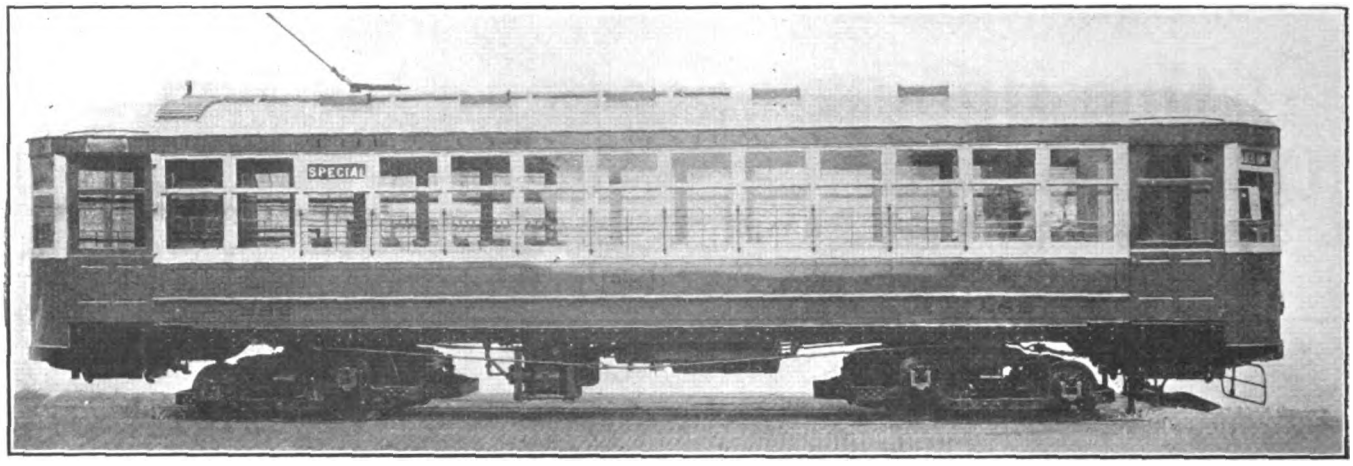


Car Built in 1914 and Remodeled for One-Man Operation

matic door engines. These are controlled by two air valves placed in a convenient position, one above the other, at the left of the air-brake valve. By a single movement of the operator's hand both doors can be opened. On each door engine is a switch which controls red and green lights placed in a small metal box on the front center window post immediately in front of the operator. If a door is open, a red light is shown, and when closed, a green light appears.

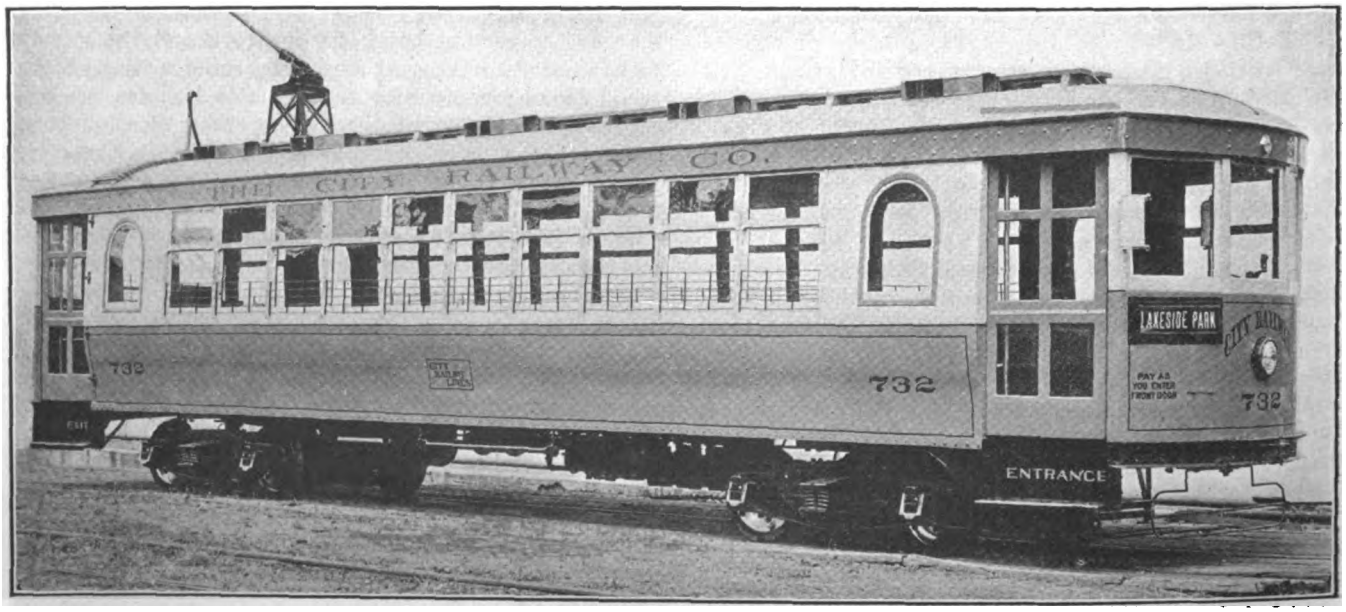
In addition to the inside and outside mirrors, each car is equipped with a row of five electric lamps over the rear door. These are placed in the letterboard panel and are controlled by the door switch. At night when the door is opened the lamps are lighted, producing a flood of illumination around the outside steps. The lighted area extends for a distance of 15 or 20 ft. and materially assists the operator in determining when the passengers have alighted.

The double-truck one-man cars were equipped with Syracuse turnstiles at the rear end, located as shown in an accompanying illustration. At heavy loading points, in Dayton, it frequently happens that twenty or twenty-five passengers leave the car at the same time. If it were necessary for them all to leave by the front door, confusion and delay would occur, because even with a double front door, only a small number of passengers can board the car before they come into contact with outgoing passengers in the aisle. The method followed, however, has been found to eliminate this difficulty altogether. Another advantage is that passengers move toward the rear of the car, where they will alight, and the entrance is thus kept clear.

How Car Requirements Were Met

When the City Railway commenced one-man operation, it was decided to rebuild all its cars, because they were very much in need of it, and also to purchase fifteen new light-weight cars especially designed for that method of operation. The latter have already been described in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 28, 1922. As the company's shops were not fitted for such general rebuilding, the work was done at the shops of the Oakwood Street Railway, Dayton. A single car was first entirely rebuilt, repainted inside and out, and completely equipped as a sample of the type to be operated. This model was then approved by the City Commission, and the company began publicity work to tell the general public what it intended to do and how it expected to give better service.

At the start the model car was placed in service with two men, operating on No. 1 run on the best line in the city of Dayton. The company's object in stationing



Ten More Cars of This Type Were Put in Service Recently

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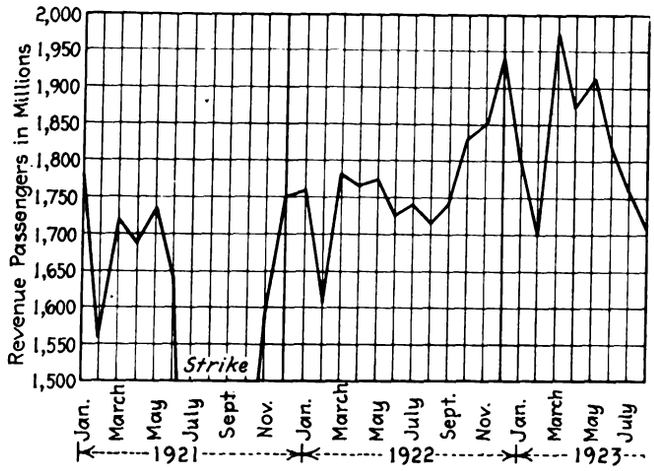
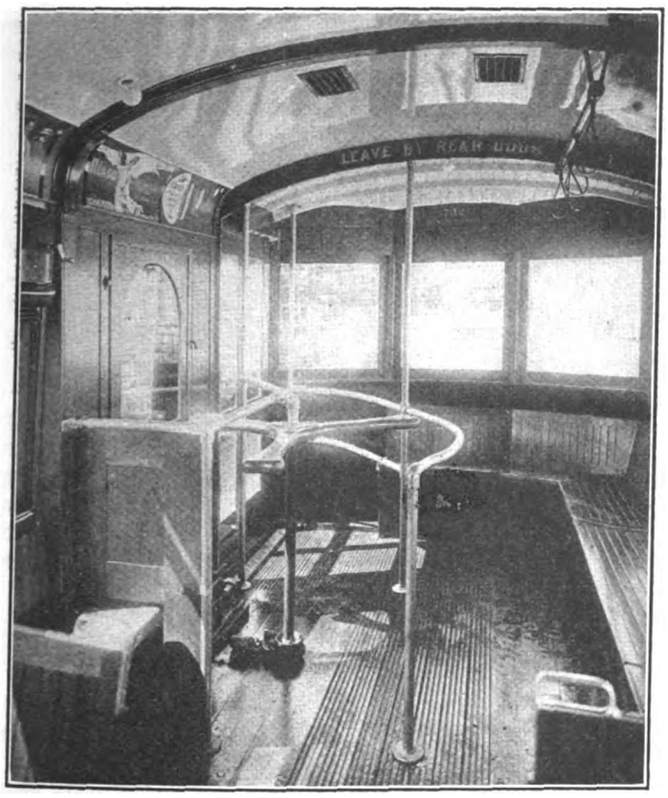
two men on the car was to have the second man stand in the rear and in case any one started to alight by the front door he could call out "Rear door, please." These two men alternated in running the car, and by this means, both became expert at it. The car was operated for three days on this run and then put on No. 2 run, the crew of the latter run having been broken in during this period. In this way, all of the crews on runs from 1 to 12, on that line, were instructed in the new operation of cars. At the same time, the public became quite familiar with it. On Sunday, July 23, 1922, when travel was light, a complete equipment of new cars was installed on one line. The same method was followed to inaugurate one-man service on the other lines in the city. At the present time, the company is operating 100 per cent one-man service with double-truck cars.



Curve Showing Trend of Revenue on Dayton City Railway

The percentage in saving of platform wages for the first eight months of this year, compared with the corresponding months of 1922, was as follows: January, 36.4 per cent; February, 36 per cent; March, 37.2 per cent; April, 39.8 per cent; May, 37.7 per cent; June (increased wages), 33 per cent; July, 33.8 per cent; August (extra time for change men in the rush hour), 29.6 per cent.

All the expenses of reconstructing the old cars, as well as the purchase of new cars, have been paid for by the saving in wages and operating expenses and by the increased traffic resulting from improved service. The number of revenue passengers has increased to a gratifying extent. This trend is illustrated in the accompanying chart. The City Railway believes that its success in this venture has been due not only to the front-entrance and rear-exit plan adopted, but also to the thorough education of the public, the careful training of the operators, and attention to small details of equipment. The riding public is well satisfied with the service, and the operators would prefer to resign their jobs rather than return to two-man operation.



The Removal of the Turnstiles Installed at Rear, as Shown Above, Has Been Made

Interior of Older Type Car Rebuilt for One-Man Operation

Saving in Platform Expense

The wage scale in effect after the strike beginning in July, 1921, was 41 cents per hour for the first three months, 43 cents per hour for the ensuing nine months, and 45 cents after the end of the first year. This was later increased to 46, 48 and 50 cents per hour respectively, when one-man operation began. In June of the present year, the company voluntarily increased wages to 51, 53 and 55 cents per hour for the one-man operators.

No better proof of the success of one-man operation in Dayton is possible than an examination of the financial results therefrom. Besides paying for the reconstruction of the old cars, as already stated, and the purchase of new cars, the railway has paid 6 per cent on the preferred stock and 3 per cent on the common stock.

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When all service was performed by the two-man cars, the company had 240 platform men. At the present time, with 100 per cent one-man service, the number is 126, which includes six flagmen for railway crossings. At the time of the change, all regular runs were replaced by one-man cars on a car-for-car basis, with the same number of swing runs, but extra trippers added for the evening rush hour. This was done to give the better service which the company promised when making the change. Inasmuch as the change was made gradually, no actual release of employees from service was required, but the company simply ceased to employ new men as employees turned in their resignations. This method worked out to the mutual satisfaction of the railway and the platform men.

Some Operating Details

With two-man operation the average schedule speed of the lines of the City Railway was 9½ m.p.h. Since the inauguration of one-man operation, no change has been made in this schedule. In fact, one of the problems has been to keep the operators from running ahead of time. Since he is in sole charge of the car, the operator does not now have to wait for a signal from the conductor, and this saving in time has resulted in an actual increase in speed, rather than in a tendency to slow up operation.

In the matter of making change, the 5-cent fare has been a great advantage. During the rush hour, from 4:30 to 6 p.m., changemakers are stationed at the principal loading points. By making correct change for passengers before they board the car, they have speeded up operation to such an extent that actual records show a loading speed of thirty-five passengers per minute.

The issuance of transfers has been another problem. A machine is now being developed in Dayton, which is inexpensive and it is hoped will prove satisfactory. Experiments are being tried with it on the Oakwood Street Railway.

Ordinarily, all switches are controlled from inside the car, by using a switch iron through a hole in the floor. During the evening rush hour, however, switchmen are stationed at important points to throw the switches. They also serve as changemakers at these locations, and thus are an additional help to speedy operation.

When one-man service was first inaugurated all of the cars were equipped as noted previously, with Syracuse-type turnstiles at the rear doors. The public has now become educated to the method of operation, and the turnstiles are no longer considered necessary and are being removed from all of the cars. By taking them out, passenger interchange is accelerated, and at the same time valuable space inside of the car is regained. The removal was made also on the ground of public relations, and since their removal, the approval of the passengers has been clearly expressed.

Cost of New and Rebuilt Cars

The rebuilt cars are of three general types, those designated as Barney & Smith cars with a narrow platform, a wooden type built by the Cincinnati Car Company in 1909, and some modern steel cars. Five out of twenty of the latter type have been rebuilt at a cost of $2,000 each for the body, outside of trucks and electrical equipment, and the weight reduced 4,500 lb. by changing the type of motors and trucks. The wooden cars were rebuilt outside at a cost of $4,825 each, which includes an overhead charge of 100 per cent. The cost of converting the older Barney & Smith cars varied somewhat in price, on account of the installation of electric heat in four of them. The price of the new light-weight cars was $9,971 each.

In all of the cars there has been installed, for emergency, a conductor's air valve in the front vestibule, operated by a red cord running along the molding. This cord has pull-handles at the front, middle and rear of the car, labeled "For Emergency Only." When the cord is pulled, exhaust air actuates a circuit breaker knock-out, which shuts off the current, applies the brakes and balances the door engines in the same manner as in the standard safety car.

Ten new steel light-weight cars of the type shown in an accompanying illustration were put in service during September of this year. The use of all single-truck cars has now been discontinued, and fifty of them were burned a short time ago, after all available material had been salvaged. Enough plate glass was secured to equip all of the new cars, and in addition there remained a plentiful supply for future replacements.

During the past year the company has been operating with an insufficient number of cars to provide adequate service. Passengers have been crowded in to such an extent that it has been difficult to close the doors. While the undesirable features of such an arrangement are freely admitted by the railway, nevertheless this has served as an excellent test of the value of one-man cars in heavy traffic. Although the population of Dayton is only 160,000 and there are five separate railways operating within the city, nevertheless the City Railway carries an average of 60,000 passengers on week days, and on Saturdays from 75,000 to 80,000.

The public has been pleased with the one-man operation; the platform men are thoroughly satisfied with it, and the number of accidents has decreased. The financial results have been so good that the old rolling stock has now been entirely rebuilt or replaced by new cars. It is therefore felt by the company that the success of the experiment begun a little more than a year ago has now been thoroughly established.

New Safety Organization on Beaver Valley Traction

EX-MEMBERS of the safety committee of the Beaver Valley Traction Company, New Brighton, Pa., determined to keep in touch with the safety work that is being carried on, have formed a new organization known as the "Veterans' Association" of the safety committee, which is sponsored by H. O. Allison, safety engineer.

The safety committee is elected by a vote of all the employees. Membership in the Veterans' Association is limited to those who have served at least one full term on the committee. If any member is re-elected to the safety committee he automatically loses his membership in the Veterans' Association. The purpose of the new organization, of which W. F. Allshouse, track foreman, is president, is to carry on the safety work, and functions as the "Senate of Safety" for the road. Thus has it been exemplified that interested employees who possess initiative will respond when there is a real need for their work. That the safety work pays is attested to by the following statement issued by W. H. Boyce, general manager:

"Organized safety work has resulted in the reduction of our accident costs from 8 per cent of the gross, which was the average for a ten-year period, to 2.42 per cent of gross in 1920, and 1.89 per cent in 1921."

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Using the Streets for the Greatest Good of the Greatest Number*

By J. Rowland Bibbins
Consulting Engineer, Washington, D. C.

Traffic Conditions in Several Cities Are Cited as Typical of the General Problem.—The Subject of Expediting Traffic Movement Is Looked at in a Broad Way, from Which It Is Noted that However Important Are Other Phases of City Planning, Transportation Must Be Considered as a Fundamental

IT SEEMS high time for those concerned in the serious study of city and transportation development to make a new appraisal of present conditions and future possibilities, for the conflict of interest of those using the public streets has become a veritable battle for supremacy. "Traffic" has become a regional as well as a local problem, and future growth must be met more frankly and scientifically than in the past.

Elements of the Problem

In general, the elements of the problem are as follows:

1. Transit service—capacity and routing.
2. Street traffic control—vehicle and pedestrian.
3. Rail and marine traffic—provision for special needs.
4. Street and highway plan—capacity for present and future.
5. Pedestrian movement.
6. Relation to the broad city or district plan and the general public welfare; special needs of the office, wholesale, retail, warehouse and industrial districts; also the purchasing power of the city for public improvements as measured by its increasing revenues from taxation of private property.

Some Typical Conditions

Chicago has attempted literally to serve an area of over 200 square miles by a central district eight blocks wide by twelve blocks long. But business has now burst through these fictitious boundaries, after facing an economic loss estimated by the City Plan Commission at $60,000,000 a year from traffic impedance due alone to parking in a lineal street frontage of only 110,000 ft. A thirty-minute day and no-parking rush hour traffic ordinance has improved conditions, but 300,000 cars in the Chicago district call for accommodations upon the public streets for business and pleasure.

Baltimore recently found in its business district 152,339 vehicle movements and only 21,036 street car movements, and that during the rush these vehicles handled only 11 per cent of the total passengers carried, while the street cars handled 89 per cent.

Detroit has developed a northerly sub-center of unusual size, Highland Park, but here, at the principal exit from the Ford Motor Works, a rush-hour traffic is found averaging eighteen seconds headway per street car, two seconds for vehicles, and from 0.1 to 0.2 second for pedestrians; i.e., about 200 street cars, 1,800 motors and 10,000 to 20,000 pedestrians per hour.

Montreal, at its three most important street crossings, finds 75 per cent more vehicles than street cars, but these carry only 7 per cent of the passengers carried by cars. And during heavy winter snowfall, practically all traffic is confined to the car tracks for long periods. Motors have multiplied five times in six years and trucks nearly doubled in two years. There are only three main highway entrances to the city, one from the south; but over 80,000 United States automobiles enter Quebec Province during the summer, mostly reaching Montreal. Yet Montreal has only one main traffic street with roadway as wide as 54 ft., necessary for free two-way traffic with street cars and parking, and this street is used for heavy freight traffic between east and west side railroads and industrial districts as well as for the street railway terminal trunk lines.

Los Angeles is striving to work out of its tangle of motor traffic, superimposed upon its street railway and heavy interurban train movement through the streets. It has been recently proposed seriously to exclude street cars entirely from the central business district, using a belt-line transfer instead.

A large proportion of the through interchange l.c.l. freight movement between Chicago railroad terminals is still handled through the city streets by trucks. In Cincinnati practically all l.c.l. interchange freight, formerly handled by trap cars, is now motored through the streets by the shortest route.

These are not far from typical conditions throughout the country in the larger cities. The two most serious tendencies have been the general resistance to any change or betterment except at the "other fellow's" expense, and the very general recourse of city authorities to sudden and drastic prohibition in one form or another in the use of the public streets.

Growth and the Future

It is probable that by 1940 our population will approximate 130,000,000 people, of whom 70,000,000 or more will reside in the cities. Railroad freight tonnage is increasing proportionately as the cube of the population or nearly so; ton mileage is increasing much faster. Thus, terminal tonnage is a problem proportionate to the cube of urban population, at least for a time. Trucking tonnage will probably increase as fast; for, except that which moves car-load direct from origin to final destination, the entire rail tonnage must be carried over our streets and highways one or more times, according to the number of fabrications.

The paradox of transit traffic increasing as the square of the population still continues in New York City, and in most cities it is at least following a geometric

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progression, rather than straight proportion. Motors are increasing far beyond the fourth power of the population, and it is found in some cases that the total movement each day in and out of the delivery district of a large city is equal to, or greater than, the number of car registrations for the entire city. Pedestrian traffic seems to be hopelessly crowded into the background.

On the other hand, fixed traffic facilities, such as streets, tracks and terminals, are only slowly increasing —hardly as fast as the population, if at all—while the traffic itself is increasing in geometric ratio to the population. Meanwhile, city authorities hesitate to undergo apparently expensive improvements, although clearly running the risk of vastly greater expense later, due to the rise in property values. And here is the one fortunate aspect. For the assessed value of property in our cities is increasing at about 1.7 power of the population, in some cases faster than the square. This growth is generally stable and a reasonably sure index, and should offer great encouragement to careful study and prompt action.

SUGGESTIONS FOR CONSTRUCTIVE ACTION

From these facts it is clear that the immediate and future problem is largely a terminal one. It has been greatly neglected in the past and left entirely in private or corporate hands or to the carriers themselves. Few cities have even gone so far as to develop bypass traffic streets and highways,* and in a recent 2,000-mile auto trip in the East the writer did not see a single sign at the entrance to a city reading "Heavy traffic detour this way."

There are many avenues for constructive action, immediate and future, which ought to be based upon ascertainment of definite facts first. The general idea of decentralization is of course good, but even subcenters have to be planned in advance. Thus, the problem of Highland Park, Mich., is already as large as the central district problem of a city of a million or more.

The thoroughfare plan is most important. We now know that the old decimal system of 40, 50, 60, 80 ft. widths has little merit as a measure of real traffic capacity. Sidewalks and obstructions must give way and arcading of highly developed narrow streets may often have to be resorted to, to widen the roadway and still give opportunity for full development of air rights above. The constant extension of building heights is a ruinous civic policy. Some office buildings are now being built with automobile storage for their tenants in the basement.

The "twilight zone" surrounding the business districts of all large old cities offers an unusual opportunity for development of marginal long-time storage facilities for business cars; and in cities of rugged topography, hillside garages with entrances from two or three levels can be built and operated at far less cost than the ramped buildings now being built. Limited parking must be adopted, but rigid prohibition is obviously the wrong method, at least until our citizens become rich enough to have their own chauffeurs. In every city many idle spaces can be developed, at least temporarily, for pay storage at moderate rates; and underground storage in large public areas, such as the ideal situation in Grant Park, Chicago, remains to be developed.

With a reasonable accommodation of essential motor traffic, it will be found that the problem of street car movement will unravel itself through better operation, now almost impossible, and rapid transit. Singularly enough, the value of prepayment loading stations for street cars at large industries and other heavy transit points, for speeding up the line, has been too often neglected by both transit companies and industries. Electric railways still exist as our major hope of mass transportation, but they cannot function unless given the right of way which is proper under our democratic code of life—the greatest good of the greatest number. The fuller development of strategic railroad entrances, available in many of our large cities for combination railroad, rapid transit and motor ways, is a public resource of immense value to which immediate thought should be given; for this policy will save tremendous investment in otherwise duplicated facilities, or, conversely, provide more facilities for the same money.

Perhaps the greatest immediate need of the railroads is to apply a "suction pump" to their terminals to get the freight away. In other words, off-rail movement is perhaps equal in importance to overland movement. In the aggregate, half of the total transport cost, origin to destination, is off-rail. The efficient organization of this great off-rail movement in our cities is a problem that has been almost wholly lost sight of, except in a very few cases.

To this end there must be brought about some reasonable form of general terminal unification—at least in operation, if not in ownership and control. Probably half of the investment in railroads today is in other than main-line track, namely, terminals, and the proportion of new capital therein is increasing and necessarily must continue to do so. Coupled with a real organization of off-rail motor movement, terminal unification offers perhaps the greatest opportunity of the future for increasing the efficiency and revenue-earning capacity of railroad investment. And in the face of the present astonishing growth of rail tonnage, some such plan may soon become imperative. Zoning of commercial districts, including terminal, port and harbor operations, has also become a definite need.

The reclamation of land values, especially in railroad terminals, surrounded as they are by highly developed areas, again offers future possibilities difficult to exaggerate, and one of the most important financial resources now available to the railroads. It is almost axiomatic that rise in land values must eventually force a recession of freight facilities (and possibly passenger facilities) through the agency of motors, just as in other normal real estate development. Store-door delivery will simply accelerate this rational process.

In these necessary great public improvements of the future, part solutions are dangerous, as the various factors are so inter-related. In rational terminal evolution (used in the broader sense), rail, motor, trolley, barge and ship must each play their logical part. If a reasonable system, similar to our present local district assessment method, is worked out on a basis of true cost and benefit, with excess condemnation where it is obviously essential to insure correct development, the future growth of our cities will not prove so distressing a problem as in the past. However important other phases of city planning, transportation must be recognized as having a more definite place in the general perspective. It is not a detail; it is fundamental.

*But Baltimore has developed its "Falls Way"; Chicago, 65 miles of freight tunnel and its two-level Michigan Boulevard (South Water Street Extension underway); New Orleans, its Belt Railroad; St. Louis, its plan for motor freight to off-track inland stations.

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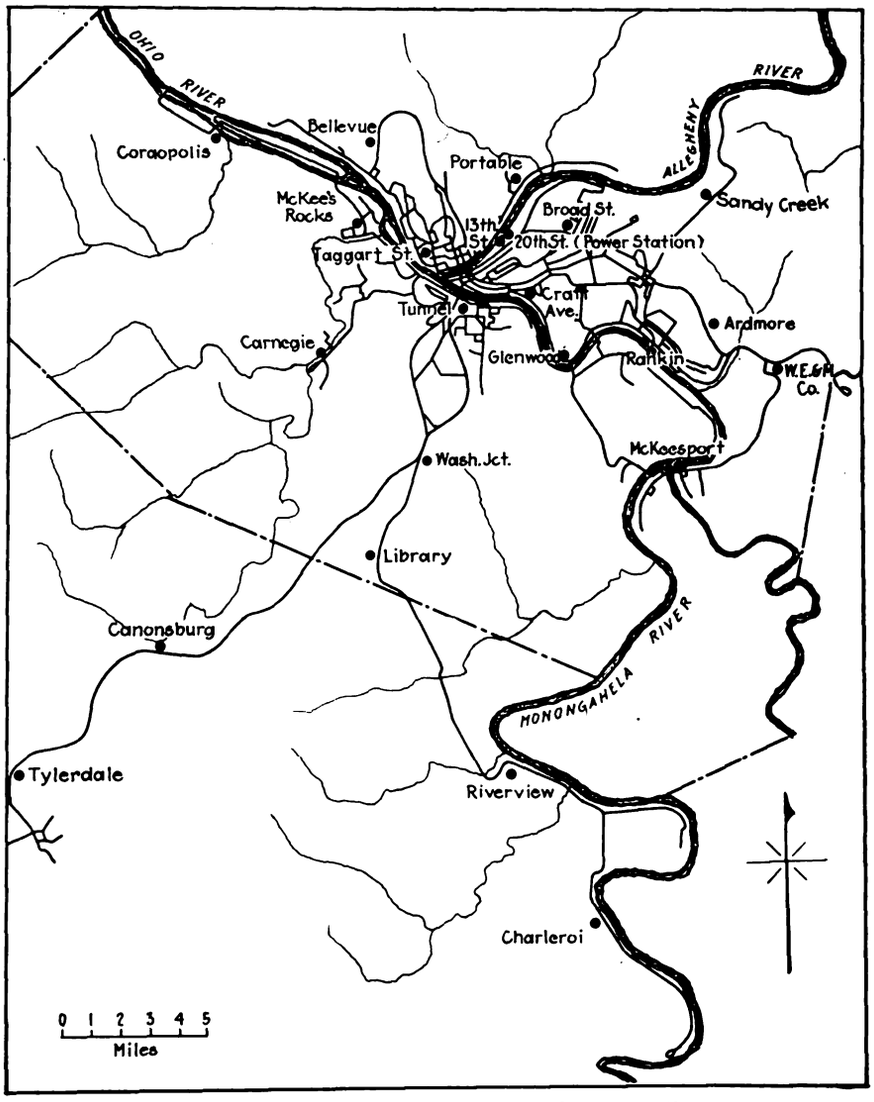
Shunt Operation of Rotary Converters in Substations Effective

By R. J. Saulsbury
Chief Electrician Pittsburgh Railways

Pittsburgh Railways System Adopted Shunt Operation for 60-Cycle Converters Early in 1923—Time of Power Outages During First Six Months of This Year Reduced to Less than Half that Occurring with Compound Operation Last Year—Flashovers Almost Eliminated

As THE older direct-current power stations and motor-generator substation sets supplying the Pittsburgh Railways were replaced with modern 60-cycle rotary converters, it began to be noticed that the power supply was not as reliable as formerly. Outages became more frequent and flashovers were increased. Since the substations were tied in to a large alternating-current distributing circuit instead of being operated separately, these disturbances frequently affected large sections of the power system, rather than being purely local as in the past. After researches made under the direction of the chief electrician, it was decided to adopt shunt operation of all the rotary converter stations. The result was that difficulties of this sort were immediately reduced in number. Outages of any sort became the exception rather than the rule, and in a period of six months only three flashovers have occurred.



Map of the Pittsburgh Railways, Showing Substations

EXTENT OF THE SYSTEM

The system of the Pittsburgh Railways comprises some 600 miles of track, the greater portion of which lies within the city of Pittsburgh, but important interurban lines reach Washington, Charleroi, McKeesport, Oakmont, Emsworth and Coraopolis. Originally these lines were all fed from independent direct-current power plants, but with the growth of the system it was not always possible to place a power station at a point where the supply was needed, owing to the absence of coal, transportation and water. This forced the adoption for some of the lines of alternating current, which was changed over for railway service by means of motor-generator substations. The main advantage of the motor-generator was the flexibility of operation and the possibility of using smaller reserve capacity. Some of these sets were driven by induction motors, but the difficulties experienced on account of low power factor and poor voltage regulation soon showed that the disadvantages of this type of motor outweighed the advantages, so that the design swung over to the synchronous motor-generator sets.

This was in the days of the earliest 60-cycle rotary converters. Increases in capacity of the system were made with this type of equipment, forming a secondary ring outside the metropolitan district. These 60-cycle converters operated very well with the remainder of the system, as they were usually connected to the metropolitan stations through single, long d.c. feeders, and could not exchange any great amount of load. Since these stations were each practically isolated, individual heavy-duty emergency storage batteries were connected with them. These batteries have since been removed from service.

The installation of larger and larger units of power

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TABLE I—TOTAL NUMBER OF SUBSTATION OUTAGES PITTSBURGH RAILWAYS, 1922 AND 1923

	Twentieth Street	Thirteenth Street	Broad Street	Craft Avenue	Tunnel	Taggart Street	Total
1922							
January	0	3	0	1	1	1	6
February	0	0	1	1	1	2	5
March	0	0	0	1	1	1	3
April	0	0	0	0	1	2	3
May	1	3	1	1	2	2	10
June	3	1	3	3	6	2	18
	4	7	5	7	12	10	45
1923							
January	0	0	0	1	1	0	2
February	1	0	2	1	3	1	8
March	2	0	0	0	1	0	3
April	1	0	0	0	0	0	1
May	1	0	1	0	1	3	6
June	2	1	1	1	3	1	9
	7	1	4	3	9	5	29

TABLE II—TOTAL MINUTES OF SUBSTATION OUTAGES, PITTSBURGH RAILWAYS, 1922 AND 1923

1922	Twentieth Street	Thirteenth Street	Broad Street	Craft Avenue	Tunnel	Taggart Street	Total
January	0	25	0	16	12	16	69
February	0	0	7	11	14	15	47
March	0	0	0	11	8	9	28
April	0	0	0	0	3	26	29
May	20	48	20	16	13	9	126
June	11	5	34	50	66	10	176
	31	78	61	104	116	85	475
1923							
January	0	0	0	10	7	0	17
February	7	0	13	17	36	23	96
March	5	0	0	0	2	0	7
April	2	0	0	0	0	0	2
May	2	0	2	0	5	14	23
June	10	14	13	8	30	8	83
	26	14	28	35	80	45	228

supply, which took place when the power plants of the railway were placed under control of the Duquesne Light Company in 1913, introduced operating economies which made it possible gradually to replace the d.c. power stations, some of which were by this time obsolete, with a.c.-d.c. substations. By this time some of the earlier operating difficulties of 60-cycle converters had been ironed out, and due to the greater efficiency and less floor space required, the standard was changed over to the rotary converter station. After 1915 all new stations erected were equipped with rotary converters, although additional motor-generator sets were placed in existing stations.

Substations Now Have Superseded Power Plants

At the present time all of the d.c. plants have been superseded with substations, with the exception of one at the heart of the downtown district, which still is maintained for stand-by service. The locations of the substations are shown on the map. There are now six stations feeding the metropolitan district, consisting of

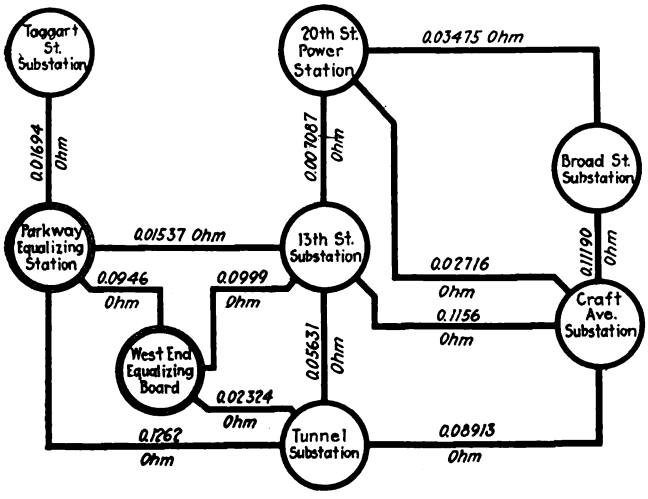

Diagram Showing Relative Resistance on D.C. Feeder System Between Substations

the d.c. power plant, whose capacity is 6,400 kw.; two rotary converter substations with a capacity of 15,200 kw., and three motor-generator substations with a capacity of 12,900 kw. Surrounding this central area there are eleven suburban stations, of which eight are rotary converter stations, having a total capacity of 13,300 kw., and three are induction-motor-generators with a capacity of 4,000 kw. In addition there are five interurban substations with a capacity of 4,100 kw.

All the stations operate in parallel on the d.c. side and, with the exception of one, are fed from a common a.c. bus.

Use of Rotary Converters Introduced New Problems

The change from isolated d.c. power plants to this combination of substations introduced some new operating problems. Any disturbance on the a.c. supply now affected the entire railway system instead of only isolated portions as formerly. This effect manifested itself in various ways. If the disturbance affected the voltage only, the load was shifted to the motor generators, whereas if the frequency dropped the load was shifted to the rotary converters. In the case of the induction-motor generators, it was even possible to have a momentary interruption to the a.c. supply without dropping the machine from the line.

At the same time this changeover from power plant to substation was taking place, extending as it did over a period of ten years, there had come about a great change in the transmission system, which supplied the stations. Whereas at first the substations were fed individually from separate transmission lines radiating from the a.c. power houses, today the substations are tapped off of a complicated interconnected system of 66,000-volt, 22,000-volt, and 11,000-volt transmission lines, practically all of which are operating in parallel at the separate voltages.

As the changeover approached completion, it was noticed that the power supply was not as reliable as formerly. On one occasion a failure at one of the smaller suburban substations spread out so that the load transferred to other substations opened feeder or machine switches at four additional stations, knocking them off like a row of dominoes. On another occasion a flashover in a metropolitan station dropped it from the line, kicked two others off completely, and pulled out feeders from three other stations.

The d.c. feeder distribution system, shown in an accompanying illustration, indicates the resistances in the tie line between the stations for the metropolitan district. A study of the distribution system showed immediately that compound operation, either of motor-generator sets or rotary converters, was undesirable. In case of trouble on the d.c. feeders, the tendency of the rotary converters was to pick up most of the load. This was due primarily to the low resistance between the d.c. buses and the various stations, which allowed considerable load to shift from one station to another in time of trouble.

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In order to prevent this additional load from building up on one machine and pulling out another station entirely, it was decided to apply as far as possible the method of shunt operation to all of the substations. Shunt operation began early in 1923 at all of the substations on the Pittsburgh Railways except one where special conditions prevented it. The results were immediate and surprising. Outages of any sort became the exception rather than the rule. At the same time a more complete study of the a.c. power supply and the development and application of an adequate relay system to isolate defective lines resulted in a much more continuous supply of power. However, eliminating this factor entirely, and giving account only to those troubles occurring within the station itself or coming in over the d.c. distribution system, the results obtained exceeded expectations. Almost complete continuity of service followed, probably as near 100 per cent as will be possible in practice.

In the thirty days before shunt operation of nine converter stations there were sixty-two outages for a total of 401 minutes, thirty-four of which were flashovers. For thirty days after shunt operation began, there were twenty-five outages for a total of 151 minutes, of which only three were flashovers. It is not to be understood that all the above outages represent serious delays to service. In most cases the station was small and the outage affected only one or two cars, while in others one feeder was affected for a minute or two. However, the above figures for the two periods were made on the same basis, so that the results are comparable.

Shunt operation bettered the commutating characteristics of the machines in all the stations, so that higher time and current settings of the protective devices were permitted. The overload feature on the carbon circuit breakers on the d.c. side of the machine became practically unnecessary, as with reverse-current, overspeed, and overload a.c. devices the machines are protected adequately. Even where these latter devices were not in use, in such cases the d.c. circuit breakers were equipped with time delay devices and set to 150 per cent overload.

Results Especially Good on Non-Interpole Converters

The effect of shunt operation was especially noticeable in the case of the old non-interpole compound converters, on which the short-circuited series fields acted as a damping winding. The capacity of these old machines actually was increased, and it was possible to set the d.c. breakers to 200 per cent overload. Where before flashovers had been of almost daily occurrence, they now became extremely rare. At four stations there were sixteen flashovers in three months after shunt operation began, whereas for the corresponding time a year previous there were sixty-six flashovers at these same stations.

The elimination of rapidly fluctuating loads and of flashovers also has reduced maintenance costs. Brushes do not wear so rapidly nor do the commutators require so frequent dressing. The brush-holders and springs do not need renewal so often. No difficulties as to commutation, heating of fields or other operation have been experienced. Neither has there been any noticeable change in efficiency, even though particular attention has been paid to checking this item. A somewhat closer watch on the power factor must be made by the operator, but this is not burdensome. There has been no noticeable increase in heating of the tap coils.

The accompanying tables show the total station outages for each of the six city stations for the first six months of 1923, as compared with the corresponding data for 1922. The total number of cutages has been reduced from forty-five to twenty-nine, while the time of the outages has gone down from 475 minutes to 228 minutes. While the mixed assortment of motor generators and rotary converters on a railway system is not desirable, yet with such a system the shunt rotary converter seems to be the logical cure for many of its operating ills.

Minneapolis Valuation Before Minnesota Commission

Cost to Reproduce the Property is Submitted by Engineer for the Company on Six Different Bases of Unit Costs—Going Concern Value Placed at $6,000,000

THE Railroad and Warehouse Commission of Minnesota opened hearings on Oct. 8 to determine the value of the property of the Minneapolis Street Railway. Upon the valuation fixed by the commission at this hearing will depend the rate of fare to be in effect in Minneapolis. The company now has a 6-cent fare, which is lower than that established in many cities of the size of Minneapolis, but the city is endeavoring to reduce this rate. The present case was started in 1921 and after a conference of the valuation engineers for the company and the cities of Minneapolis and St. Paul with the commission it was decided to make valuations of the property on five bases. The September, 1923, basis was added on account of the delay in beginning the hearings.

Mr. Drum of A. L. Drum & Company, consulting engineers, Chicago, on behalf of the company submitted to the commission valuations of the property on these six bases, which are itemized by classes of property in the accompanying table.

The property covered by the valuation comprises the entire street railway system located within the corporate limits of the city of Minneapolis. This comprises the property of the Minneapolis Street Railway, the Minnetonka line and the Como Terminal property. The Minneapolis Street Railway also operates two suburban lines extending outside of the corporate limits of the city of Minneapolis. These suburban lines comprise the Columbia Heights line and the Fort Snelling line. Passengers are transported for one fare on all lines located within the city limits and on the Columbia Heights and Fort Snelling lines extending outside the city limits. The present rate of fare on these lines is 6 cents.

An inventory and appraisal was also prepared of two other suburban lines extending outside the corporate limits of Minneapolis. These comprise the Robbinsdale and St. Louis Park lines, which are operated outside the corporate limits of Minneapolis by the Minneapolis and St. Paul Suburban Railroad for an additional 3-cent fare from the city limits to Robbinsdale and an additional 5-cent fare from the city limits to St. Louis Park, respectively. The inventory and appraisal were prepared so that each of the above described properties was treated as a separate and distinct unit.

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THE COST TO REPRODUCE NEW AND THE ORIGINAL COST OF THE PHYSICAL PROPERTY OF THE MINNEAPOLIS STREET RAILWAY COMPANY, INCLUDING ALL PROPERTY IN THE CITY OF MINNEAPOLIS AND THE COLUMBIA HEIGHTS AND FORT SNELLING LINES EXTENDING OUTSIDE OF THE CITY LIMITS AS OF JAN. 1, 1922. THE VALUE OF THE ROBBINSDALE AND ST. LOUIS PARK LINES EXTENDING OUTSIDE THE 6-CENT ZONE LIMITS ARE ALSO SHOWN

	Pre-War Cost Average Prices 1911-1915	Ten Year Average Cost Average Prices 1912-1921	1921 Cost Prices Current July 1, 1921	Present-Day Cost Prices Current April, 1922	Estimated Original Cost	September 1923 Cost
Land	$1,290,140	$1,290,140	$1,290,140	$1,290,140	$1,290,140	$1,290,140
Track	4,907,581	6,770,165	9,241,657	7,849,115	7,105,466	8,644,720
Bridges, trestles and culverts	161,979	174,532	186,205	184,612	161,707	187,579
Paving	2,785,127	3,419,587	4,758,266	4,905,510	.....	4,065,180
Electrical distribution system	1,781,668	2,446,108	2,637,380	2,418,537	1,814,322	2,871,321
Rolling stock	4,988,495	7,697,393	10,186,495	9,187,147	4,611,154	10,406,301
Power station equipment	2,598,670	3,510,810	4,452,096	3,947,139	2,646,147	4,077,698
Substation equipment	579,641	765,035	1,038,650	926,068	591,748	1,044,650
Shop equipment, miscellaneous equipment, departmental tools and supplies	273,001	395,851	491,402	409,502	273,001	510,512
Buildings and structures	1,494,826	2,117,356	2,560,325	2,386,685	1,361,767	2,560,299
Furniture and fixtures	81,613	130,580	179,547	155,064	81,612	190,302
General stores	790,073	790,073	790,073	790,073	790,073	790,073
Expenditures not apparent in inventory	391,724	391,724	391,724	391,724	164,305	391,724
Engineering and superintendence	1,106,227	1,494,968	1,910,198	1,742,066	1,044,572	1,851,556
Administration, organization and legal expense	749,602	842,157	943,291	920,177	744,045	938,925
Taxes during construction	310,378	412,039	565,940	565,940	310,378	566,476
Interest during construction	2,914,889	3,917,821	4,994,807	4,568,340	2,758,850	4,846,569
Working capital	492,151	492,151	492,151	492,151	492,151	492,151
Cost of financing	1,384,890	1,852,924	2,355,517	2,156,498	1,312,071	2,286,340
Total physical property inside present 6-cent zone	$29,082,675	$38,911,414	$49,465,864	$45,286,488	$27,553,509	$48,013,146
Robbinsdale line	53,523	72,603	98,838	85,749	48,868	94,633
St. Louis park line	49,197	66,923	91,413	77,740	48,558	85,757
Grand total	$29,185,400	$39,050,940	$49,656,115	$45,449,977	$27,650,935	$48,193,536

The total inventoried property principally consists of 227.764 miles of single track; paving; lands; power distribution system, consisting of overhead trolley, feeder lines, underground conduit and underground wire; rolling stock; carhouses, offices and miscellaneous buildings; a steam turbine power station supplying power for the operation of the Minneapolis, St. Paul & Suburban systems; six rotary converter substations and miscellaneous electrical equipment at the Lower Dam Water Power Station; furniture and fixtures; tools, etc.

The valuation of the physical property was made from a complete and detailed field inventory of the property. The cost to reproduce the physical property new represents the minimum amount of capital required actually to reproduce the physical property of the company as of Jan. 1, 1922, on the six different bases of unit costs.

Water Power Leases and Going Concern Value

The value of the water power leases to the Minneapolis Street Railway was based on the saving they effect, this saving being computed on the basis of the total cost of the electric power purchased under these leases and the total cost of manufacture of that power if generated at a modern steam power station. The total saving to June 1, 1937, was prorated between the Minneapolis Street Railway, the St. Paul City Railway and the Minneapolis & St. Paul Suburban Railroad on the basis of the total kilowatt-hours used by each company. This element of value was included at $1,032,123.

The presentation of the claim for "going concern value" was made generally on the basis that the Minneapolis Street Railway had passed through the following stages of development:

1. Construction period.
2. Development period of construction.
3. The period of development into a successful going concern.

The engineer submitted that the fair going concern value of the property was determined to be not less than $6,000,000. One element in determining this going value was the historical development cost, which was summarized as follows:

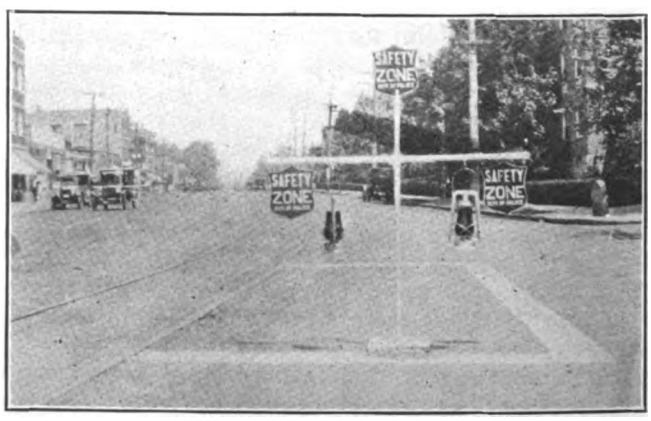
Horse, steam and cable lines, 1875 to 1891	$1,878,007
Initial electrical development, 1890 to 1903	2,628,800
Track renewed before end of useful life	1,332,803
Total	$5,839,610

Another element of going concern value submitted was that due to the consolidated operation with the St. Paul street railway system. This was given as not less than $2,000,000, measured by capitalizing the estimated saving per year to the Minneapolis company of the increased economy in operation due to such consolidated operation.

New Type of Safety Zone in Bridgeport

THE Department of Police in Bridgeport, in cooperation with the Bridgeport division of the Connecticut Company, has been installing a new type of safety zone illustrated in the accompanying engraving.

The area of the zone, which is about 12 ft. x 25 ft., is indicated by a stripe of white paint 1 ft. wide on the pavement. The peculiarity of the zone, however, is in the upright post. This is a 1-in. pipe painted white,



This Safety Zone Post Has Crossarms for Carrying Warning Notices and Lanterns

about 4½ ft. high and fitted with long crossarms. Each of the latter carries a shield, as shown, with the following letters: "Safety Zone, Department of Police." Each arm also carries a red lantern for use at night.

The post is supported in a cast base.

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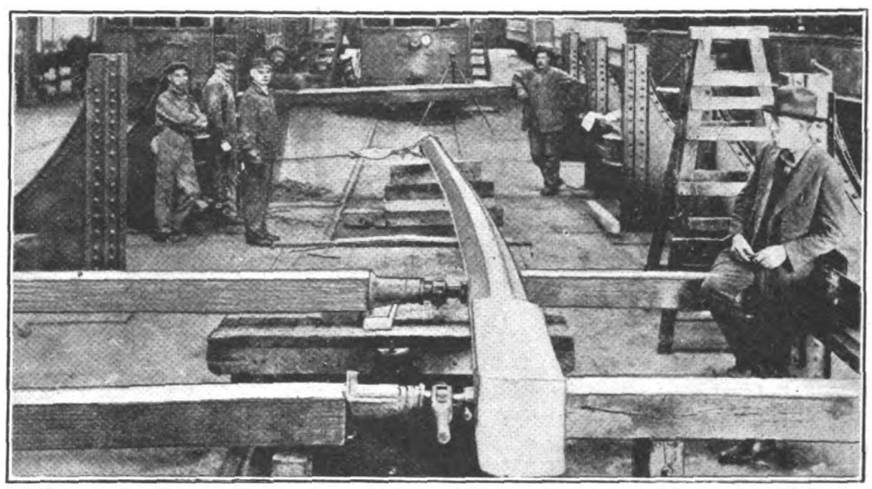
Cleveland Railway Studies Concrete Poles

Experiments Indicate that the Original Type of Reinforced Concrete Pole Contained More Material than Necessary to Secure Adequate Strength—Steel Poles Are Used on Curves and to Support Heavy Special Work

AN EXTENSIVE series of tests has been made by the Cleveland Railway to determine the relative value of different types of concrete pole for use in overhead construction on tangent track. The primary object of the investigation was to design a pole of sufficient strength, but which would require less material in its construction than did the types previously in use.



This Shows How the Concrete Pole Was Blocked in Between Two Pairs of the Stanchions Used in Straightening Car Bodies

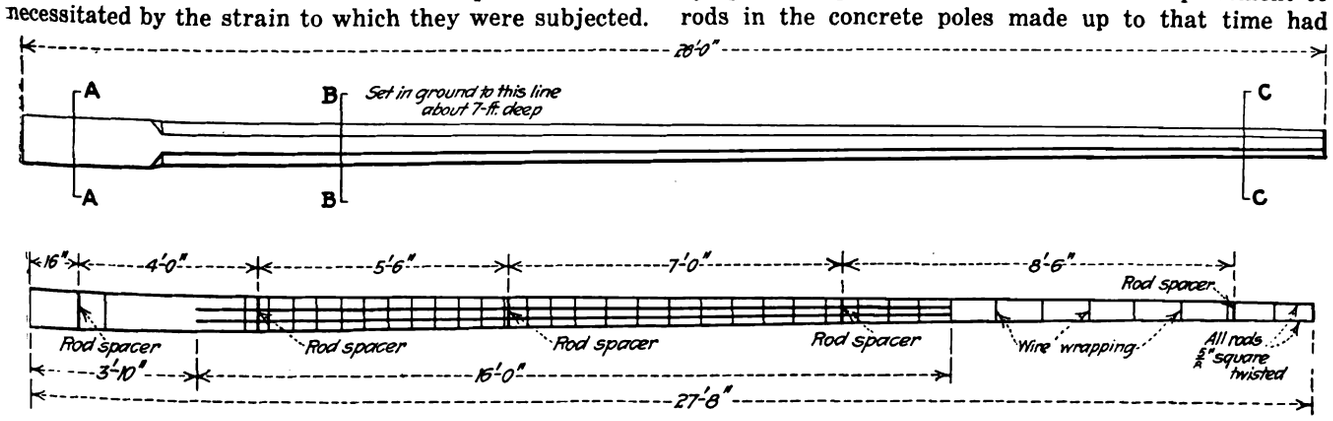
The first use of concrete poles by this company was in 1912, prior to that time all poles having been either wood or steel. Some of the latter were of small size, with only a 5-in. butt, although the more recent steel poles were larger. Many concrete poles are now used in Cleveland on tangent track, but steel poles are preferred on curves and for heavy special work, as it is believed that the former are not strong enough for such use.

The reinforcing design of the original concrete poles consisted of eight 27-ft., ⅝-in. square rods placed at the corners of an octagon. No transverse reinforcing was used. From an examination of poles constructed in 1912 and recently removed, it was found, however, that an additional rod not called for in the design, had been placed in the center of the pole. Only slight changes had been made in the design during the ensuing years, and the reinforcing in use at the time the tests were made consisted of six 27½-ft., ¾-in. square twisted bars, two ¾-in. square deformed bars 16 ft. long and one 1⅛-in. round bar 24 ft. long placed in the center of the pole.

It was felt by the engineers of the company, as well as by the engineers of the city, that more material was being used in the construction of these poles than was necessitated by the strain to which they were subjected. The maximum loading on a pole used in tangent construction was estimated to be 1,000 lb. According to their theory there is 820 lb. horizontal pull of the span, 49 lb. wind load on the trolley wire and 135 lb. wind load on a 1,000,000 circ.mil cable, making in round numbers a total loading of approximately 1,000 lb. The point of application of this load was considered to be 18 in. from the top of the pole and 20 ft. above the ground line. The maximum bending moment to which the pole would be subjected is, therefore, 20,000 ft.-lb.

With these ideas in mind a new pole was designed, particular attention being paid to the proper distribution of steel. One less rod was embodied in the new design and all of the rods were of smaller size than had previously been used. In spite of that, however, the forecast was made that the new pole would fail in compression rather than in tension.

Uniform spacing of the reinforcing rods is achieved by spacer rings of ¼-in. round stock. The placement of rods in the concrete poles made up to that time had



New Reinforcement Design for Concrete Poles

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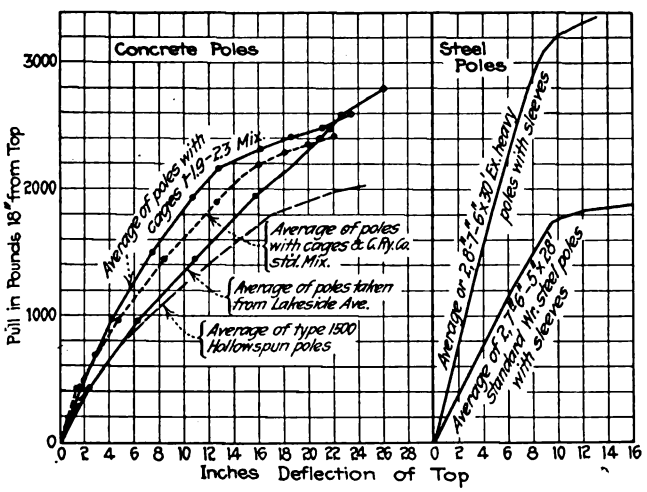
been more or less irregular. In the new method of assembling, four ⅝-in. deformed bars which are 27 ft. 8 in. long are first wired to the rings so that they form the vertices of a rectangle. After these are firmly fastened four other ⅝-in. deformed bars 18 ft. long are then wired to the rings. It was the contention of the engineers that steel placed in a transverse direction would be useful in giving greater strength to the cage. Soft iron wire No. 12 gage is therefore wrapped spirally the entire length of the cage with a space of 3 in. between turns. Difficulty was experienced at first in wrapping this wire so that it would bind the cage tightly enough to prevent its collapse. This was overcome by making with a pair of pliers, a kink in every slack turn of the wrapping wire and tieing it to the rods on every third turn. This drew the wire much



Average Bending of Concrete Poles and Steel Poles

more taut than could be done by hand and bound the cage so tightly that there was no possibility of its collapsing.

After some practice in building these cages it was found that they could be made in about 3.6 man-hours. There seemed to be no reason to change the forms already in use and the old ones were accordingly used. In the present process the cage is placed in the forms first and the concrete is poured upon it. There is a slight tendency for the concrete to stick to the cage and not fill the form unless a stirring rod is used and the mixture poked around.

To change the kinds of material used in mixing the concrete for poles was not considered desirable. In the first place, the old materials were near at hand and easy to obtain. In the second place, a pole of light color and good appearance was desired and it was known that the old material would insure these conditions. Finally, the concrete mixing gang were experienced in the handling and use of these materials. It was decided, therefore, to use the same materials and change only their proportions in the mixture. The standard mixture in use before these tests were made consisted of 1 part of cement, 2.1 parts of sand and 1.3 parts of gravel. After extensive analyses, void determinations, etc., it was decided to use a mixture consisting of 1 part of cement, 1.9 parts of sand and 2.3 parts of gravel.

In order to compare the strength of these two concrete mixtures, six 6-in. tubes, three of the old mixture and three of the new mixture, were subjected to a crushing test, twenty-eight days after being poured. These tests showed a strength of 3,690 lb. per square inch for the new mixture and 2,370 lb. per square inch for the old mixture.

The apparatus used for testing the strength of poles is shown in the accompanying illustration. The butt is blocked in between the stanchions used in straightening car bodies. Poles are blocked at the extreme end and again at the ground line, 6-in. x 6-in. timbers and a screw jack being used in each case. The load is applied by means of a chain fall fastened at one end to the stanchions and at the other end to a point 18 in. from the top of the pole. A dynamometer is placed in line next to the pole, so that the exact magnitude of the force being applied at any particular moment can easily be determined. The deflections of the poles under load are read by means of a transit.

As a typical example of the experiments, we may take a test of a pole with the 1-1.9-2.3 mixture and the new cage. This pole was 11 in. square at the butt and 10 in. square at the ground line. A load of 500 lb. was first applied, causing a deflection of 1½ in. Thereafter the load was increased in increments of 500 lb. until a total of 2,000 lb. was reached. Deflections were respectively 4 1/16 in., 6¾ in., and 10¼ in. The load was then eased off to nothing, and it was found that the pole had a permanent set of ⅞ in. Then 1,000 lb. was applied, producing a deflection of 5⅜ in. After reapplying a load of 1,500 lb. the increments were 250 lb. at a time, producing deflections of 9¼ in. at 1,750, 10⅝ in., and finally 12½ in. at a loading of 2,250 lb., when small cracks began to appear in the concrete. At 2,400 lb. the pole failed before the deflection could be taken. The load was then eased off to 2,250 lb., when the deflection was 16⅜ in. Continuing to ease off the load, it was found that the deflection at 2,150 lb. was 28¼ in. When the load had been taken off altogether, the pole had a set of 16¼ in.

The method of testing was varied somewhat with the different poles, and a direct comparison of the loads carried by them would, therefore, be somewhat misleading. In some cases the load was increased by increments of 250 lb., and in other cases 500 lb. Moreover, with some of the poles, the experiment was tried of easing off the load to nothing at frequent intervals during the test. However, the behavior of the poles under the strain was sufficiently similar, so that a few general conclusions were possible.

Classification of Tests

The poles tested during this investigation may be classified in six groups. The first group consisted of old poles built and installed at various times since 1912. The dimensions of these poles varied somewhat, but in general they were approximately 11 in. square at the butt and about 9½ in. square at the ground line. They were built with the old reinforcing already described and the old concrete mixture was used. Seven such poles tested all failed on the compression side, at loads varying from 2,400 lb. to 3,000 lb.

The second group of poles to be tested consisted of those using the old concrete mixture and the new reinforcement. This type failed at an average load of about 2,400 lb., but the deflection was less until the breaking point was almost reached.

Poles using the new reinforcement design and the new mixture constituted the third class tested. These likewise all failed in compression as the engineers had foretold except for one pole which was found to have a defective cage. The loads ranged from 2,000 lb. up to

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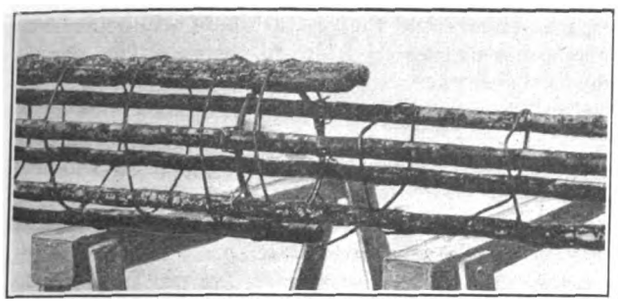
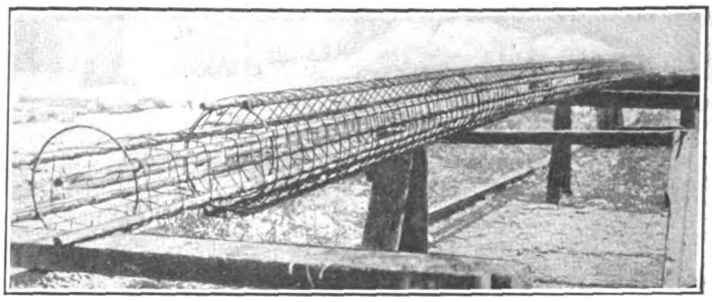




Cage Used in the New Pole

2,600 lb., the average load being closer to the latter figure.

Hollow concrete poles which were similarly tested compared well in strength with the solid poles, averaging slightly over 2,000 lb.

Two light-weight steel poles of the 7-6-5-in. type tested at the same time failed at identical loadings. Each of these poles was supplied with a protecting sleeve at the ground line and in both cases failure occurred at the 1,950-lb. load. Larger steel poles of the 8-7-6-in. type were similarly tested. They failed at 3,350-lb. and 3,475-lb. load. These poles were equipped with sleeves, as were the lighter steel poles, but were 30 ft. in length instead of 28 ft.

Inasmuch as the estimated load to which poles will be subjected is only 1,000 lb. and 20,000 ft.-lb. of bending moment, it will be seen from the accompanying chart that all types of pole were well above the strength required. The solid concrete poles all failed at loadings more than twice as great as that which they will have to carry in actual service. The conclusion was accordingly reached that the new pole with the new mixture was an improvement on the earlier design because less material is used in its construction.

Comparison of Manufacturing Costs

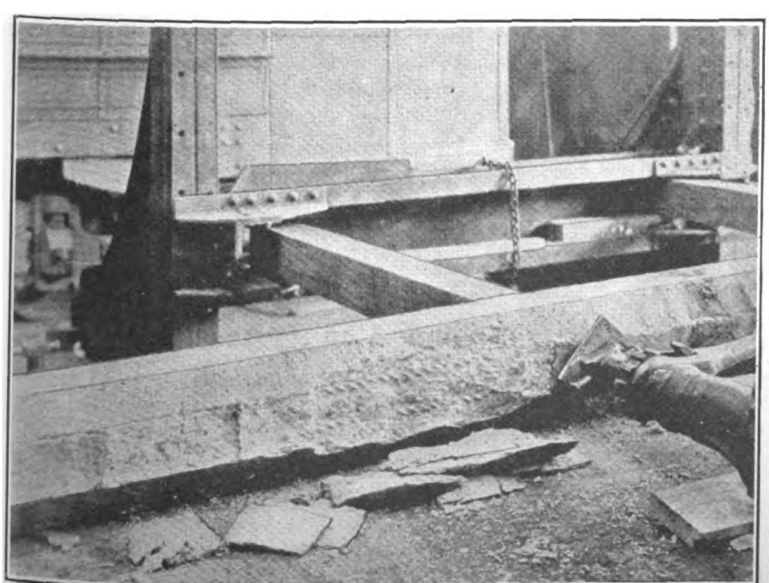
The next consideration covered in this investigation was the matter of cost. The older type concrete pole cost $21 to manufacture. The second type, with old standard mixture and new reinforcement, cost $18.60; and the new pole, $15.90. Thus the pole with the new reinforcing design and the new mixture is much more economical than previous designs of concrete poles. This pole supported so nearly the same load as the present pole that it was felt that its cheaper cost more than offset the slightly greater strength of the old pole and the future use of the new design was therefore recommended as a result of the investigation.

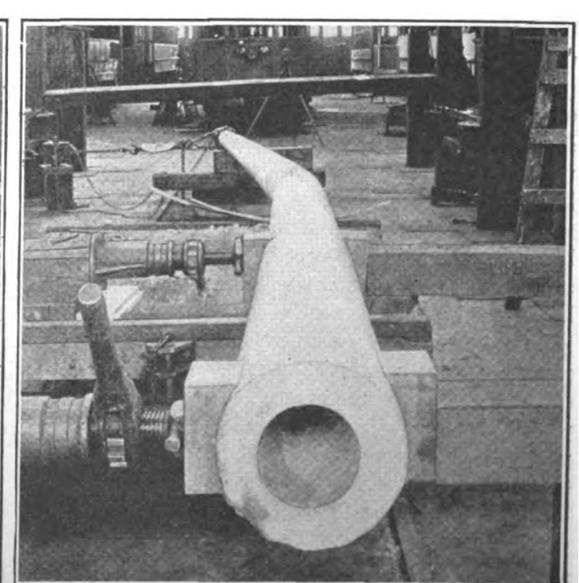
Salvaging Power Plant Stack Soot

THE Norfolk & Western Railway reclaims the soot which falls to the bottom of the one brick chimney which supplies draft for fourteen boilers at its power plant, located near Bluestone Junction, W. Va. Two of the boilers are at present being installed. The chimney is provided with a hopper-shaped bottom, which discharges the soot into a home-made steam ejector. This ejector consists of a 4-in. horizontal pipe, which turns upward into the central aperture of a standard T-fitting. A ¾-in. steam pipe leads into one of the other openings in the fitting, opposite to it being a 4-in. discharge to the coal elevator.

The jet of steam playing directly into the elevator pipe creates a powerful suction in the first mentioned pipe, which effectively draws the soot to the T-fitting, after which the steam current carries it along. Just before the soot reaches the coal elevators it passes through a water spray which condenses the steam and moistens the soot so that it does not blow out of the elevator buckets while being carried up to the coal hopper.

It is estimated that 60 per cent of the soot is combustible, and with the power plant operating at an average load (inflating with the full complement of fourteen boilers will be 8,000 boiler-hp.) probably 10,000 lb. of soot will return to the coal elevators in a week.





Left—Scaling Shows Start of Failure on Compression Side. Right—The Hollow Poles Compared Favorably with the Solid Poles

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Some Details of Illinois Central Electrification*

Conversion to Electrical Operation to Embrace Approximately 418 Miles—Details of Plans for Power Generation and Transmission

BY D. J. BRUMLEY
Chief Engineer Chicago Terminal Improvement, Illinois Central Railroad.

THE general construction program of the Illinois Central electrification in the Chicago district is as follows:

1. Complete the easterly side of a new through passenger terminal; complete the rearrangement of sewers and underground facilities; extend the track elevation and grade separation; make changes in grades that are necessitated by ordinance; be prepared to proceed with the work of electrification; and electrify the entire suburban service within seven years after February, 1920.

2. Electrify the entire freight service north of East Roosevelt Road within three years after the completion of the suburban electrification, or before 1930.

3. Electrify the entire freight service south of East Roosevelt Road within five years thereafter, or before 1935.

4. Electrify the through passenger service not later than 1940, if a certain proportion of the railroads using the lake-front passenger terminal station are operating electrically at that time.

The work of electrification contemplated embraces approximately 418 track-miles. The electrification system to be used was determined by a commission appointed by the railroad company. This body made a careful study of the Chicago terminal situation and compared it with the electrifications of similar properties in the United States and foreign countries. The commission recommended, and the Illinois Central Railroad adopted, the 1,500-volt direct-current overhead-contact system for use in the Chicago terminal area. The details for the electrical system are being worked out, and it is planned to begin partial operation of the suburban service about the middle of 1926. The generation of current can be provided for readily either along the shore of Lake Michigan, Lake Calumet, or the Calumet River, adjoining the electrically operated tracks, and be easily accessible to ample supplies of water.

For tractive power, high-tension alternating current, of probably 33,000 volts, will be converted to 1,500-volt direct current in not less than five substations on the railroad company's right-of-way. The conversion will be by rotating machines; the machines, transformers, switchboards, and auxiliary apparatus being housed in brick buildings of attractive design. The direct-current switching and protective equipment will be of the latest high-speed type.

The overhead system will consist of steel supports spaced approximately 300-ft. centers, for carrying the contact wires, transmission, signal, and miscellaneous power circuits. The overhead contact wires will be supported by messengers of high conductivity, so that over each track there will be sufficient conductor to supply the power required for that track, thus avoiding the necessity for independent parallel feeders. The contact wires, messengers and their attachment will be made of materials highly resistive to corrosion. The normal height of the contact wire above top of rail will be 22 ft., and it will be suspended from the messenger so as to make its alignment conform to that of the track it serves. As the electrification will be carried out in progressive steps, the spans constructed initially for the suburban electrification will be ultimately extended to include the freight, through-passenger, and such subsidiary tracks as will be electrified. The track rails being well bonded will form a return circuit for the propulsion current and will be cross-bonded at impedance bond locations, thus avoiding any interference with signal track circuits.

SUBURBAN SERVICE WITH MULTIPLE-UNIT TRAINS

Suburban passenger cars are now being purchased for the electrified service, but are being placed temporarily in steam suburban service. The character of the suburban service is such as to make the multiple-unit train the most economical system. Provisions are being made for operating two-car semi-permanently connected units consisting of one motor car and one trail car.

These units will have control apparatus in one end of each car and will operate either singly or in trains of two to five similar units. The service provides for a high rate of acceleration and braking and a normal balancing speed of 57 m.p.h. on tangent level track. The motor cars will be equipped with four 750-volt motors connected in two groups of two motors in series per group with series parallel control.

The braking equipment will be the electro-pneumatic brake for multiple-unit service with a 1,500-volt motor-driven compressor. Power for the control and brake operation as well as for the car lights will be furnished by a motor generator set on the motor car, having a 1,500-volt direct-current motor and a 32-volt direct-current generator with storage battery provided as a reserve. The two-car unit will have a pantograph collector on the motor car only. Electrical heaters will be used, the details of which have not as yet been fully decided.

The cars will be equipped with diaphragms, enabling passengers to move safely and comfortably between cars and thus make advantageous use of all seats in the train. By the use of aluminum alloys and a careful redesign of the original steel suburban car, the weight will be reduced approximately 3,000 lb., reducing the trail car to approximately 89,000 lb.

As there will be no need to purchase electric locomotives for either through main-line freight service or switching service, or for the through passenger service, for several years, no attempt will be made to design such equipment at present.

*Abstract of a paper which was published in the proceedings of the American Society of Civil Engineers for September, 1923.

British Roads Change to Electricity

Within the next two years the electrification of the three lines from Waterloo to Guilford (London & South Western Railway) will be completed. The London, Midland & Scottish group are beginning the change over on the line covering Manchester, Oldham, Middleton, Royton and Shaw, as a preliminary to larger developments. The same group intends to electrify the system to Rickmansworth.

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Gross Revenue of Electric Railways Is Higher than in 1917

Census Figures of 1922 Are Given for Nine More States—Track Mileage Has Decreased Slightly and Net Income Is Lower in Some Cases on Account of Greater Operating Expense

PRELIMINARY figures of the electric railway census for last year have now been released for several states in addition to those printed in this paper Nov. 3. In a group of seven states west of the Mississippi River there has been a slight decrease in track mileage in every one except Minnesota. The number of revenue passengers, however, has increased in Arkansas, Nebraska, Minnesota, but has decreased in Kansas, Colorado, Arizona and New Mexico. Two of the Eastern states show decreases in track mileage and traffic.

Kansas.—The figures show a decrease of 3.2 per cent in track mileage and a loss of 5.7 per cent in the number of passengers carried. Gross railway operating revenues, however, show a gain due to fare increases of 26.3 per cent, and aggregated $4,527,397 in 1922 as compared with $3,585,079 in 1917, while railway operating expenses increased 46.6 per cent, and net income decreased 31.7 per cent.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies	†15	19	.....
Miles of sigle track operated‡	543.15	561.00	*3.2
Number of cars, all types	613	607	1.0
Electric locomotives	3	5	.....
Number of persons employed	1,346	1,680	*19.9
Salaries and wages	$1,773,652	$1,240,725	43.0
Primary horsepower, total	7,300	16,730	*56.4
Kilowatt capacity of generators	5,450	10,992	*50.4
Current generated, kilowatt-hours	11,224,902	21,677,157	*48.2
Current purchased, kilowatt-hours	27,122,697	30,687,892	*11.6
Passengers carried	43,575,343	46,212,673	*5.7
Revenue car mileage	12,037,274	13,819,088	*12.9
Railway operations, revenues	$4,527,397	$3,585,079	26.3
Railway operations, expenses	$3,366,397	$2,296,457	46.6
Net revenues, railway operations	$1,161,000	$1,288,622	*9.9
Auxiliary operations, revenues**	$281,562	$532,732	*47.1
Auxiliary operations, expenses	$217,264	$393,803	*44.8
Net revenues, auxiliary operations	$64,298	$138,929	*53.7
Net operating revenues	$1,225,298	$1,427,551	*14.2
Taxes assignable to railway operations	$337,353	$279,428	20.7
Operating income	$887,945	$1,148,123	*22.7
Non-operating income	$58,196	$58,963	*1.3
Gross income	$946,142	$1,207,086	*21.6
Interest and other deductions from gross income	$740,651	$906,269	*18.3
Net income	$205,491	$300,817	*31.7

† Three companies with 17.05 miles of track, which reported in 1917, discontinued operations prior to 1922, and the track of another company was operated under lease.

‡ Includes 47.39 miles in 1922, and 46.33 miles in 1917 lying outside the state, but owned by companies within the state, and excludes 85.44 miles in 1922 and 67.02 miles in 1917 operated in the state, but owned by companies outside the state.

** Chiefly revenues from electric light and power departments of electric railways.

Arkansas.—The figures show a slight decrease in track mileage, while passenger traffic increased by 11.8 per cent in 1922 as compared with 1917. Gross railway operating revenues aggregated $1,793,277 in 1922, an increase of 38.1 per cent, but on account of the more rapid increase in expenses the net revenues from railway operations decreased 12.3 per cent.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies	9	10	.....
Miles of single track†	128.94	131.36	*1.8
Number of cars, all types	271	262	3.4
Number of persons employed	871	645	35.0
Salaries and wages	$1,151,530	$555,839	107.2
Primary horsepower, total	35,348	16,650	112.3
Kilowatt capacity of generators	25,550	12,457	105.1
Current generated, kilowatt-hours	56,562,946	33,080,677	71.0
Current purchased, kilowatt-hours	3,838,955	4,360,889	*12.0
Passengers carried	**34,131,000	30,525,360	11.8
Revenue car mileage	5,735,435	5,917,302	*2.8

* Indicates decrease.

	1922	1917	Per Cent of Increase, 1917-1922
Railway operations, revenues	$1,793,277	$1,298,744	38.1
Railway operations, expenses	$1,336,317	$777,773	71.8
Net revenue, railway operations	$456,960	$520,971	*12.3
Auxiliary operations, revenues‡	$1,497,270	$658,187	*127.5
Auxiliary operations, expenses	$682,087	$301,796	126.0
Net revenue, auxiliary operations	$815,183	$356,391	128.7
Net operating revenue	$1,272,143	$877,362	45.0
Taxes assignable to railway operations	$270,391	$162,366	66.5
Operating income	$1,001,752	$714,996	40.1
Non-operating income	$61,320	$33,336	83.9
Gross income	$1,063,072	$748,332	42.1
Deductions from gross income	$806,307	$497,291	62.1
Net income	$256,765	$251,041	2.3

† Includes 8.62 miles of track in 1922, and 9.53 miles in 1917, lying outside of the state but owned by companies within the state.

** In addition there were 661,405 passengers carried by eleven motor buses operated by electric railway companies.

‡ Chiefly revenue from electric light and power departments of electric railways.

West Virginia.—An increase of 6.8 per cent in track mileage and a gain of 18.6 per cent in the number of passengers carried occurred in this state. Gross railway operating revenues amounted to $7,057,025 in 1922, an increase of 41.2 per cent as compared with 1917, but on account of a more rapid increase in expenses (72.3 per cent), net income from all sources decreased by 47.5 per cent.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies	†16	19	.....
Miles of single track operated in state‡	422.06	395.15	6.8
Number of cars, all types	573	633	*9.5
Electric locomotives	4	1	.....
Number of persons employed	2,303	2,446	*5.8
Salaries and wages	$3,369,579	$1,787,466	88.5
Primary horsepower, total	81,375	35,042	132.2
Kilowatt capacity of generators	61,800	23,635	161.5
Current generated, kilowatt-hours	118,680,170	86,860,542	36.6
Current purchased, kilowatt-hours	47,607,035	25,300,487	88.2
Passengers carried	95,989,610	80,920,697	18.6
Revenue car mileage	15,238,374	14,622,900	4.2
Railway operations, revenues	$7,057,025	$4,998,377	41.2
Railway operations, expenses	$5,076,694	$2,946,622	72.3
Net revenues, railway operations	$1,980,331	$2,051,755	*3.5
Auxiliary operations, revenues	$1,756,886	$926,070	89.7
Auxiliary operations, expenses	$799,639	$413,675	93.3
Net revenues, auxiliary operations**	$957,247	$512,395	86.8
Net operating revenues	$2,937,578	$2,564,150	14.6
Taxes assignable to railway operations	$621,965	$365,798	70.0
Operating income	$2,315,613	$2,198,352	5.3
Non-operating income	$411,149	$942,906	*56.4
Gross income	$2,726,762	$3,141,258	*13.2
Interest and other deductions from gross income	$1,844,372	$1,459,777	26.3
Net income	$882,390	$1,681,481	*47.5

† Reduction in companies due to consolidations and reorganizations.

‡ Excludes 97.09 miles in 1922 and 78.11 miles in 1917 lying outside the state, but owned by companies within the state, and includes 3.82 miles in 1922 and 2.09 miles in 1917 operated in the state but owned by companies outside the state.

** Chiefly revenues from electric light and power departments of electric railways.

Mississippi.—A decrease of 21.4 per cent in track mileage, was accompanied by a loss of 30.9 per cent in the number of passengers carried. Gross railway operating revenues amounted to $692,298 in 1922 as compared with $617,527 in 1917, an increase of 12.1 per cent, and operating expenses increased 52.2 per cent during the five-year period.

	1922	1917	Per Cent of Increase 1917-1922
Number of operating companies	†7	11	.....
Miles of single track operated‡	96.55	122.79	*21.4
Number of cars, all types	130	187	*30.5
Number of persons employed	366	627	*41.6
Salaries and wages	$427,914	$392,600	9.0
Primary horsepower, total	4,500	16,035	*71.9
Kilowatt capacity of generators	4,500	12,575	*64.2
Current generated, kilowatt-hours	5,935,600	20,022,367	*70.4
Current purchased, kilowatt-hours	4,251,784	3,279,254	29.7
Passengers carried	8,441,459	12,215,749	*30.9
Revenue car mileage	3,075,482	3,990,356	*22.9
Railway operations, revenues	$692,298	$617,527	12.1
Railway operations, expenses	$751,884	$494,164	52.2

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	1922	1917	Per Cent of Increase, 1917-1922
Net revenues, railway operations	††$59,586	$123,363	.....
Auxiliary operations, revenues**	$284,739	$585,515	*51.2
Auxiliary operations, expenses	$202,662	$395,842	*48.8
Net revenues, auxiliary operations	$82,077	$187,673	*56.3
Net operating revenues	$22,491	$311,036	*92.8
Taxes assignable to railway operations	$47,025	$59,503	*21.0
Operating income	††$24,534	$251,533	.....
Non-operating income	$975	$24,670	*96.0
Gross income	††$23,559	$276,203	.....
Interest and other deductions from gross income	$201,864	$395,645	*49.0
Deficit	$225,423	$119,442	88.7

† Four companies with 22.47 miles of track discontinued operations prior to 1922.

‡ Excludes 1.36 miles in 1922 and 1.38 miles in 1917 operated in the state, but owned by companies outside the state.

††Deficit.

** Chiefly revenues from electric light and power departments of electric railways.

Arizona and New Mexico.—The figures show a decrease in track mileage of 13.7 per cent and a decrease of 23.4 per cent in the number of passengers carried. Gross railway operating revenues aggregated $386,594 in 1922, a decrease of 13.4 per cent as compared with 1917. This decrease, accompanied by an increase of 10.4 per cent in operating expenses, resulted in a deficit of $130,025 in 1922 as compared with a net increase of $32,844 in 1917.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies	†5	6	.....
Miles of single track	55.12	63.84	*13.7
Number of cars, all types	70	66	.....
Number of persons employed	172	224	*23.2
Salaries and wages	$202,208	$221,711	*8.8
Primary horsepower, total	.....	989	.....
Kilowatt capacity of generators	.....	665	.....
Current generated, kilowatt-hours	.....	1,526,960	.....
Current purchased, kilowatt-hours	3,107,185	4,010,388	*22.5
Passengers carried	**7,271,456	9,488,467	*23.4
Revenue car mileage	1,391,248	1,729,926	*19.6
Railway operations, revenues	$386,594	$446,218	*13.4
Railway operations, expenses	$404,581	$366,337	10.4
Net operating revenues	§$17,987	$79,881	.....
Taxes assignable to railway operations	$18,255	$19,979	*8.6
Income from other sources	$2,377	‡$76,910	*96.9
Gross income	§$33,865	$136,812	.....
Interest and other deductions from gross income	$96,160	$103,968	*7.5
Net income	§$130,025	$32,844	.....

†One company with 8.75 miles of track discontinued operations prior to 1922.

**In addition there were 42,960 passengers carried by two motor buses operated by electric railway companies in New Mexico.

§Deficit.

‡Includes net income from light and power departments to the amount of $56,590. There were no operations of this character in 1922.

Alabama.—The figures show a slight decrease in track mileage and a decrease of 5 per cent in the number of passengers carried. Gross railway operating revenues amounted to $4,904,276 in 1922, an increase of 37.8 per cent as compared with 1917, operating expenses increased 72.3 per cent and net income made a gain of 22.6 per cent.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies	†12	13	.....
Miles of single track operated‡	365.63	367.18	†0.4
Number of cars, all types	684	639	7.0
Number of electric locomotives	3	3	.....
Number of persons employed	2,581	2,129	21.2
Salaries and wages	$3,237,294	$1,645,028	96.8
Primary horsepower, total	29,805	38,702	*23.0
Kilowatt capacity of generators	22,375	28,100	*20.4
Current generated, kilowatt-hours	22,083,271	21,503,940	2.7
Current purchased, kilowatt-hours	144,199,062	94,718,843	52.2
Passengers carried	80,717,808	84,962,155	*5.0
Revenue car mileage	15,819,643	16,037,615	*1.4
Railway operations, revenues	$4,904,276	$3,559,064	37.8
Railway operations, expenses	$3,893,655	$2,259,414	72.3
Net revenues, railway operations	$1,010,621	$1,299,650	*22.2
Auxiliary operations, revenues**	$2,466,258	$2,048,681	20.4
Auxiliary operations, expenses	$1,203,956	$1,004,319	19.9
Net revenues, auxiliary operations	$1,262,302	$1,044,362	20.9
Net operating revenues	$2,272,923	$2,344,012	*3.0
Taxes assignable to railway operations	$623,448	$468,896	33.0
Operating income	$1,649,475	$1,875,116	*12.0
Non-operating income	$533,732	$36,325	1,369.3
Gross income	$2,183,207	$1,911,441	14.2
Interest and other deductions from gross income	$1,371,954	$1,249,582	9.8
Net income	$811,253	$661,859	22.6

† One company with 1.50 miles of track discontinued operations prior to 1922.

‡ Excludes 2.22 miles in 1922 and 2.17 miles in 1917 operated in the state, but owned by companies outside the state.

** Chiefly revenues from electric light and power departments of electric railways.

Minnesota.—The figures show an increase of 4.2 per cent in track mileage, and a gain of 11.2 per cent in passengers carried. Gross railway operating revenues amounted to $16,100,065 in 1922, an increase of 30.1 per cent as compared with 1917, but on account of a more rapid increase in expenses (46.0 per cent), net income from all sources decreased by 14.1 per cent.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies	10	10	.....
Miles of single track†	697.14	668.94	4.2
Number of cars, all types	1,362	1,414	*3.7
Electric locomotives	3	1	.....
Number of persons employed	4,930	4,970	*0.8
Salaries and wages	$7,582,904	$5,258,100	44.2
Primary horsepower, total	122,500	122,500	.....
Kilowatt capacity of generators	91,400	91,400	.....
Current generated, kilowatt-hours	145,675,347	152,469,348	*4.5
Current purchased, kilowatt-hours	22,455,451	23,860,491	*5.9
Passengers carried	‡352,464,915	316,904,581	11.2
Revenue car mileage	36,065,996	38,793,434	*9.6
Railway operations, revenues	$16,100,065	$12,375,143	30.1
Railway operations, expenses	$11,542,739	$7,905,772	46.0
Net revenues, railway operations	$4,557,326	$4,469,371	2.0
Taxes assignable to railway operations	$1,395,465	$1,064,065	31.1
Operating income	$3,161,861	$3,405,306	*7.1
Non-operating income	$99,127	$52,460	89.0
Gross income	$3,260,988	$3,457,766	*5.7
Deductions from gross income	$1,636,234	$1,566,115	4.5
Net income	$1,624,754	$1,891,651	*14.1

†Includes 29.08 miles in 1922, and 27.75 miles in 1917 lying outside of state, but owned by companies within the state, and excludes 12.83 miles in 1922, and 14.17 miles in 1917 operated in state, but owned by companies outside of state.

‡In addition there were 70,605 passengers carried by two motor buses operated by electric railway companies.

Colorado.—A decrease in track mileage of 7.8 per cent was accompanied by a loss of 10.8 per cent in the number of passengers carried. Gross railway operating revenues amounted to $6,704,377, an increase of 41.8 per cent, and net income from all sources made a gain of 110.7 per cent.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies	†13	15	.....
Miles of single track	430.81	467.15	*7.8
Number of cars, all types	875	817	7.1
Electric locomotives	8	7	.....
Number of persons employed	2,991	2,402	24.5
Salaries and wages	$3,648,898	$2,126,531	71.6
Primary horsepower, total	61,469	58,139	5.7
Kilowatt capacity of generators	44,855	39,770	12.8
Current generated, kilowatt-hours	108,493,550	98,227,472	10.5
Current purchased, kilowatt-hours	11,681,087	13,281,070	*12.0
Passengers carried	91,723,208	102,882,744	*10.8
Revenue car mileage	15,745,601	17,030,884	*7.5
Railway operations, revenues	$6,704,377	$4,728,732	41.80
Railway operations, expenses	$4,711,626	$2,974,853	58.4
Net revenues, railway operations	$1,992,751	$1,753,879	13.6
Auxiliary operations, revenues‡	$1,423,474	$1,051,044	35.4
Auxiliary operations, expenses	$791,903	$429,964	84.2
Net revenues, auxiliary operations	$631,571	$621,080	1.7
Net operating revenues	$2,624,322	$2,374,959	10.5
Taxes assignable to railway operations	$576,105	$532,848	8.1
Operating income	$2,048,217	$1,842,111	11.2
Non-operating income	$110,932	$46,736	137.4
Gross income	$2,159,149	$1,888,847	14.3
Interest and other deductions from gross income	$1,715,969	$1,678,481	2.2
Net income	$443,180	$210,366	110.7

†Three companies with 26.73 miles of track which reported in 1917 discontinued operations prior to 1922.

‡Chiefly revenues from electric light and power departments of electric railways.

Nebraska.—Track mileage decreased but there was an increase of 1.9 per cent in the number of passengers carried. Gross railway operating revenues amounted to $5,344,204 in 1922, an increase of 26.8 per cent as compared with 1917, but owing to a more rapid increase in operating expenses the net income from all sources shows a decrease of 1.6 per cent for the period.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies	5	6	.....
Miles of single track†	238.79	244.89	*2.5
Number of cars, all types	546	526	3.8
Electric locomotives	4	2	.....
Number of persons employed	1,699	1,845	*7.9
Salaries and wages	$2,409,829	$1,527,534	57.8
Primary horsepower, total	27,889	27,663	0.8
Kilowatt capacity of generators	2,375	20,475	*0.5
Current generated, kilowatt-hours	54,447,834	49,241,514	10.6
Current purchased, kilowatt-hours	6,767,096	3,341,588	102.5
Passengers carried	97,566,736	95,782,721	1.9
Revenue car mileage	13,980,336	14,018,246	*0.3
Railway operations, revenues	$5,344,214	$4,213,457	26.8
Railway operations, expenses	$3,804,379	$2,697,958	41.0
Net revenues, railway operations	$1,539,835	$1,515,499	1.6
Auxiliary operations, revenues	$643,890	$279,810	130.1
Auxiliary operations, expenses	$467,655	$215,738	116.8
Net revenues, auxiliary operations	$176,235	$64,072	175.1
Net operating revenues	$1,716,070	$1,579,571	8.6
Taxes assignable to operations	$537,180	$375,149	43.2
Operating income	$1,178,890	$1,204,422	*2.1
Non-operating income	$44,162	$20,364	116.9
Gross income	$1,223,052	$1,224,786	*0.1
Deductions from gross income	$750,579	$754,015	0.7
Net income	$472,473	$479,771	*1.5

†Includes in 1922, 33.14 miles of track lying outside of the state but owned by companies within the state, and in 1917, 33.90 miles of such trackage.

*Indicates decrease.

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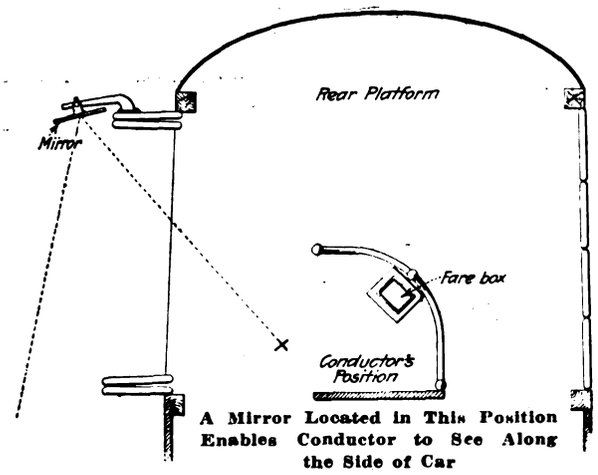
Conductor's Mirror Reveals Approaching Passengers

BY ERWIN C. SCHROETTER

NOWADAYS the rear platform of the ordinary electric railway car is equipped with folding doors. These doors are habitually closed before the car starts, the process being compulsory where doors and control are interlocked, and being required by rule in cases where the doors are not equipped with interlocking devices. The conductor, in collecting fares, usually faces toward the rear and cannot see passengers approaching alongside the car from the front. It frequently happens, therefore, that he closes the doors and gives the signal for the car to start just as a belated passenger reaches the rear entrance. In such cases, the passenger is usually left behind, nourishing a natural but unjust resentment against the railway and its representative on that particular car.



A Mirror Located in This Position Enables Conductor to See Along the Side of Car

To remedy this difficulty and enable the conductor without leaving his post to see a passenger approaching from the front a mirror may be installed on the rear leaf of the door as shown in the accompanying illustration. When the rear folding door is opened, the position of this mirror would be such that a single glance from the conductor would suffice to show him whether there was a passenger approaching from the front. The device is somewhat similar to that which has been successfully used at the front end of railway cars, to enable the motorman from his normal position to see what is happening at the rear end.

Seventy per Cent of Riders Have Exact Fare on Beaver Valley Line

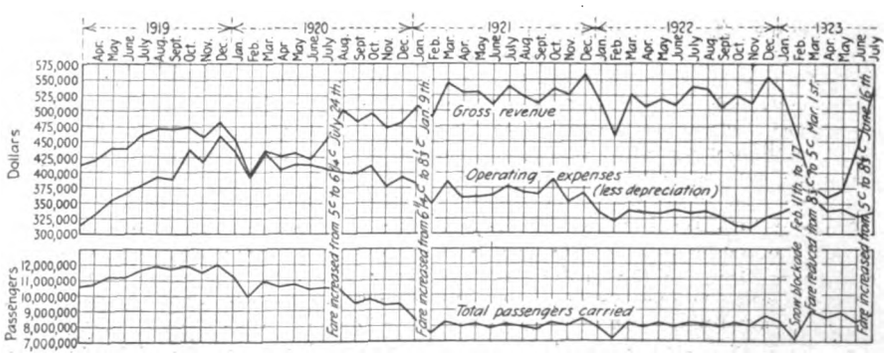
WITH a view to determining the percentage of persons who tender exact fare when boarding a car, the Beaver Valley Traction Company, New Brighton, Pa., recently made a check of the passengers boarding a car on the route operating from Rochester to Beaver Falls and for part of the day through Beaver Falls to Morado Park. The results show that on Sept. 18, on the car checked, 296 passengers presented passes, 1,096 paid cash fares and 120 transfers. Of the passengers tendering cash fare, it was necessary to make change for 445, or 40 per cent. Sixty per cent, or 651 passengers, paid fare with the exact change. If the number of those who presented the exact fare is combined with those who presented passes or transfers, it is found that 70½ per cent had the exact fare, while change had to be made for only 29½ per cent.

Effect of Fare Changes in Seattle on Passenger Traffic

THAT changes in the rate of fare do not reflect themselves immediately in passenger traffic on a street railway is shown by the experience in Seattle in the past five years. The accompanying chart shows the number of passengers carried, the gross revenue and the operating expenses from April, 1919, to July, 1923. Upon the commencement of municipal operation and until July 24, 1920, the fare was 5 cents. The number of passengers monthly in this period fluctuated between 10,000,000 and 12,000,000, the receipts being practically in proportion. On that date the fare was increased to 10 cents with four tickets for 25 cents. The number of riders did not decrease immediately, but there was a slight reduction up to December, 1920, when the monthly total had fallen to 9,424,000.

The cash fare remained the same through 1921, but on Jan. 9 of that year the ticket rate was increased to three for 25 cents. The chart shows that this caused a further decrease in the number of riders. The figure remained practically at 8,000,000 per month until February, 1923, when a snow blockade reduced the riding materially for a period of about six days.

Pursuant to a pre-election pledge, the Mayor obtained a reduction in fare to a flat 5 cents, effective March 1 of this year. The events leading up to this change were described in the ELECTRIC RAILWAY JOURNAL for Aug. 4, page 175. The increase in passenger traffic due to the 5-cent fare was not very large. In fact, the reduction in revenue was so great that pressure immediately was brought to bear on the city administration, and on June 16 the fare was increased to 10 cents cash, with an 8⅓-cent ticket rate, which had been in effect previous to the agitation for reduced fares. Operating results for June and July indicate that there has been virtually no reduction in riding due to this increase in fare, so that almost the entire value of the change in rate has been realized.



Operating Revenues, Expenses and Total Passengers, Seattle Municipal Railway, 1919 to 1923, Showing Effect of Various Changes in Rate of Fare

The chart of operating expenses shown beneath that for revenue indicates that while the costs fluctuate to a certain extent along with the revenues, this change is not nearly so great. In other words, the margin between receipts and expenses was practically wiped out during the period of the 5-cent fare.

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Association News & Discussions

Public Security Issues in Better Demand*

Progress Being Made in Solving the Special Problems of the Electric Railway Companies

BY HENRY R. HAYES
Stone & Webster, Inc.

WE HAVE witnessed this year in the public utility business in this country a continuation of the great expansion which took place during the years of 1921 and 1922. To provide funds therefor, and for refunding purposes during this period of two and three-quarter years, it has required, in addition to the investment in property of large sums of undistributed earnings, the sale of upward of $2,500,000,000 of bonds, notes and stocks.

This large volume of financing, in itself one of the major items in the total of all financing for the period, could not have taken place unless the condition and general credit of the industry as a whole were fundamentally sound. In the opinion of the committee they have never been better, though the costs of capital (hereinafter discussed) are high.

Happily, in the interests of the industry and the public served, there is evident, to a marked degree, a steady broadening of the market for utility securities. It is noticeable in two ways —first, in an increased demand from institutions such as savings banks and insurance companies which gather in the small savings of the people, and secondly, in the last three years especially by sales of securities to the extent of many hundred millions of dollars direct by companies to the users of utility service. In the latter instance it has resulted in opening up an entirely new market for securities in small lots on a basis of reasonable costs. We believe this market has still greater possibilities of development. As has been pointed out to members of this association, all such efforts to sell securities which possess investment merit at prevailing market rates should be aided and encouraged by investment bankers. As the estimated annual budget of the industry requires for extensions, improvements, and refunding purposes over one billion dollars, no new possibilities for raising capital should be neglected.

The current year is one in which many state legislatures have been in session. There were more or less active efforts, in some cases political, in six states to break down state-wide regulation of utilities and to revert to the harmful method of local regulation by the municipalities (so-called "home rule"). Much time and attention has been required of your committee and several group legislative committees, but in every case "home rule" efforts were unsuccessful.

We are dealing with an industry intimately and inextricably bound up in the industrial and social life of the country. It represents a capitalization of close to $15,000,000,000. The industry is basic and essential to all the people. It is an industry, too, where the profits are now limited and can no longer be subjected to the evils of exorbitant profits too often prevalent in its early history. Viewed in this light, it might seem disturbing that there has existed so much talk and agitation this year for local regulation of utilities, especially in New York State, where there was much agitation for municipal ownership and operation.

Those investment bankers who are identified with the actual sale of public utility securities know full well how sensitive the minds of investors are to any tendency, economic or political, which will, or even might, adversely affect honest investment. Investors seem to possess that kind of instinct which can recognize agitation of a purely political character and are very much disposed to withhold funds from the business while such agitation exists. Continued withholding of funds cramps a utility and the public is eventually not adequately served. It is very unfortunate that voters in general, who naturally are themselves daily users of utility service, do not yet seem to have acquired any such discernment. It has become more evident than ever that a development of local sales of investment securities by operating companies direct to users of service will be helpful in preventing such unfair political attacks.

When administered with the broadest powers and in a judicial manner, state-wide regulation of public utilities has been conclusively proved, in the opinion of your committee, to afford the best guarantees which investors can have in this country for a maintenance of that integrity of investment necessary for a ready flow of money into the business (see annual report of 1922 committee).† Where such conditions do not exist we find lack of development of the business or higher costs of money or both—conditions which adversely affect the costs of service to the consumer.

A careful study made by your committee of the policies of the various states throughout the country in regulating the industry shows that as to privately owned plants, in the forty-eight states and the District of Columbia only twenty-five commissions have authority in matters of valuation, rates, services and capitalization. While about three-quarters of the states require of privately owned properties their financial reports of operation, and that such reports are open to public inspection, probably less than half of these reports are actually published. We believe that the public and investors are entitled to this information. Your committee does not believe the best operating results can be attained by the industry until the commissions have such broad authority, exercise it judiciously and regularly and publish full financial reports of operations. Furthermore, money cannot be steadily raised at reasonable costs until the country more fully attains this result.

Of those utilities which are municipally owned and operated, only ten state commissions have jurisdiction over rates, services and accounting. It seems essential that voters of communities which are in the utility business should be more actively educated to a point where public opinion will require proper accounting and sound methods of engineering, finance and operation.

ELECTRIC RAILWAYS

Your committee believes that electric railway service is essential to community service, especially for heavy traffic. The field is developing for trackless trolleys and buses, but such transportation should be supplemental to the main system of transportation. While this newer development in transportation has taken place comparatively recently, it is interesting to note that eighteen state commissions already have jurisdiction over "auto buses" and more with partial and limited jurisdiction. This kind of legislation should be encouraged.

The problems of the electric street railways today are those largely incidental to more economical operation and the prevention of unfair competition. Much progress has been made in the solution of both.

The interurban roads are especially hampered by competition on the high-

*Abstract of a report made to the Investment Bankers' Association of America by Mr. Hayes as chairman of its committee on public service securities. Presented at the annual meeting, Washington, D. C., Oct. 29-31, 1923.

†See ELECTRIC RAILWAY JOURNAL, Oct. 14, 1922, page 639.

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ways from trucks and buses which do not pay a fair proportion of the tax burdens. The problem of expense of maintenance of the highways alone, aside from the unfairness of the competition for freight and passenger traffic, is serious and perhaps national in scope.

An instance of unfair competition is the Chicago, Aurora & Elgin Railroad-Smith Bus Line, Inc., case. The Illinois Commission granted a certificate of convenience and necessity to the bus line. An appeal to the order of the commission was confirmed by the Circuit Court. The case on appeal was taken to the Supreme Court, which reversed the decision of the lower court and set aside the order of the state commission. The following is quoted from the decision of the Supreme Court of the State of Illinois: (Joseph K. Choate, Receiver, et al., Appellants, vs. Illinois Commerce Commission, Appellee — April, 1923.)

The railroad company has assets valued at approximately $15,000,000 and a gross operating revenue of substantially $1,250,000 a year. Notwithstanding the fact that the railroad company operates through an unusually rich, heavily populated section, it is temporarily in the hands of a receiver. The total assets of the Smith Bus Line are three buses purchased in the summer of 1920 at a total cost of about $10,000. It is safe to say that they are now worth less than one-third of that amount. The commission recognized the financial irresponsibility of the bus line and directed it to provide liability insurance to the amount of $10,000 for each bus. Passengers in a bus loaded 50 per cent beyond its capacity now have for their protection the privilege of trying to collect $10,000 from an insurance company. The public has nothing to assure them that the bus line will operate on regular schedule, and it requires no argument to demonstrate that it is incapable of furnishing adequate service to the inhabitants of the two smallest villages in the valley, much less to the 100,000 people living in and between Aurora and Elgin. One accident resulting in a serious injury or death of one person would be enough to wipe out the entire assets of the bus line. If one of the buses were taken out of service the bus line's ability to serve the public would be lessened one-third, and with three buses out of service the public would have no accommodation at all. The financial statement of the bus line shows that it is wholly incapable of supplying additional facilities, whereas the receiver for the traction line is financially able to provide additional equipment, if the transportation needs of the territory demand it. The plan of the bus line is to start from the railroad terminals a few minutes ahead of the cars and to secure what business it can without making an effort to provide adequate service for the territory through which it operates.

The railroads in this country have kept pace with the industrial development and the population increase, and the prosperity of the nation has been due to a large extent to the steady expansion of the transportation system. The savings of hundreds of thousands of investors have been massed to build our great network of railroads, and these transportation systems are entitled to protection from irresponsible competition. If shoestring transportation companies, with no money invested in right of way and no reserve capital to provide adequate service or to protect the public from damage, are permitted to drop in here and there and take the cream of the transportation business from the permanent transportation systems, disastrous results are inevitable. If the permanent highways built at the expense of the people are destroyed, these irresponsible bus lines, that profess to serve the public convenience and to supply public necessity, will leave the public to walk or to provide other transportation facilities. Orders of the public authorities to furnish adequate transportation facilities would be unavailing, because the bus lines would be wholly incapable of complying with the order.

The statute provides the means for compelling the existing transportation system to provide adequate service for the public. If the people living in the territory through which the Aurora, Elgin & Chicago Railroad operates are not being properly served they can file a complaint with the Commerce Commission, which has the power to order whatever change or increase in service the evidence warrants. If the existing transportation company does not comply with the commission's order, then a situation may arise where the public convenience and necessity will require the establishment of another system. The theory of the public utilities act is to provide the public with efficient service at a reasonable rate by compelling an established carrier occupying a given field to provide adequate service and at the same time to protect the existing utility from ruinous competition. (West Suburban Transportation Company vs. Chicago & West Towns Railways, No. 15273.) By this method the public is protected from paying the cost of the operation of competing systems and a return upon a double investment of capital. No doubt the proposed bus line would accommodate a few individuals in the Fox River Valley, but the convenience and necessity which the law requires to support the commission's order is the convenience and necessity of the public as distinguished from that of an individual or any number of individuals. There is some evidence in this record which, if it stood uncontradicted, would support the order of the commission, but the evidence taken as a whole overwhelmingly preponderates against the order. Where it is found that the order of the commission is without substantial foundation in the evidence it is the duty of the courts to set it aside. (Commerce Commission vs. Cleveland, Cincinnati, Chicago & St. Louis Railway, No. 15389.)

The Circuit Court erred in confirming the order of the Commerce Commission. Its judgment is therefore reversed and the order of the commission is set aside.

Disclosure of Information

Your committee is pursuing the studies initiated by the 1922 committee with reference to financial information contained in offering circulars as well as in data released by public utility companies. The fact that adequate financial information to some degree at least is not yet being released creates a condition detrimental to the business. We believe that investors should have complete information and that the public is entitled to know what the industry is doing financially. Until these results are accomplished, your committee does not feel that public utility credit will gain that high standing which it has rightly earned.

There exists little difficulty in getting the necessary information as to the steam railroads or the telephone business. Why should there be difficulty with respect to the public utility business, i.e., the gas, electric light, power and electric railways, devoted likewise to the service of the public interests.

Central Electric Traffic Association to Meet Nov. 21

THE next regular meeting of the Central Electric Traffic Association will be held at the Hollenden Hotel, Cleveland, Nov. 21 and 22.

The opening session, called at 10 a.m., will be in the nature of a round-table discussion. At this session all matters of interest to the electric railways, particularly those affecting the various committees of the Traffic Association, should be brought up for discussion. The afternoon session will be devoted to the meetings of the various committees.

The morning session of Nov. 22 will be devoted to reports of committees and such other business as may properly be presented.

A meeting of the chairmen of all standing committees will be held at 2 p.m., Nov. 21, to outline the program and arrange for the necessary committees to conduct the work of the Traffic Association for the year 1924.

Federated Engineering Societies Studying Coal Storage

RESULTS of far-reaching economic and social importance are likely to be attained by the nation-wide study of the storage of coal now in progress by nearly 100 committees of the Federated American Engineering Societies, it is disclosed in a progress report by Dean F. Walker of the University of Kansas, who is directing the field work of the investigations. He said that the final report would be ready about Jan. 1, 1924, and would place at the disposal of the nation the most authoritative information obtainable as to the engineering, chemical and economic factors involved in the storage of coal.

More than 500 engineers are actively engaged in making the study under the direction of a main committee, headed by W. L. Abbott of Chicago. These engineers have found, it was reported to the executive board, that it is necessary to conduct separate investigations to meet peculiar local conditions which are found in various cities and districts.

The executive board authorized the appointment of a special committee to study the report of the United States Coal Commission with the object of ascertaining what engineering conclusions of the commission the Federated American Engineering Societies might adopt.

Executive Secretary L. W. Wallace of the federation, in a report to the board, deals with substitutes for anthracite, saying:

"Upon the eve of the threatened coal strike, F. R. Wadleigh, Federal Fuel Distributor, made an official and formal request that the Federated American Engineering Societies assist the Federal government in its proposed plan of informing the public as to what substitutes could be used, where to secure them and how to utilize them.

"Plans were about perfected whereby the Federated American Engineering Societies could effectively co-operate with Federal and state officials when the strike which made it so immediately necessary to proceed was settled.

"Although the strike is over, yet there is the necessity for such procedure, as anthracite is becoming harder to secure and the cost is steadily increasing. Therefore, it is deemed advisable for the Federated American Engineering Societies to give careful consideration to encouraging such a campaign of education."

Arkansas Utilities Association

THE dates for the convention of the Arkansas Utilities Association have been changed to Thursday and Friday, Nov. 15 and 16.

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Maintenance of Equipment

Inspection with Watt-Hour Meters

By O. A. Norene
Assistant Master Mechanic Omaha & Council Bluffs Street Railway

SYSTEMATIC inspection is important in the care of equipment. At the present time we use two forms of inspection in Omaha—one on the kilowatt-hour basis and the other on the seven-day basis. The kilowatt-hour basis of inspection has proved the most satisfactory. At present only about 50 per cent of our cars are equipped with economy meters; however, the balance of the cars will be equipped in a very short time. These meters are equipped with three inspection dials, "A," "B" and "C," which determine when the car should be held in for inspection.

What we term the "A" or light inspection is made after the car has made approximately 800 car-miles, as calculated from the meter reading. At this time brakes, emergency control, and equipment and motors are inspected and oiled.

The "B" or general inspection at the carhouses includes all of the fifty-three items enumerated on an inspection card. This is made when a car has made approximately 2,400 car-miles, or about once every seven days.

Small cards are furnished for the use of the inspectors, on which the different parts of equipment are enumerated. Each part is checked off, dated and initialed by the man when the inspection is made. Two cards are made out, one of which is retained by the carhouse foreman, while the other is sent to the master mechanic's office. Here a large card is kept, on which the different inspections and car failures are checked off for a whole month. If a car is pulled in between inspection periods for any defect, or for faulty or careless inspection, it can easily be traced to the right man. It is a probability that the period between the two "A" and "B" inspections can be increased materially in the near future.

The "C" inspection, or general overhaul, is made at the general repair shops after the car has made about 50,000 car-miles. Trucks and electrical equipment are then removed and overhauled and the car body is placed in the paint shop, where it is repainted or revarnished as the need may be.

Tie Bar Reduces Work of Track Construction

A Labor-Saving Device Used to Support the Tie While It Is Being Spiked to a Suspended Girder Rail

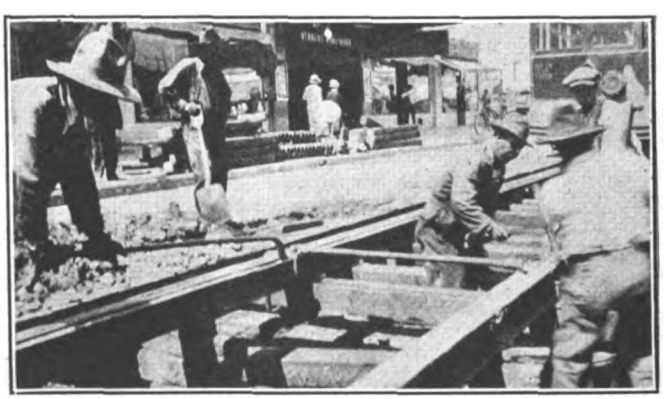
By Clifford A. Elliott
Engineering Department Pacific Electric Railway, Los Angeles, Cal.

WHERE a 7-in. 128-lb. grooved girder rail is used in reconstructing tracks in paved streets, the Pacific Electric Railway uses a trench 21 in. deep. When this reconstruction work is carried out under service conditions, the track is usually "cribbed up" while the excavation work is taking place. In this work every fourth tie is left in place under the rail until the 21-in. trench is completed, when full tieing of the tracks takes place. The placing and spiking of the permanent ties formerly required six laborers. Four of these, each with a tamping bar, held the tie in position at the ends, while the other two laborers spiked it in place.

A tie bar has now been designed which enables the work to be performed by four men. The accompanying illustrations show the method of using this tie bar.

The bar is made up of two pieces of steel, ½ in. x 1 in. by approximately 8 ft. long. These are riveted together with countersunk head rivets for a length of 6 ft. to form the handle of the tie bar. At the toe, the bar is bent to give a convenient form when used as a fulcrum, and the two steel bars are spread apart so as to give a head fork width of 6 in. The cross-section is extended downward 18 in. and the ends are then bent outward for an additional length of 6 in. These latter projections act as peavies for holding the tie in position.

In using this bar the laborer puts the fork over the rail and pushes the toes under the tie, then by pressing down on the handle the tie is raised into position and is firmly held for spiking.



At Left, Holding a Tie in Position for Spiking. At Right, Form of Tie Bar Used by Pacific Electric Railway

Replacing 9-In. Rail by 7-In. Rail Shimmed Up

HIGH cost of maintenance recently caused the Kansas City Railways to replace track on Walnut Street between Eighth and Twelfth Streets. This piece of track had been reconstructed several years ago, using old rail which after further wear had broken in many places. This short stretch required the attention of a gang of six or eight men almost constantly, replacing broken joints and broken rail. In the former reconstruction, this track had been placed in solid concrete on creosoted ties. All this base was in first-class condition, but the replacing of the 9-in. rail with the 7-in.

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rail involved some complications. There was not room to place steel ties except by removing a large amount of concrete. The problem was solved, however, by placing upon each of the old wooden ties a 2-in. shim, and incasing all, including the base of the rail, in rich concrete.

New Equipment Available

New Model 16-In. Lathe

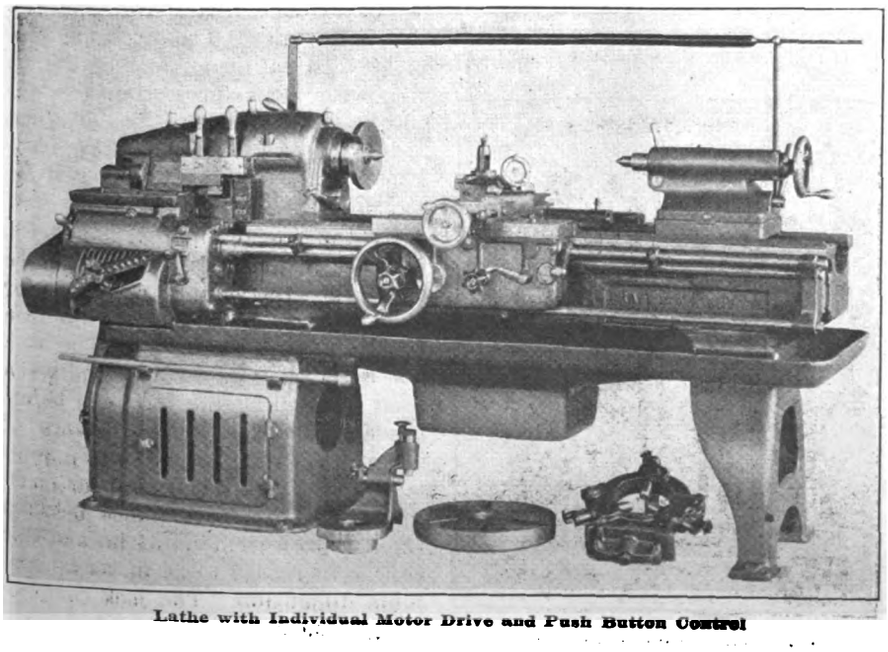
A LATHE with general head for drive by independent motor, single pulley or with cone pulley head has been brought out by the Pratt & Whitney Company, Hartford, Conn. This is a 16-in. lathe known as model B and is suitable for either tool room or high-speed work.

A compact headstock has been developed for both the geared and cone-head types. By mounting the back gears below the spindle, overhanging parts are eliminated, the headstock is centered over the bed and the operator is given greater freedom of movement. The back gears can be engaged from the front of the machine by means of an eccentric lever located under the spindle nose.

The individual motor drive is equipped with push-button control located conveniently on the front of the headstock. The motor is mounted within the cabinet leg and connects by belt to the main drive pulley. For single pulley the drive is through a guarded pulley at the rear. The cone head has a solid housing and side gears. A hand brake adds to the safety and speed of operation.

The positions of the ratio lever and rocker arm for any desired feed or thread are instantly located by a large, direct-reading index plate mounted on the quick-change gear box. This device permits rapid setting and checking of the feed in use and makes the gear box foolproof. A smooth, quiet drive to the feed gearing is secured by the use of large spur gears.

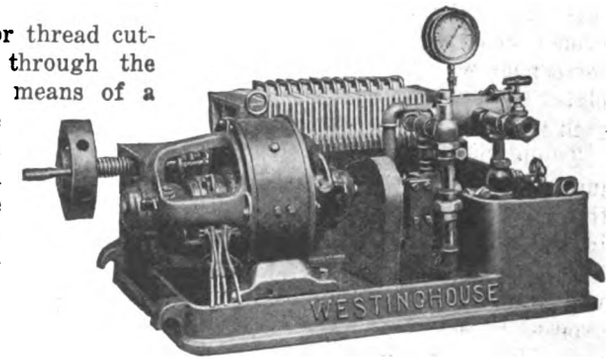
Quick withdrawal for thread cutting is accomplished through the regular handwheel by means of a coarse-threaded sleeve on its hub, making it a one-hand operation. A positive stop on the sleeve acting against a similar stop on the carriage does away with any strain on the cross-slide. The lever operating the combined stop and reverse rod is located at the right end of the apron. This is above the lead screw and permits the operator to set the carriage stop without stooping or taking his eyes from the work. The tailstock has a long, solid barrel and a large graduated spindle. This spindle is locked by a long wedge on its lower side in such a way that no loss of accuracy can occur from the locking strain. The tailstock is clamped to the bed by an eccentric shaft parallel to the spindle, and the same handle provides a means of moving the tailstock along the bed. The usual type of carriage cross adjustment is provided.



Lathe with Individual Motor Drive and Push Button Control

Oil Drying and Purifying Outfits

IN ORDER to make it possible for central stations and other large users of transformers, oil circuit breakers, electrolytic lightning arresters and feeder voltage regulators successfully to dehydrate and purify oil with a minimum of expense, the Westinghouse Electric & Manufacturing Company has developed a special type of filtering outfit.



10 Gal. Oil Drying and Purifying Outfit

The outfits are made in five standard sizes, divided into two classes according to the size of the filter paper. The three larger sizes are rated at 10, 20 and 30 gal. per minute and the two smaller sizes at 2½ and 5 gal. per minute. A complete outfit consists of a filter press, motor, pump, oil strainer, pressure gage and piping. The sizes up to and including 10 gal. per minute are mounted on an iron base cast with a high rim that forms an enclosure and serves as a drip pan. The 20 and 30 gal. sizes are mounted on a structural iron base and have a sheet metal drip pan.

The filter press proper is made up of a series of flat cast-iron plates and frames assembled alternately with filter papers between them. By means of a screw and lever and a movable cast-iron end block the plates, frames and papers are forced tightly together. The plates and frames are cast with holes in two of the corners. When the plates and frames, with the filter papers between them, are assembled, the holes form the inlet and outlet for the oil.

The filter paper used is a special grade of white blotting paper about

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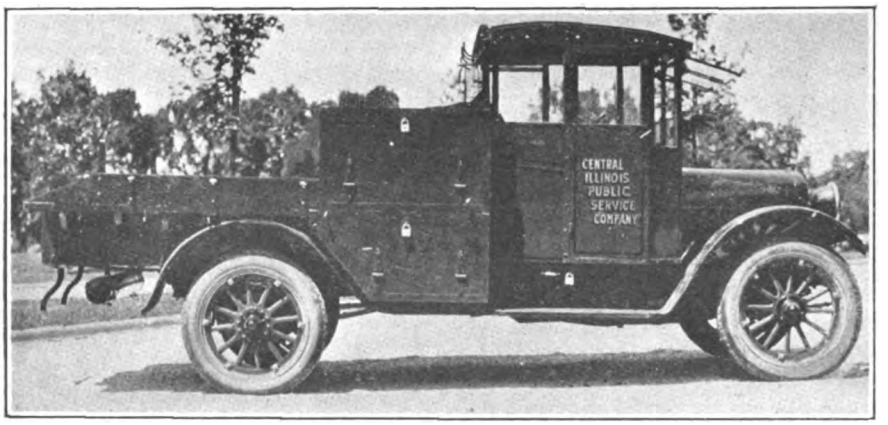


New Line Truck of Central Illinois Public Service Company

0.025 in. thick. It is prepared from wood pulp and contains no coloring matter or chemicals that might injure the oil. Five sheets, cut to the proper size with holes punched to correspond with the holes in the filter plates and frames, are used between each plate and the adjacent frame.

To obtain the best results in treating the oil it is absolutely necessary that the filter paper when first placed in the filter press be entirely free from moisture. Since filter paper will invariably absorb moisture if exposed to the air for any length of time and must, therefore, be thoroughly dried under heat before it is used, specially constructed drying ovens have been designed for this purpose.

Large Fleet of Line Trucks Used in Illinois

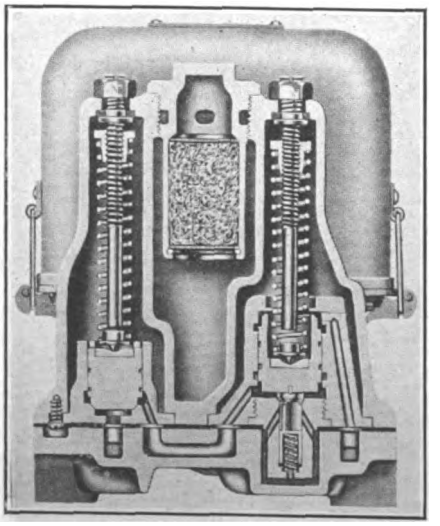
FIVE new line trucks have recently been added to the fleet of speed wagons used by the Central Illinois Public Service Company, making a total of twenty-four trucks of this type now in use. This company operates the Central Illinois Traction Company, the Southern Illinois Railway & Power Company and gives local service in several other localities.

The type of trucks as shown in the accompanying illustration has built-in boxes, racks and receptacles for the various tools needed in line repair work. Wooden tool boxes are located at the rear of the cab, and in addition steel tool boxes are placed on the running board below the cab on either side. A galvanized steel receptacle at the rear of the body is used for carrying rubber blankets. At the left of this compartment is another for carrying live line tools. This is 10½ ft. long and extends under the seat. Another small rectangular compartment beside this is used for carrying pike poles. This also extends under the front seat. A compartment at the right hand side is used for shovels, digging bars, and other miscellaneous large tools. In maintaining the various lines, the trucks are located in districts and take care of the maintenance of overhead lines, transmission, and distribution systems, of which there is about 1,600 miles, giving service to 205 towns in Illinois.

New Type of Governor

A NEW governor for motor-driven air compressors is being placed on the market by the Westinghouse Traction Brake Company, Wilmerding, Pa. This has been designated type S-16 and distinctive features include a reduction in size, weight and cost, as well as improvements in design of detail parts over the well-known double safety valve type of governor.

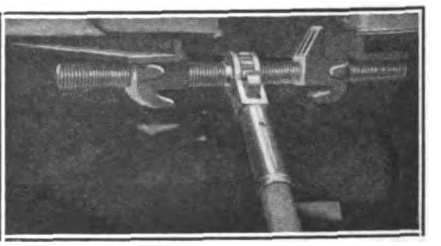
The contact fingers are self-contained and incased in molded insulation, so that they can be readily removed as units without special tools. The finger adjustment is permanent, so that there are no screws which may loosen in service. An efficient pneumatic blowout is provided. When the governor cuts out, this, in combination with the peculiar shape of the contacts, insures that the opening arc is lengthened and cooled, so as to extinguish it effectively. Air from the main reservoir line is vented from the switch cylinder into the switch governor whenever the governor cuts in. This aids in discharging copper gases. A self-contained cartridge type of hair strainer is used to protect all parts. Pipe connections are made in a separate base so that no pipe connections need be broken in order to remove the operating parts. Pressure adjustment is made by loosening a locknut with a wrench and using a screwdriver on the high and low-pressure adjusting stems. Both high and low-pressure valves have metal seats.



Construction of New Type Governor

Handy Type Push and Pull Jack

A HANDY tool for wrecking operations as well as one for which many uses can be found in electric railway shops is the new push and pull jack being marketed by the Duff Manufacturing Company, Pittsburgh, Pa. The design of this jack is extremely simple, consisting of a steel screw, ratchet with pawl, and two cast steel nuts. The nuts are provided with flat projections on the top and with hook projections on the bottom and on either side. The flat projection is used for pushing operations, while the hooks are used for attaching tackle for pulling.



Jack Applied for Spreading Operations

By the use of chains and hooks, fastened to the nuts, the jack can be used for retracking cars or for straightening bent portions where a direct pull is necessary. The jack has a capacity of 10 tons and when used for pulling the jaws can be extended to a maximum distance of 25 in.; this can be reduced to a minimum of 9½ in. When used for pushing the minimum distance between the flat projections is 8½ in. and this can be increased to 24 in. as a maximum dimension. The jack complete weighs 39 lb.

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The News of the Industry

Votes for Franchise

Baton Rouge Electric Company Given Fifty-Year Grants—New Lines to Extend to Suburbs

The taxpayers of Baton Rouge, at a recent election, voted affirmatively on a city ordinance for a fifty-year franchise to the Baton Rouge Electric Company for a railway line to the suburbs, north of the city, where the works of the Standard Oil Company are located. An affirmative vote was also given the Baton Rouge Electric Company for an extension of the franchise on its belt line, thus making both franchises effective for fifty years.

The Baton Rouge Electric Company realized that another line was needed to bring the service up to date and to meet the growing wants of the city, and expressed itself as ready and willing to undertake the work of improvement as soon as it was authorized to do so. The extensions and additions contemplated under the ordinance are said to involve the expenditure of about $300,000.

Under the provisions of the franchise it is stipulated that the motive power for the cars shall be electric; that the fare for one continuous trip on any line covered by the franchise shall not be more than 5 cents unless ordered changed by the Commission Council of Baton Rouge, the Louisiana Public Service Commission, or any other legally constituted authority. In addition free transfers are to be issued.

It is stipulated that within thirty days after the granting of the franchise and right of way the Baton Rouge Electric Company shall file with the city auditor its acceptance and shall furnish a certified check in the sum of $5,000 that it will construct and put in operation the said Dixie extension over the streets within two years from the date of grant and acceptance.

It is agreed that the company shall not sell or lease its privileges to any railroad operated by steam coming into the city of Baton Rouge. A provision allows for the free transportation of the police of the city when on duty and in uniform or with badge, firemen and other city employees. The franchise states that a failure to operate the road for thirty consecutive days without cause or the consent of the Commission Council shall operate as a forfeiture of the franchise, the failure to be determined and forfeiture decreed and enforced by any court of competent jurisdiction. A provision is also made that children attending schools in the city shall be furnished transportation at a price not exceeding three-fifths of the regular fare, provided that each child shall have the right to such reduced fare only when going and returning from school.

Improved Platforms for Golden Rod Yellow Cars

The Interborough Rapid Transit Company, New York, N. Y., gave a demonstration run with four reconstructed cars on its Second Avenue Elevated line Nov. 7. The principal improvements in these cars consist of vestibuling the platform and providing sliding doors to replace the old swinging gates. The new platform arrangement will protect passengers against stormy and unpleasant weather conditions and also decrease the length of time required for station stops during heavy traveling periods. The new doors are electro-pneumatically operated and the door control is so arranged that one man can operate the doors on several cars. This system is similar to that already in use on Interborough subway trains. The run was witnessed by Transit Commission representatives and Interborough officials.

"A Mutual Desire"

Brooklyn Queens Manhattan

LOOK AHEAD

With B. M. T.

Vol. 1 OCTOBER 24, 1923 No. 1

A Mutual Desire

Everybody wants better transit.

But better transit depends upon the co-operation of the PUBLIC, the CITY and the transit companies.

Toward this end the B. M. T. begins today the publication of a weekly bulletin.

Let us "LOOK AHEAD" to the realization of our mutual desire.

GERHARD M. DAHL

Published by The BROOKLYN MANHATTAN TRANSIT LINES

B. M. T.

In the hope of giving better transit with the co-operation of the public, the city and the transit companies the Brooklyn-Manhattan Transit Corporation has started the publication of a series of weekly bulletins named "Look Ahead." The first of the series was posted in 2,500 cars of the surface line and of the rapid transit lines in Brooklyn, Queens and Manhattan on Oct. 26. The company aims to make this publication a connecting link of information between the traveling public and the companies. The first message is reproduced herewith.

Arguments Advanced

Supreme Court at Columbia Hears Failings of City of Spartanburg and Its Railway Property

Another act in the drama of the controversy in Spartanburg was acted on Oct. 8, when the Supreme Court held a hearing in Columbia on the petition of the city to make the South Carolina Gas & Electric Company renew operation of its cars or forfeit its franchise.

The argument for the city, which was presented by C. E. Daniel, stressed the original contract existing between the city of Spartanburg and the South Carolina Gas & Electric Company. It was his contention that the commission had no authority to order cars in the city abadoned.

Henry M. Earle, general counsel for the local traction company, took the stand that the commission was guided by principles of common sense and justice, when it ordered abandoned the operation of an unprofitable railway. He said further that the city had been given better transportation than it ever had, and that if the franchise were forfeited, the city would have no street railway at all, because no individual or company would accept a franchise in view of the loss it imposes and of the attitude of the city administration toward this business proposition. He said that the fact was overlooked by the relators that Spartanburg had, for more than twenty years, the benefit of the services of a utility company built entirely at the expense of outside capital, and that the right of the investors to be protected against the alleged forfeiture had also received little consideration. Further, that the injury the public would receive through the crippling of the utility had also been overlooked.

He referred to the unreasonableness of the city in demanding transportation which was now out of date. He said that the abandonment by the public of the mule cars in 1899 and of the electric cars in 1920 was the natural result of progress and development, and that an established utility should not be required to forfeit its right to exist as an alternative to incurring the loss consequent to such natural changes.

In conclusion, he stated that the relators might, for reasons of their own, attempt to take advantage of the company's position brought about by the changed conditions, but that the commission had been created and organized for the purpose of protecting the rights of the State of South Carolina in its public utilities, and that it had seen fit to stop the confiscation and forfeiture and to protect alike the public utility

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company and the investors through considerations that were ignored by the City Commissioners. He said that the company had not declined to furnish service, that the public was not "irreparably" or otherwise "injured" and that adequate service was being and will be afforded under the direction of the commission, which had full authority and jurisdiction.

It will be recalled that cars in the city of Spartanburg were ordered abandoned July 21, through an order from the South Carolina Railroad Commission. Following the actual stopping of the cars, the company maintained the regular schedule on the interurban lines from the city limits on the western side of the city to Saxon mills and on the eastern limits to Clifton and Glendale Mill villages. The various steps in the controversy have been followed from time to time in these columns.

In the meantime the company is operating buses in the city of Spartanburg proper, which are giving satisfaction to the patrons, and the company, at the same time, is continuing the electric railway service on the suburban line, which runs about 10 miles beyond the city limits. Since Oct. 8 no step has been taken by the court, and undoubtedly some time will elapse before a decision will be rendered.

Following the hearing, the city on Oct. 20 filed an additional argument which quotes at length from the decision rendered by the court in connection with the New Jersey traction difficulty.

Chamber of Commerce Boosts Company's Position in Richmond

The Chamber of Commerce of Richmond, Va., recently adopted the following resolutions:

Whereas the Virginia Railway & Power Company, inspired by an abiding faith in the fairness of the people of Richmond, has lately expended and authorized to be spent large sums of money in order to secure the adequacy of its service to the public and make its proper contribution to the general prosperity and growth of the city, and

Whereas this substantial expression of good faith has stabilized and improved business conditions; therefore, be it

Resolved, That the Chamber of Commerce of the city of Richmond, Va., urge upon its members and other civic bodies, and the public in general, a united effort to secure for the company through the City Council such revision of its franchise obligations as will insure a fair and equitable franchise and establish for the company a credit base to enable it to provide adequate, satisfactory service to the public.

The company is fighting for a recognized valuation for rate-making purposes in Norfolk at the present time and better conditions in Portsmouth, which will appeal to the public lender and increase the stability of the company's stocks and bonds. The same is true in Richmond, where officials are unable to carry out improvement programs because the city has not passed on its application for a blanket franchise to cover a number of old existing franchises which have begun to expire.

In a new statement, printed in *Public Service News*, the Richmond bulletin of the company for car distribution, now current, the company says, in commenting on its expenditures, that public utilities must always be in a position of inviting new capital, and that new capital is attracted only by prosperity on a sound economic financial basis.

Denies Commission Jurisdiction to Order Extensions in Los Angeles

A ruling of the State Supreme Court of California revealed on Oct. 31 that the writ of mandate sought by the Hollywood Board of Trade to compel the State Railroad Commission to assume jurisdiction of and to hear and determine a complaint against the Los Angeles Railway Corporation, which the Hollywood Board of Trade had filed with the commission, was denied.

Since 1918 the Hollywood Board of Trade has vigorously sought the right to place the power with some municipal or state board or commission to force the Los Angeles Railway Corporation to extend its lines into the Hollywood district of the city of Los Angeles. At various hearings the California State Railroad Commission has taken the stand that it did not have the power to order the extensions as the Hollywood district was already adequately served by the local lines of the Pacific Electric System, and it was the opinion that the line extensions would produce duplicate service in territory already supplied with car service. Also, in the particular territory into which extensions were sought the present fare of the serving line was 10 cents. It was the issue of the Hollywood Board of Trade that the extension of the other line would produce a 5-cent fare.

The Los Angeles Board of Public Utilities took the stand that it could not comply with the Board of Trade's petition and order the extensions, as the City Attorney of Los Angeles ruled that under the terms of the city's charter the Board of Public Utilities did not have authority to issue such an order.

It was suggested to the Board of Trade of Hollywood that it file a suit to determine who had jurisdiction.

After the Board of Trade had filed its original petition to the commission to order the line extensions, the commission saw fit to dismiss the application at a hearing held in Los Angeles, as the Board of Trade failed to present sufficient evidence to support its application that the ordering of such line extensions by the commission into Hollywood would be to the advantage of all parties and the public in general provided the question was determined by the courts prior to an exhaustive hearing on the merits of the case.

The court held that the question was a municipal matter and that the public utilities act, in so far as it seeks to confer jurisdiction upon the State Railroad Commission to order a street railway to extend its lines into a new territory in which it has no franchise, is ineffective for that purpose and to that extent void.

Tax and Free Transportation Are Heavy Burdens

The City Council of Seattle, Wash., recently referred to the franchise committee a petition of the privately owned Seattle & Rainier Valley Railway asking relief from its franchise requirements that it pay the city a gross revenue tax of 3 per cent, and also give policemen, firemen and other city officials free transportation. The petition recites that the company is unable to earn dividends on all its stocks, but nevertheless has removed the disparity in fares between the Rainier Valley line and the Seattle Municipal Railway by eliminating the transfer charges and by selling school tokens twelve for 25 cents. The company will be unable to continue these concessions if the tax and free transportation requirements are continued, the petition avers. The Rainier Valley company also asked repeal of an ordinance requiring the company to pave a portion of its right of way in Rainier Avenue between Morgan Street and Graham Street, asserting the work was unnecessary, and that the cost, $39,600, including replacements of tracks, would be a heavy strain on the company's finances.

Partial Service Resumed in Saginaw

Partial resumption of street car service with the motor bus as an auxiliary has taken place in Saginaw, and within the next ten days, according to present plans of the officers, the entire Saginaw Transit Company will be in operation.

Service was started on Nov. 1 as an aid to the merchants who observed the annual fall Dollar Day, which a majority admitted was the largest since Dollar Day was begun several years ago, and most of them asserted that the improved city transportation service had a great deal to do with the success of the merchandising event.

The company was not ready to commence operations, but it was decided to start two complete car lines and three motor bus routes to aid the jitneys that have been serving the city since the suspension of street car service on Aug. 10, 1921.

Just as rapidly as track and overhead repairs are made additional cars will be placed on the lines, Charles S. Kressler, general manager of the company, says. Special crossings, diamonds and switches that have delayed work have been received and are now being installed. Although the jitney buses are giving the company competition, this will not be for long, as their licenses expire Nov. 30, and in the meantime the City Council will pass necessary legislation to prevent all competition with the car company.

Mr. Kressler has started advocating the best patronage for the car lines. His opening campaign launched with the merchants of the city whom he addressed was referred to in detail in the Oct. 27 issue of the ELECTRIC RAILWAY JOURNAL.

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Governor Smith Optimistic

More Republicans in Assembly, but New York's Democratic Governor Is Hopeful About Traction Program

In spite of the personal appeal of Governor Smith to the voters of the state of New York to give him a Democratic lower house in the Legislature, the people up-state did not enthuse in support of the proposed public utility control and hydro-electric development legislation. As a result of the election on Nov. 6 the Assembly is Republican by an increased majority.

It is anticipated, however, that the Republicans will propose compromise legislation dealing with public utility regulation and power development. The most that can be expected, however, is some attempt to solve the New York City traction muddle, and that some effort will be made in this direction by the Republican Assembly leaders seems certain with a Gubernatorial and Presidential campaign coming on next year.

Under the Hearst-Hylan plan defeated in the Legislature this year, the functions of the Transit Commission, with jurisdiction in New York City, would have been transferred to the Board of Estimate and Apportionment of New York City. Among the objections raised by the Republicans was that the program advanced by the Democrats did not insure the permanency of the 5-cent fare and did not require municipally operated lines to be self-sustaining, but that it left the Board of Estimate the power to increase rates and provided for the concealment of losses and merging into the tax rate.

The Republicans also opposed the appropriation by the city for bus lines.

New Plan for Transit Commission

It is said that Governor Smith has a plan under consideration calling for the elimination of the Transit Commission appointed by Governor Miller, but which will recognize the principle of state regulation of transit lines. All functions now performed by the Transit Commission in connection with the planning and construction of new transit lines would be recognized as city functions and shifted to the Board of Estimate or some agency created by the city for the purpose of taking over this work. It is said that Governor Smith will submit a transit proposal which in the main will follow the lines suggested by the Republicans in the Assembly at the conferences with Governor Smith in the closing weeks of last year's Legislature.

What the Governor regards as a necessary prerequisite for the solution of the traction difficulty is to break the deadlock between state authority and city authority. It is said that a compromise is now possible, for while the Republicans with their majority in the Assembly would have the power to prevent abolition of the Transit Commission, Democratic leaders can't see any reason why they should want to exercise that power as long as this contention for the principle of State supervision is not disregarded.

News Notes

Propose Thirty-eight per Cent Increase.—Proposals of the employees of the Worcester Consolidated and Springfield Street Railway Companies in connection with a contract to replace that which expires Dec. 31 call for an eight-hour day, a maximum of 80 cents an hour for regular blue uniform men, 95 cents an hour for one-man car operators and a 30 per cent increase of pay for miscellaneous employees. As computed by the company officials, the employees' proposals call for an increase of 38 per cent over the existing rates, figured on the hourly basis, or 22 per cent when figured by the day, plus the reduction of the workday from nine to eight hours. In the case of one-man car operators it is figured that the increase would be 44 per cent, on the hourly basis. The increased wage for platform men would be $5.60 minimum to $6.40 maximum, per day of eight hours, and $7.60 for one-man car operators. The companies propose 58 cents an hour as the maximum, as at present, with an additional 5 cents an hour for one-man car operators, and elimination of certain bonuses. The first conferences took place on Nov. 5.

Comments on Power Situation.—Alexander MacKenzie, president of the Brazilian Traction, Light & Power Company, was among the arrivals on the *S.S. American Legion* of the Munson Steamship Line in New York recently. Sir Alexander reported that his company, which furnishes all the traction, light and telephone service to Rio de Janeiro and São Paulo, Brazil, is completing a new 160,000-hp. plant 100 miles from Rio de Janeiro. He also said that the present plant, which only provides 75,000 or 80,000 hp., was not only inadequate but that the water supply in that section was running low.

Men Want Conferences.—The street car men's union has renewed its request of the directors of the United Electric Railways, Providence, R. I., for a conference on its recently submitted draft agreement including a wage increase and the closed shop. In a letter signed by Business Agent Coleman and Secretary Coates the men claim that a proposition which looks to conferences to settle differences is reasonable. The company had called for immediate arbitration.

Wages Increased. — The Frankford, Holmesburg & Tacony Railway, which operates a trolley line to the northeastern section of Philadelphia, has voluntarily granted its employees a wage increase of 3 cents an hour. This makes the new scale 48 cents. The increase, which went into effect on Sept. 16, affects about 100 men.

Disapprove "L" Scrapping. — The trustees of the Boston Elevated Railway are opposed to the removal of the elevated structure and the substitution of subways on the ground that such change would cost $80,000,000. In a special report to the Legislature recently filed, the trustees say that if $80,000,000 is to be spent, the money should be used to provide additional service, which would benefit the community as a whole rather than the destruction of lines already built. They concur in the opinion of the transit commissioners who reported in 1913 that the "advantage to be gained by substituting subways for elevated structures are in no way commensurate to the expense."

Pay Increase Granted.—An increase of from 48 to 73 cents an hour to shopcraft workmen on the Washington, Baltimore & Annapolis Railroad has been granted. About 200 men will be benefited by the increase, it was announced by Edward D. Bieretz, business agent of the Electrical Workers' Union. Several weeks ago the men went on strike after failure to get the increase asked for but were persuaded to return to work pending negotiations.

Benefits of Merger Noted.—As the result of recent consolidations, 1,700 miles of transmission line, serving about 14,000 square miles of territory in Illinois, is now included in the properties of the Central Illinois Public Service Company, Mattoon, Ill. The company has taken over eight concerns in central and southern Illinois. The consolidation, according to officials of the company, makes possible the generation and purchase for distribution to customers of about 175,000,000 kw.-hr. in 1923, as compared with 128,000,000 generated during 1922. The new Central Illinois Public Service Company, as the result of the merger, now includes the Middle West Power Company, Canton Gas & Electric Company, Lewistown Electric Company, Central Illinois Power Company and other utilities.

Franchise Revoked, Cars Still Operating.—Although the franchise of the Waverly, Sayre & Athens Traction Company, in Sayre, Pa., has been revoked, the company is still operating cars between Waverly and Athens. The reason for the revoking of the franchise is bound up with the financial inability of the company to meet all the pavement requirements in Sayre. The borough requires that pavement should be made in accordance with the franchise, i.e., with concrete. The company finished a considerable lot of pavement last fall with tarvia asphalt and intended to finish the remaining ¾ mile in the same manner. The Burgess, however, insisted on the pavement being laid with concrete or the franchise annulled. The business men of Sayre have petitioned the Borough Council to reconsider the revoking of the franchise because of the business loss to the merchants and the inconvenience to hundreds of persons who use the line, but the Borough Council refused to take action in the matter.

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Foreign News

Proposed Extensions in Province of Milan

Further Electrification of State Railways and a Subway in City of Milan Under Consideration

The Council of the Province of Milan is negotiating with the Italian Government and a number of traction companies to increase the mileage of electric interurbans in the Province of Milan. Apart from a number of electric interurbans and steam tramways which are now in operation, a great number of country bus lines are giving service in the country, generally in a very poor and unsatisfactory way.

The total mileage of new lines to be built for electrical operation in the Milan province is 63. The lines which are now steam operated and whose electrification will be subsidized by the province total 80 miles.

It is further planned to restore about thirty miles of lines which had been abandoned during the war and after the war period. Several of these companies are considering the adoption of Diesel electric or straight gas rail cars on these short lines.

GENOA-MILAN LINE

The Italian State Railways has recently added about 36 miles to its three-phase electric system on the Turin-Genoa-Milan triangle. The total mileage now in service is about 300. It is planned to operate fast passenger trains on the section between Genoa and Voghera at a maximum speed of 77 m.p.h. This will shorten the limited train schedule between Milan and Genoa by about thirty minutes. The distance of 95 miles formerly was covered in two hours and forty minutes, there being heavy grades in the electrified section. The State Railways has estimated that the cost of electrification of the track, exclusive of buildings, track repairs and locomotives, has amounted to approximately 1,000,000 lire per kilometer, while new electric locomotives cost approximately 1,200,000 lire each. It is estimated that, apart from the passenger traffic, it will be possible to move 4,000 freight cars daily between the harbor of Genoa, Milan and the Simplon and Gothard lines toward Switzerland.

FRANCHISE FOR AN UNDERGROUND ROAD FOR MILAN

At the meeting on July 31 of the Milan Municipal Council, Public Works Commissioner Marchetti gave an account of the franchise negotiations pending between the city of Milan and the Milan Metropolitan Railways for the construction of a system of underground electric railways.

This Italian-French-Spanish Corporation is affiliated with the same interests which control the Paris underground and the Madrid subways, and proposes to invest at least 150,000,000 lire in the construction of three subway lines in the city of Milan. The first line to be built will have as its terminals Loreto Circle, at the northern end of the city where the express and local interurban lines from Monza enter, and the industrial fair grounds at the south. It would have a route mileage of about 5 miles, with fifteen stations. It is purposed to start work this year in order to put the first line in operation by 1925. The two other lines will complete a loop around the city line of Milan and will connect all interurban terminals with the State Railways Central, New and Southern stations and with the Northern Railways station.

ELECTRIC ROAD TAKES OVER BOAT SERVICE

The Italian Minister of Public Works has turned over the operation of the Lake Maggiore steamboat service to the Cisalpine Public Undertakings Company, which is also the owner and operator of the Domodossola-Locarno Electric Railway. From 1916 to the present this steamboat service has been operated by the Italian Government.

New London Underground Railway Offices

To secure greater efficiency and more economic working and administration, a new office building is being erected at St. James' Park Station for the housing of the staff of London's Underground. With the growth in the work it has become imperative that the various staffs, which are now scattered about London, should be concentrated, and to this end designs were prepared for a new office building adjacent to the existing headquarters at Electric Railway House.

Municipal Tramways in England Sold to Private Companies

The Ilkeston Town Council has sold its tramway and electricity undertakings to the Nottinghamshire & Derbyshire Tramway Company and the Derbyshire and Nottinghamshire Electric Power Company, at a figure fully £8,000 greater than the amount required to pay off the outstanding loans. The Town Council is thought to have been fortunate in securing such favorable terms. Some years ago numerous municipalities in England undertook extensive tramway and electric lighting operations, with the idea that the municipalities could operate better and more cheaply than private enterprise. In the case of the smaller towns this has not worked out very well, because the business is done on such a small scale that it is usually uneconomical.

Compagnie Generale Francaise de Tramways

Appropos of the new extension of the accord between the Compagnie Generale de Tramways Francaises and the various municipalities wherein it operates the following figures of the results of recent operations indicate that here, as in so many other cases, the lines are having difficulty in keeping up with the demands upon them, particularly so with respect to the Paris municipal tramways as well as most others in France. Returns have increased greatly, so have running expenses, and the amounts available, or which can be readily had, for real improvements, as well in track renewals as in rolling stock, are by no means adequate. The figures herewith are for eight months' operation, and with the proportionate increase continuing until the end of the year they may well show an augmentation of nearer 15 per cent than 10 per cent. With ulterior increases on the same scale it is certain that a vast system of improvements on all hands will be necessary to cope with the traffic of five years hence.

	Receipts in Francs Eight Months 1923	Receipts in Francs Eight Months 1922
Marseilles....	29,970,811	28,210,906
Le Havre.....	5,778,209	5,656,781
Nancy	4,305,534	3,934,992
Orleans.....	965,474	897,594

The total increase is 2,319,756 francs, which for the proper standard of comparison must be turned into dollars at the normal, not the present, rate of exchange, say 5 francs to the dollar. Marseilles, with nearly a million population, has receipts of around $8,000,000 a year, and Orleans, with fifty thousand, but $240,000.

Glasgow Tramway Extension

The tramway department of the Glasgow Town Council on Aug. 1 formally took over the line of the Glasgow Subway Railway and the Paisley & District Tramways as agreed and confirmed by act of Parliament. The subway purchase price was £385,000 and that of the Paisley tramways £250,000. By the addition of these two properties the city's municipal tramway system has been extended by 24 miles, of which 6 miles is accounted for by the subway. The total length of route under the control of the tramway department is now 126 miles.

Narrow Gage and Top Deck Covers

The British Ministry of Transport has refused to sanction the use of top-deck covers for cars running on the narrow gage of 3 ft. 6 in. at Chester, on the ground of the risk of overturning, especially from wind pressure.

Debentures Issued. — The London Underground Railway has issued £6,000,000 of 4½ per cent debentures.

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Financial and Corporate

Dismantling Likely

Supreme Court Hears Report of Receiver on Northern Massachusetts and Connecticut Valley Systems

That the Northern Massachusetts and Connecticut Valley Street Railway systems would soon be dismantled in large part, if not wholly, was the tenor of evidence and discussion at a hearing given Nov. 2 in Boston by Judge De Courcy of the Massachusetts Supreme Court on the fourth report of Daniel P. Abercrombie, receiver.

The Northern Massachusetts case was considered first. Mr. Abercrombie said the Athol division was operated at a profit and he believed that sale of it as a going concern was feasible. He said the whole property, if sold for dismantling, would bring about $125,000 and there would be claims of about $60,000, leaving about 10 cents on a dollar for the holders of $500,000 worth of bonds. He added that he believed he could do better than this at a receiver's sale.

Taking up the Connecticut Valley system, Mr. Abercrombie said the lines showed an operating loss of approximately $15,000 since the beginning of the present calendar year, and that passenger revenue in this period had been $41,000 below the corresponding period of 1920. He asked for authority to issue receiver's certificates in the amount of $30,000 to pay taxes and power bills.

Bentley W. Warren, appearing for a bondholders' committee and for two banks holding mortgages, offered objections to a receiver's sale of the properties, preferring foreclosure.

Judge De Courcy directed counsel to try to agree on whether the sale shall be by receiver or through foreclosure, on the question whether or to what extent the lines should be operated in the meantime, and what amount of receiver's certificates should be issued.

On the part of Chambers of Commerce in the larger towns involved some discussion has taken place relative to organizing local companies to take over lines in a position to pay profits, and there have also been conferences with bus operators concerning the feasibility of installing a bus service to supplant the trolley service.

Income Lower, Traffic Increases in Detroit

The total operating revenue for the city of Detroit, Department of Street Railways, during September was $1,843,027 against $1,532,927. The former figure included revenue from transportation amounting to $1,766,670. The total operating expenses for the month of September were $1 360,890, compared with $1,073,417 for the same month a year ago. Net revenue from railway operations was $482,137 in September of the current year. A year ago it was $459,511. The net income shows a slight decrease over that of September, 1922. A year ago it was $61,026, and in September of this year it was $59,213. Total passenger traffic increased from 35,770,063 in September, 1922, to 38,385,837 in September, 1923.

Reorganization of Washington-Virginia Company

A reorganization of the Washington-Virginia Railway is being planned by a noteholders' committee, under which the road has operated for the past three years. The first step in the proposed reorganization will be the filing of petitions in the courts of the District of Columbia and Virginia to have the rights of the various lien holders judicially determined.

The noteholders' committee met in Philadelphia recently and decided to start proceedings for a reorganization. While preparing the court petition, Mattie M. Newcomer, an individual bondholder, unexpectedly filed suit at Fairfax Court House, asking that a receiver be appointed.

The petition for receiver, which was filed by Attorneys Charles H. Merrillat and William M. Ellison, alleged that the company had defaulted in the payment of dividends for the past three years.

The charges brought are that corporation officials have allowed the properties to reach that degree of insolvency through "wrongful misappropriation, waste and reckless improvident and unlawful financiering, abuse of its corporate powers and unlawful diversions of proceeds" of several of the bond issues and mortgages.

Judge Samuel G. Brent has ordered that the defendants to the petition show cause why a receiver should not be appointed.

The allegations made extend over a period of time from 1908 to the present. The two lines—the Falls Church line and the Mount Vernon line—were at that time merged. Clarence P. King, who became president of the consolidated companies in 1908, later became president of the Washington Railway & Electric Company.

The Washington Utilities Company, the petition cites, was created under the laws of Virginia by Clarence P. King as "part of a scheme of accomplishing a huge consolidation of street railway interest in and about the District of Columbia and adjoining states."

This scheme, as well as many others, the petitioner says, collapsed, thus bringing about the state of insolvency in which the company now finds itself.

Judgment Affirmed

Supreme Court Rules Philadelphia Banks Must Give Columbus Railway $1,136,310

The Ohio Supreme Court in affirming the judgment of the Franklin County Court of Appeals in the Augusta Slaymaker case gives the treasury of the Columbus Railway, Light & Power Company $1,136,310 to be paid by E. W. Clark & Company, Philadelphia bankers. This decision ends one of the hardest fought controversies in the railway field.

The story began in December, 1918, when Augusta Slaymaker and other stockholders of the company brought suit to recover money paid to the Clarks for their services as fiscal agents of the local concern.

In December, 1920, shortly after control of the company had been wrested from the Clarks by Charles L. Kurtz and his associates, leave was obtained for it to enter the Slaymaker case via a cross-petition in which it was sought to recover for the company certain sums which, it was claimed, had been obtained or expended illegally by the Clarks. Included in these sums were commissions paid by the Clarks to themselves on the sale of Rail-Light securities; payments made the Clarks for supervision of construction of certain equipment; losses incurred by the "franchise surrender" in 1918; payments made by E. K. Stewart, treasurer under Clark, to John Scott Anderson, C. C. Philbrick, and others from what was denominated the "Yellow Dog Fund," and other alleged illegal payments and expenditures.

Judge Kinkead Sustains Judgment

Judge George B. Okey was named master commissioner to hear the testimony, and after several months rendered his report, finding for the company on nearly every ground. He was sustained, in the main, by Common Pleas Judge Kinkead, whose opinion scathingly arraigned the Clarks for the way in which they had enriched themselves at the expense of the Rail-Light stockholders, and decreed that the Clarks should return to the Rail-Light the sum of $1,512,021 and pay all costs in the proceedings.

Although Judge Kinkead was sustained by the Court of Appeals, the amount of the judgment was fixed at $1,136,310. The principal items follow:

Management contracts	$224,716.05
Profit on sale of stocks	117,841.72
Franchise surrender	64,659.00
Stewart withdrawals	218,527.31
John Scott Anderson	173,273.40
Total	$799,017.48

Interest on these amounts from the date of their payment to April 1, 1923, brought the total of the appeals court judgment to $1,136,310. The Clarks now also must pay interest upon that sum from April 1 to the date of payment of the judgment, and in addition, must pay all court costs as a result of the decision of the Supreme Court.

Charles L. Kurtz, president of the Columbus Railway, Light & Power

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Company, said that acquisition of the above-mentioned amount would help toward the improvements and new construction projects that needed to be carried out. He said that new cars were needed as the present equipment was insufficient. His company needs in addition a new power plant which alone will call for an expenditure of approximately $4,000,000, and car line extensions must be undertaken in the near future.

There still remains the possibility of the Philadelphia bankers having the case transferred into Federal Court. The $1,136,310 is subject to orders of the state courts and unless restrained by federal action can be paid to the Columbus Railway at once. The various steps in this controversy have been followed from time to time in these columns.

Investigation of Service Resumption in Kewanee Started

An electric railway line will be salvaged from the junk pile if $140,000 can be raised in Kewanee, Ill., to finance a new company. Pursuant to the stopping of the interurban service between Kewanee and Galva and the city cars in Kewanee recently a representative group of citizens and the board of directors of the Chamber of Commerce have lost no time in delving into the problem of resuming operation of service formerly provided by the Galesburg & Kewanee Electric Railway.

A thorough investigation reveals the fact that new cars and extensive work on the South Main Street line will be necessary, the total cost of the improvements being about $90,000. This with the $50,000 which must be paid to David Wine, the junk dealer who purchased the line, brings the total sum needed to $140,000.

With a capitalization of only $140,000 the belief is general that the cars can be operated at a fair return. So confident is Mr. Wine, the purchaser, of these possibilities that he has offered to take $50,000 of stock in the new concern provided a first mortgage upon the property is given him. E. E. Baker, president of the Kewanee Boiler Company, in behalf of that concern, offered to take $10,000 worth of stock, leaving only $80,000 to be raised.

Indianapolis Company Wants Loan for Tax Purposes

Approval of the negotiation by the Indianapolis Street Railway of approximately $150,000 to obtain funds with which to pay taxes of the company was asked by Robert I. Todd, president, in a recent conference with John H. McCardle, chairman of the Public Service Commission. Although the company is maintaining service in Indianapolis with a 5-cent fare, one of the lowest in the country, the revenue of the company is not sufficient even to pay taxes when due, Mr. Todd told the commissioner.

Under the public service commission law, utilities wishing to make a loan for a period of less than a year are not required to obtain the approval of the commission. Loans made for one year or more must be approved by the commission. Mr. Todd told Mr. McCardle that he was not sure the tax loan could be taken care of within a year.

The financial condition of the company and the continuance of the 5-cent fare in Indianapolis, it is said, depend largely upon the outcome of the application of the Terre Haute, Indianapolis & Eastern Traction Company for a certificate of convenience and necessity to enter the electric field in Indianapolis. The commission and the City Council both approved the plan. The matter was carried to the courts by other electric companies objecting to the granting of the certificate. The action of the commission was upheld in the Circuit Court and the case is pending before the Supreme Court.

The Terre Haute, Indianapolis & Eastern case has a direct bearing on the railway situation, it was explained, because the electric company is to provide electric current for the car company. It has been stated that the saving to the car company on electric current would amount to enough to pay the taxes of the company.

Holdings in Waterloo Relinquished

During a special meeting in Waterloo, Iowa, of the board of directors of the Waterloo, Cedar Falls & Northern Railway, C. D. Cass and L. S. Cass, president and general manager of the traction system, relinquished all their holdings to the bondholders to develop a bus line. They now have big buses operating between Waterloo and Cedar Falls and have made plans to extend their lines to Winthrop on the east. It is believed their future plans will include development of bus transportation in central Iowa.

C. M. Cheney, vice-president of the Des Moines & Central Iowa Interurban Company, was named president and general manager to succeed the Cass brothers in the interurban property they relinquished.

The property is valued at between $9,000,000 and $10,000,000, with $7,500,000 indebtedness against it. Of this amount there are $5,500,000 in first mortgage bonds, with the company owing the balance of $2,000,000 to the government.

Cass brothers have sought to have the affairs of the company adjusted to the satisfaction of the bondholders for some time past, since it was seen that the railway was being operated at a loss each month. The average loss a month is approximately $12,000. The transaction was friendly in every particular.

With Waterloo as a center, the company has lines extending to Cedar Rapids, Waverly and Cedar Falls, besides the city service in Waterloo and Cedar Falls.

Birmingham Receivers Allowed to Default Interest Payment

The lifting of the receivership of the Birmingham Railway, Light and Power Company on Jan. 1 is made possible by a decision of Judge W. I. Grubb of the United States Court for the Northern District of Alabama, allowing the receivers to default in the payment of interest due on Nov 1 on the refunding and extension mortgage bonds of the company. Judge Grubb handed down his decision at a hearing held in Birmingham on Oct. 30.

Some time ago it was agreed that the bonds, which are held by various parties and which amount to $4,600,000, be deposited with a committee for redemption. It was stated at the meeting held before Judge Grubb that 75 per cent of these bonds have already been deposited with the committee. Arrangements are made to purchase from the committee all coupons due on these bonds Nov. 1. Practically all of these bonds held by parties in Birmingham have been deposited with the committee and many from other places also. There was some difficulty in locating all of the bonds, hence the time for their deposit with the committee was extended from Oct. 31, 1923, to Dec. 1, 1923.

At the hearing held before Judge Grubb Attorney W. B. White of Tillman, Bradley & Baldwin, appeared for the co-receivers of the Birmingham Railway, Light & Power Company, Lee C. Bradley and J. S. Pevear. Attorney Powell C. White of New York appeared for the bond holding committee. There was no protest offered against default in the payment of the 6 per cent interest on the bonds. In all cases where bonds have been deposited checks are being mailed to the holders.

It is intimated that with the lifting of the receivership, which is to take place about Jan. 1, 1924, many improvements will be made by the Birmingham Railway, Light & Power Company, in the way of new equipment and the extension of some of its lines. With the elimination of the jitney and the reduction of cash fares from 8 to 7 cents traffic on the cars has increased considerably.

New Directors Elected in St. John

At the annual meeting of the stockholders of the New Brunswick Power Company, St. John, N. B., the following board was elected: Walter C. Allison, of Manchester, Robertson & Allison, Ltd., St. John; W. S. Fisher of Emerson & Fisher, Ltd., St. John; L. C. Gerry of Bodell & Company, Providence R. I.; W. E. Golding of George McKean and Company, Ltd., St. John; J. L. McAvity of McLean, Holt & Company and T. McAvity & Sons, Ltd., St. John; A. P. Paterson of Baird & Peters, Ltd., St. John; M. A. Pooler, general manager and vice-president of company; E. N. Sanderson, New York, president of the company, and Richard Sullivan, broker, St. John.

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Iowa Property Sold

David G. Fisher, president of the Iowa Southern Utilities Company, operating the street railway lines of Centerville, Iowa, and the electric interurban railway between Centerville and Albia, Iowa, and Centerville and Mystic, in addition to serving forty-one cities and towns in southern Iowa with electric power, has sold his entire interests and control of the corporation to George M. Bechtel of Davenport. Mr. Bechtel is president of Iowa's oldest bond house, George M. Bechtel & Company, and a bank director and manufacturer in Davenport.

The Iowa Southern has been a financial success since it was organized by Mr. Fisher and associates in 1916, with four power plants in the vicinity of Leon, Iowa, as a nucleus. In 1919 Centerville's utilities were purchased and in 1921 Newton, Iowa, and adjacent territory were added to the chain.

The corporation's interurban railroad is the outlet for the coal mines of Monroe County, which would not otherwise have easy access to the markets. An approximate tonnage of 100,000 tons is moved over this interurban annually, this being the principal freight handled by the road.

Beginning with a population of 5,000, the Iowa Southern now serves a population considerably in excess of 75,000. Extensive power plant extension and development and transmission line extension have taken place in recent years.

Can't Agree on Third Arbitrator for Substation Appraisal

All efforts of the city of Seattle and the Puget Sound Power & Light Company to appoint a board of arbitration, satisfactory to both parties, to appraise two railway substations to be taken over by the city in November have met with failure. The city and the company have agreed upon two arbitrators, but in an effort to name a third each has selected seven arbitrators, who have been rejected by the other party. James B. Howe, counsel for the company, has asked that Mayor Brown certify, on behalf of the city, that the arbiters named by the two parties have been unable to agree upon a third arbiter, as a preliminary to action by the company to have Chief Justice John F. Main of the State Supreme Court designate the third arbitrator.

Mayor Brown has been advised by Corporation Counsel T. J. L. Kennedy that the Mayor has no authority to certify, except under an ordinance passed by the City Council specifically directing him to do so. The three appraisers are to fix the value of the two substations to be taken over by the city with the first block of 5,000 kw. of the power service now being sold to the Seattle Municipal Railway by the company. The contract by which the city bought the railway lines gave the city the right to reduce the power contract in 5,000-kw. blocks, provided the city paid the company for the substations. The company has the right, on five years notice, to reduce the power service without requiring the city to buy the substations. The city has served one year notice of its intention to take over the first block and substations in November.

Melbourne System to Be Extended

Plans Under Consideration Contemplate a Total of 266 Route-Miles of Electric Railway

The report of the Melbourne and Metropolitan Tramways Board for the year ended June 30, 1923, shows that its plan for a general tramway scheme, with the abandonment of the present cable line and an increase in the tramway route mileage from 125 to 266 before the year 1940, has been accepted by the Parliamentary standing committee on railways. It is now before the Minister of Public Works. The preparation of this plan occupied the board and its officers for about two and one-half years and provides for probable growth in tramway and railway traffic for twenty years ahead.

On April 5, 1923, the board entered into an agreement with its employees, following the decision of the Commonwealth Court of Conciliation and Arbitration, providing for an increase of pay of 4d. per day to the traffic staff, three days good conduct leave in addition to the usual twelve days annual leave, and time and a half for all work on Sundays and holidays. This agreement will add £60,000 to the annual wages bill. It also provides for quarterly adjustment of wages in accordance with the Commonwealth statistician's cost of living figures. Based on these figures for the quarter ended June 30, 1923, the wages on Aug. 1, 1923, were further increased by the sum of £55,000 per year. The contract will remain in force until March 31, 1925.

Population served by tramways		667,000
Journeys per head of population served per annum		340
	Cable	Electric
Gross capital expenditure	£2,162,725	£1,946,569
Mileage of double track	45.9	53.3
Mileage of double track (horse)	.625	.....
Mileage of single track	.....	19
Traffic receipts	£1,254,282	£656,996
Total revenue	£1,260,912	£661,486
Working expenses	£924,789	£503,166
Balance of revenue over operating expenses	£336,123	£158,321
Car-miles (cable, 14,832,416; horse, 9,808)	14,842,224	6,742,428
Passengers carried	155,820,153	70,811,393
Average maximum number of cars in use daily	477	177
Percentage of working expenses to total revenue	73.34	76.07
Average traffic receipts per car-mile	20.282d.	23.386d.
Average traffic receipts per mile of single track	£13,480	£5,230
Average traffic receipts per passenger	1.93d.	2.226d.
Average total receipts per car-mile	20.39d.	23.55d.
Average speed per hour, including stops	9 miles	10 miles
Scale of fares	1d. to 3½d.	1d. to 7d.
Average distance per penny (1d.)	1.44 miles	1.104 miles
Average number of passengers per car-mile	10.41	10.50
Number of cars in stock	601	204
Average number of kilowatt-hours per car-mile	.....	2.353
Number of employees	3,035	1,840

Considerable new construction has been completed during the past year, including a sample center-entrance car which proved so satisfactory in service that ninety others have been ordered. Two single-truck safety cars will be imported from the United States. The number of electric cars now in service is 204, made up of 155 single-truck and 49 double-truck cars. On the cable systems there are 592 grip cars and 597 other cars. New carhouses with sprinklered fire protection have been installed. The program for improvements during the next three years calls for an expenditure of £1,700,000.

Statistics for the year ended June 30, 1923, are given in the accompanying table.

Suit Fails to Compel Payment of $350,000 Tax

Efforts to force the Cincinnati Traction Company and the Cincinnati Street Railway to pay the city of Cincinnati $350,000, claimed to be the amount of tax due the city for 1920, failed on Oct. 17, when Judge Stanley Struble, in the Hamilton County Common Pleas Court, dismissed the suit of Attorney Robert S. Alcorn, suing as a taxpayer. The court took the view that the railway, owing to the fact that it leases its properties to the traction company, is not in any sense liable to the city for the payment of the tax, and that this company is entitled to be dismissed as a defendant.

The suit charged that the companies were obligated to pay the tax of $350,000 annually under the ordinance passed in August, 1918. The plaintiff also claimed that the gross receipts of the defendant companies in 1920 were sufficient to pay the tax, but that the city and the companies entered into a conspiracy to release the companies from the payment. As an end to the alleged "conspiracy," it is charged that the City Council passed an ordinance in 1921, which sought to change the method of accounting so as to postpone the payment of the tax for 1920 to 1922. The acceptance of the 1918 ordinance by which the public became a party in the management of the properties of the defendant companies is mentioned by Judge Struble as enabling the public to escape the fear of it, not the actual exploitation incidental to private control on the one hand, and a large capital investment incidental to municipal ownership on the other.

Judge Struble in his opinion declared the gross earnings were made a trust fund in the hands of the operating company and the remedy of the city for any misapplication or failure to apply them to the purposes named in the ordinance, would be in a court of equity to compel the observance of the obligations of the trust, rather than an action at law for a money judgment.

He says that if the operating company should refuse to obey the order of a court of equity to pay this tax

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to the city where the gross earnings were sufficient to pay the tax, the court no doubt would have the power as a means of enforcing its order to render a personal judgment against the operating company.

The court said regarding this:

These claims which counsel made orally are not included in the plaintiff's amended petition and if true make an entirely different cause of action than that stated in the amended petition upon which the parties went on trial. The cause of action to be tried here is the one stated in the pleadings, not the one in the oral statement of counsel. The city of Cincinnati can recover this tax for the year 1920 by merely refusing to agree to further postponements of its payment, thus forcing the traction company to include this tax in the cost of service for future years, thereby increasing its earnings by an increase in taxes.

Alabama Power Takes Control of Tuscaloosa Property

The property of the Tuscaloosa Railway & Utilities Company of Tuscaloosa, Ala., with the exception of the creamery and ice plant, became the property of the Alabama Power Company by the filing of a deed for record on Nov. 1.

The cars in Tuscaloosa are now being operated by the Alabama Power Company, under the superintendency of T. L. Beauchamp, formerly district manager for the Alabama Power Company at Decatur, Ala.

J. M. Barry, manager of retail operations of the Alabama Power Company, with offices in Birmingham, Ala., was in Tuscaloosa on Nov. 1 in connection with the transfer of the railway. He stated that a better service would be given in Tuscaloosa than had been given heretofore. He said the company would at once place voltage regulators on all feeder electric lines, insuring a more even voltage, and will make many general improvements in the service.

The master mechanic of the Alabama Power Company from Montgomery, Ala., is spending several days at Tuscaloosa looking over the rolling stock of the street car company and also examining the tracks. He says improvements will also be made in this branch of the service.

Heavy Deficit Represents Strike Costs. — The International Railway, Buffalo, N. Y., for the nine months ended Sept. 30, 1923, had an operating revenue of $7,269,457 against $8,065,828 a year ago. The operating expenses and taxes amounted to $6,920,570. This represented a decrease in comparison with the nine months ended Sept. 30, 1921, when the operation and taxes amounted to $7,062,555. The deficit for the nine months ending Sept. 30 of this year was $792,876, which far and away exceeded the deficit of the same period in 1921, but the loss from operation for the nine months ended September of this year represented strike costs. It will be recalled that the company did not operate full service in 1922 due to the strike on its property.

Auction Sales in New York.—At the public auction rooms in New York on Nov. 7 there were sold $1,213 South Carolina Gas & Electric Company, Spartanburg, S. C., certificates of indebtedness, 16¼ per cent.

Bonds Offered.—Aldred & Company, New York, are at the head of a syndicate which is offering at 95 and accrued interest to yield 6⅞ per cent $3,540,000 of the first mortgage thirty-year 6 per cent sinking fund gold bonds series "A" of the Quebec Power Company. The bonds are dated Oct. 1, 1923, and are due Oct. 1, 1953. The proceeds of this financing will be applied to cover the purchase price of consolidated mortgage bonds of the Quebec Railway, Light, Heat & Power Company, Ltd., purchased by the Quebec Power Company and hypothecated in favor of the company's total authorized issue of bond and to furnish funds for further additions, improvements and extensions to hydro-electric power plants, transmission lines and distribution systems.

Order to File Claims.—The United States District Court, Southern District of Ohio, recently ordered Harry Hartwell, receiver of the Ohio Electric Railway & Power Company, which is the defendant in the case of the Columbia Avenue Trust Company, Plaintiff, vs the Ohio Electric Railway & Power Company, to serve notice on the company's creditors that unless they file their claims by Nov. 20 the claims shall be barred. The court said that they must be filed in the receiver's office in the city of Pomeroy, Meigs County.

Net Earnings Increase. — The net earnings of the Illinois Power & Light Corporation for the twelve months ending Sept. 30 are 33 per cent higher than the net of the corresponding period last year, according to figures made public recently. A portion of the big increase for the period is due to additional properties acquired by the corporation during the year. The net earnings for the twelve months amounted to $8,792,517. In the same period in 1922 they were $6,801,017. The Illinois Power & Light Corporation was organized on June 1, this year. The twelve months earnings are those of the companies merged to form the new concern. The net earnings for 1923 are more than double the interest charges on the entire funded debt of the company.

Debentures Offered.—A. B. Leach & Co., Inc., and the Federal Securities Corporation, New York, are offering at 98¼ and accrued interest, to yield 7.25 per cent, $2,250,000 of the Public Service Company of Colorado ten-year 7 per cent sinking fund convertible gold debentures. The debentures are dated Oct. 1, 1923, and are due Oct. 1, 1933. These debentures are being issued to provide for part of the cost of the properties being constructed for and acquired by the consolidated company. The Public Service Company of Colorado is a successor by merger to the properties of the Denver Gas & Electric Light Company and the Western Light & Power Company.

Will Receive Bids.—The Guaranty Trust Company, New York, N. Y., will receive until Nov. 12 bids for the sale to it of the first refunding and collateral trust mortgage 6 per cent gold bonds of the Philadelphia Company. The bonds are known as series "A" and are due Feb. 1, 1944. The amount received must be sufficient to exhaust $120,079 at a price not exceeding $105 and interest.

Will Consider Stock Increase.—The Charleston Interurban Railroad, Charleston, W. Va., will hold a meeting of its stockholders on Nov. 27 for the purpose of increasing its capital stock to $3,000,000, it has been announced by Arthur F. Hill, secretary of the company. The stockholders will act upon a resolution that will increase the present 15,000 shares of stock of the par value of $100 each to 30,000 shares of stock of the par value of $100 each. The 15,000 shares of preferred stock are to be issued upon such conditions and with such preferences as may be determined at the meeting. The call for the meeting was issued in accordance with the terms of a resolution adopted by the board of directors on Oct. 19. It is stated that the past year has been one of the most successful in the history of the company, and plans are in process of formation for new equipment, additions and extensions.

Consolidation Being Discussed.—At a special meeting of the board of directors of the Potomac Public Service Company, Frederick, Md., matters pertaining to the consolidation of the properties of the Potomac Public Service Company and the Cumberland plants were discussed. While no announcement was made it was said that definite steps will be taken at an early date to effect a consolidation of the two.

Service Resumed and Buses Purchased.—Service has been resumed on the interurban line that runs from Bryan, Tex., to College Station, where the Agricultural and Mechanical College of Texas is located. This line was recently sold under receivership, and a new company, the Bryan-College Traction Company, capitalized at $27,500, was organized to take it over. The incorporators of the new company are E. H. Edge, J. M. Lawrence, E. H. Austin and others. An hourly schedule of cars both ways has been in effect and will be maintained during the college year, it was announced by the new owners. The company has purchased three buses put in operation by the students of the college when the interurban discontinued service last year.

Earnings Increase.—The Virginia Railway & Power Company, Richmond, Va., in a nine months financial statement just issued shows gross earnings of $7,777,696 and a balance after all deductions of $933,975. Earnings by comparison with last year increased 13.86 per cent. Operating expenses increased 8.83 per cent.

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Traffic and Transportation

No Five-Cent Fare Now

Altoona Railway Official Says Problem Is to Exist at Present Rates—Wages Should Attract Employees

That there will be no return to the nickel fare soon and that the trolley company is worrying more at present with the problem of how it can keep going on existing fares, is the summary of a statement by General Manager S. S. Crane of the Altoona & Logan Valley Electric Railway in reply to published statements in local newspapers to the effect that "the return of the nickel street car fare would not occur until a certain regulatory body was dismissed from the control of street railway fares." The 7-cent fare in Altoona, Pa., has been in effect for several years.

In his answer Mr. Crane referred to the general impression that public utilities are making too much money. He said there seemed to be an idea current that the public utilities had some means of securing money out of the air, so to speak, or that they had some occult means of making a dollar go further than others can. He said that how it could be presumed that the utilities escaped the condition of high cost of living was to be wondered at, for the same condition that confronts the individual also applies to the utilities.

Some Properties Excepted

It was his belief that the problem before practically all the street railways of the country was not the question as to when they should reduce the fares, but rather how they could keep on going on the existing rates. He said that the exceptional railways were those so situated in the midst of heavy traffic, well distributed throughout the day, frequent interchange of loadings, relative short hauls, or other advantageous conditions that their present fares supply their needs. The statistics of the industry as a whole, he went on to say, showed that since 1913 the average rate of fare had increased from 4.84 cents to 6.88 cents (44 per cent), while the cost of materials had increased 69 per cent and the rate of wages 114 per cent during that period.

He then went on to give some statistics of his own property. For that same period there had been an increase in labor and material expenses, exclusive of taxes, rentals, interest, and the like, of 91 per cent, against an increase in receipts of 83.9 per cent, partly due as to the latter to an increase of 22.2 per cent in the number of riders. Under peak conditions in the year 1920 the increase in operating expenses was 149 per cent, in receipts 97.9 per cent and in passengers hauled 44.7 per cent. Still the total increase in fares was only 40 per cent. He said that this status of affairs represented the industry at large.

He said that the increased fare partly covered the situation, but that the major result was obtained by neglecting the property. He meant by that, he said, that expenditures for the maintenance of the physical property were reduced to a minimum and deferred with the hope of more favorable future conditions, which condition has not obtained as yet. It was his contention that the rate of wages on the railways needed no apology, except it was that of being too low, as the industry would have to establish a rate that would attract employees, and it has scarcely done even this.

One of the important problems before the industry was to determine some method by which operating costs could be reduced, not with the idea of reducing the fare, but with the view of making the present fare sufficient for its needs. This method, adopted for the present, was the using of one employee to a car instead of two. He said that his company had within the last year expended close to $150,000 to improve the power plant by the installation of a new engine and entirely with the view of reducing expenses in that department.

He concluded by saying that the industry recognized the obligations to the public and was endeavoring in every way to meet them, and that when conditions were favorable and justified the public could be assured that the company would do its part.

Ticket Sales in Atlanta Increase

Nearly twice as many persons will invest in tickets when sold at the rate of three for 20 cents as will buy fifteen of them for $1. This at least is the experience in Atlanta during the past three months. The three-ticket rate mentioned above was put in force on July 1, 1923, by the Georgia Railway & Power Company, supplementing the fifteen-for-$1 rate in existence for some time. The cash fare in Atlanta is 7 cents. A statement covering passengers carried and tickets sold during nine months in 1922 and 1923 follows:

Month	1922 Total Pay Passengers	1922 Tickets	1922 Per Cent	1923 Total Pay Passengers	1923 Tickets	1923 Per Cent
January	5,750,310	1,182,415	20.56	5,916,213	1,194,226	20.19
February	5,398,456	1,126,659	20.87	5,408,295	1,131,820	20.93
March	6,064,062	1,262,112	20.81	6,361,049	1,305,749	20.53
April	6,253,255	1,221,575	19.54	6,256,294	1,264,844	20.22
May	6,454,443	1,282,515	19.87	6,648,031	1,316,879	19.81
June	6,083,186	1,139,033	18.72	5,140,391	1,185,522	23.06
July	6,166,925	1,078,916	17.50	6,466,118	2,031,012	31.41
August	6,125,712	1,130,335	18.6	6,449,478	2,237,125	34.7
September	6,246,253	1,201,644	18.6	6,403,190	2,262,641	35.3
Nine months	54,542,602	10,625,204		55,049,059	13,929,818	

Buses Proposed for District of Columbia

A proposal to parallel the street railway lines of Washington with modern buses, "without interfering with said railroads except by fair competition," was submitted to the District of Columbia Public Utilities Commission by Arthur E. Randle, president of the East Washington Heights Traction Railway, on Oct. 31. Mr. Randle coupled with his proposal an offer to pay the District government, in return for such franchise, 1 cent per passenger carried by the buses, or $1,000,000 annually.

The proposition, accompanied by a certified check for $25,000 as an evidence of good faith, was placed before the Public Utilities Commission during consideration by that body of a proposal by the Capital Traction Company to operate a bus from the terminus of one of its lines at Seventeenth Street and Pennsylvania Avenue, Southeast, across the Anacostia River into Randle Highlands. This bus feeder will parallel for some distance the line of the East Washington Heights Traction Railway, of which Mr. Randle is president. The East Washington company operates a single-track suburban line, with two cars in service. Citizens along the line had petitioned for improved service.

The commission granted the Capital Traction Company permission to operate the bus into Randle Highlands on Nov. 1. No action was taken on the offer of Mr. Randle, who did not disclose his associates in the proposition.

Economy to Be Effected in Grand Rapids

In order to keep fares at their present rate, seven rides for 50 cents, the Grand Rapids Railway has found it necessary to discontinue one of its through lines reaching from the northwest city limits through the downtown section to the Wealthy Street carhouse, in the southeast section. This change, according to General Manager Louis J. DeLamarter, will save the company approximately $70,000 a year and will not make it necessary to charge 25 cents for three rides. The only other alternative, he stated, would have been to put all cars on a twelve or fifteen-minute schedule if fares were not to be changed. The abolishment of the through line has necessitated agreement between the railway and the City Commission on three short lines to care for the territory formerly covered. The City Commission at first protested the

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plan on the ground that a stub line would not adequately serve the Scribner-Street district, part of the territory covered by the old route.

Mr. DeLamarter, in reference to the change, said that his company during the past four months had carried a half million fewer passengers than during the same period last year and that the changes would not work a hardship on any one.

Refuses Blanket Certificate

The Ohio Public Utilities Commission on Oct. 29 refused to grant the Youngstown Motor Transportation Association a blanket certificate, authorizing its more than 100 jitneys to operate under the new motor bus law. Following the hearing of the protest filed by the Youngstown Municipal Railway, the commission ruled that the association was not entitled to a blanket certificate for all the jitneys because the cars were owned by individuals who were members of the association and not by the organization. Ten days time has been allowed by the commission for the separate jitney owners to file their applications and affidavits for certificates, and each bus will be considered separately.

Charges were made by Ross Raymond, president of the Motor Transportation Association, against Harry Engle, the Youngstown Street Railway Commissioner, charging him with fighting the jitneys persistently and trying to eliminate them as competitors.

A. S. Somers Addresses Chamber of Commerce

In a recent address before the Brooklyn Chamber of Commerce Arthur S. Somers, director of the Brooklyn-Manhattan Transit Corporation, declared that the 5-cent fare was not a fixture in New York. He referred to a statement made at the recent convention of the American Electric Railway Association in Atlantic City that the 5-cent fare was now "virtually extinct." He said he believed that we had seen the last rail laid in the streets of the metropolitan district. He believed that buses under responsible control and direction might be tried, but that the initiative rested with the public.

In summing up the Brooklyn transit situation he said in part:

The city has invested $162,000,000 in the B.-M. T. system alone.

The city has received no return on this investment.

Every private investor who put $1,000 in the B. R. T. in 1912 has lost $433.

Drop in Percentage of Transfers Collected

Boston Finds Not So Many Presented Since Time Limit Is More Easily Checked

The effect of placing an easily checked time limit on transfers is to reduce the number presented for passage, according to the experience of the Boston Elevated Railway. That company put the Moran transfer into general use on its system on Jan. 1, 1923, and there has been a reduction to 75.15 per cent in the number of transfers collected to those issued. A table showing the percentages follows:

	Number Issued	Number Collected	Per Cent Collected
Nine years prior to change of style	690,370,933	566,717,149	80.64
January, 1923	6,155,809	4,584,714	74.48
February, 1923	5,637,514	4,223,895	74.92
March, 1923	6,308,957	4,823,486	76.45
April, 1923	5,977,524	4,558,304	76.26
May, 1923	6,363,008	4,859,410	76.37
June, 1923	6,082,908	4,617,582	76.00
July, 1923	5,848,367	4,325,667	73.96
August, 1923	5,673,586	4,205,412	74.12
September, 1923	5,713,382	4,206,156	73.62
Average nine months 1923			75.15

If all of the passengers who were prevented from using transfers because of the expiration of the time limit paid a cash fare, the additional revenue to the company based upon the operations for the nine months ended Sept. 30, 1923, would amount to $32,854 per month. If one-half of the passengers walked rather than pay another fare, the additional revenue would have been $16,427 per month. The present Boston transfer was described in the issue of this paper for July 7, 1923.

Write About Your Courteous Conductor

The Allentown *Chronicle and News* is going to present to the most courteous conductor on the lines of the Lehigh Valley Transit Company two tickets for the Lyric Theater. This procedure will be carried on every week during the winter months. The *Chronicle* believes that there are many polite conductors lurking around who do not receive enough attention for their courteous acts. The newspaper has called upon the public to help in this campaign of looking for the most polite street car conductor.

The public is called upon to write of its experiences with conductors. When some very aged, infirm or otherwise unfortunate individual receives help from a courteous conductor, the public is asked to tell about it in writing, or when some special act of consideration is shown to patrons by a conductor, it is suggested they get his number and the line on which he works, and then write in and tell the newspaper all about it. At the end of the week the editors will check up and determine who is the most deserving and the tickets will be mailed out just as soon as possible after a choice has been made. In the words of the *Chronicle and News*, "Keep us posted."

Trackless Trolley Line Approved.—Following the approval of the Public Service Commission, the Rochester Railways Co-ordinated Bus Lines, Inc., a subsidiary of the New York State Railways, opened crosstown trackless trolley service through Rochester's north end over Driving Park Avenue on Nov. 1. The fare rate is the same as charged by the Rochester trolley lines and transfers are to be exchanged between the trolleys and the new line.

Plans Further Bus Operation.—In a recent statement regarding the present traffic congestion in Philadelphia, the Philadelphia Rapid Transit Company announced that it was planning to operate motor buses, such as are now used on Roosevelt Boulevard, through streets that are not now occupied by the company, or from which existing car tracks could be removed. The company said that there would be no relief on Chestnut and Walnut Streets until the proposed Chestnut Street subway had been built. The statement also referred to the number of cars purchased by the company this year, and how many had been received and assigned to regular service. Reference was made to the trackless trolley operation on Oregon Avenue.

Fare Limit Extended.—The Manhattan & Queens Traction Corporation has established a second fare point at Old Mill Road, Elmhurst, L. I., instead of at Grand Street and Queens Boulevard. This change extends for nearly a mile, the length of the 5-cent ride to and from Manhattan. As a result of the new order, it is possible for passengers to start from points between Grand Street and Old Mill Road and ride for 5 cents to either end of the line.

Rate Hearing Postponed.—Hearing on the rates of the International Railway in Buffalo, scheduled for Oct. 31, before the Public Service Commission at Albany was postponed until Nov. 12 at Buffalo because of inability of witnesses to attend.

Employees' Suggestions in Force.—Valuable suggestions have been received from employees of the Monongahela-West Penn Public Service Company, according to Capt. George M. Alexander, president of the company, as a result of an effort made several weeks ago to have practical pointers submitted by men on the job. These suggestions proved to be the chief subject of discussion at a recent conference of the operating officials of the company and some of them have been put in force.

Want Buses. — The Missouri Public Service Commission on Oct. 31 held a public hearing on the joint application of the city of Nevada, Mo., and the Fort Scott and Nevada Light, Heat & Power Company to substitute motor buses for the railway system in Nevada. Several citizens protested against the proposed plan. Under the proposed change the company would charge the same fare. In its petition it set forth that the car system has been operated at a loss since 1919.

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Book Reviews

Kent's Mechanical Engineers' Handbook

By the late William Kent; tenth edition, rewritten by Robert Thurston Kent, editor-in-chief, and a staff of specialists. John Wiley & Sons, Inc., New York, 1923.

In the twenty-eight years that have elapsed since the first edition of "Kent's Handbook" was published, it has become so well known among engineers that little space is needed to describe it, covering as it does all phases of mechanical engineering practice, and such allied subjects as needed by the mechanical engineer. Each edition, however, has been larger than its predecessor until the present volume, consisting of 2,247 pages, is almost 2½ in. thick, even though printed on thin paper. This is some 50 per cent larger than the last edition.

This edition follows the plan adopted in a number of other handbooks, of having the various sections written by specialists. Some thirty-five men well known in their respective fields have assisted the editor-in-chief in this work.

Much of the material in the book has been entirely rewritten to conform with the latest practice. Subjects thus treated include fans and blowers, hydraulic turbines, the steam engine, steam turbines, gas producers, gas engines, oil engines, hoisting and conveying, refrigeration and ice making, heating and ventilation. A considerable amount of other material is included in the handbook for the first time, such subjects including gas turbines, automotive vehicles, aeronautics, industrial furnaces, forge shop, fusion welding and cutting, malleable castings, reinforced concrete and safety engineering. In the sections not included for the first time or entirely rewritten many paragraphs have been thoroughly revised so that the book is abreast of current practice. A complete index of 113 pages is included for use in finding references.

Laminated Springs

By T. H. Sanders, M.I.Mech.E., M.I. and S.I. The Locomotive Publishing Company, Ltd., London; Spon & Chamberlain, New York, N. Y.

This book is a comprehensive treatment of laminated types of springs, particularly for railway service. It is based on a series of articles on "Laminated Railway Springs," which appeared in recent years in the *Locomotive Railway Carriage and Wagon Review*, London.

The first six chapters are taken up with a discussion of the mechanics of the spring, treating it very largely from a practical standpoint. The next four chapters are concerned with stresses in springs, deflections, and formulas dealing with different forms of spring. Chapters 11 to 24 are concerned with the design of springs of various types, this being taken up in considerable detail.

The second part of the book, consisting of chapters 25 to 44, covers the manufacture of springs. This includes the manufacture of sections of steel, forging and cutting the material, methods of fastening and checking play, hoops and methods of attachment, fittings of hoops and finishing springs.

While the book is written from the British standpoint, considerable space is given to American practice. The book should be useful to railway men or others who are interested in the design of laminated springs.

Retail Prices—1913 to December, 1922

Bulletin No. 334 of the United States Bureau of Labor Statistics. United States Department of Labor, Washington, D. C.

This is a publication in the retail prices and cost of living series of the Bureau of Labor Statistics. It includes detailed tables and charts covering the range of prices of food, coal, gas and dry goods by months over the period included. It should be of value to the electric railway man in connection with wage agreements and similar problems.

Employment Hours and Earnings in Prosperity and Depression

By Willford Isbell King of the staff of the National Bureau of Economic Research, Inc. Published by the Bureau, New York, 1923. 147 pages.

According to the sub-title, this book is the result of an inquiry conducted by the National Bureau of Economic Research with the help of the Bureau of Markets and Crop Estimates and the Bureau of the Census, for the President's conference on unemployment. The work was carried on under the supervision of the committee on unemployment and business cycles, appointed by Secretary Herbert Hoover of the Department of Commerce, who was chairman of the conference. This committee had as its chairman Owen D. Young, chairman of the board of directors General Electric Company.

It was found that there was a surprising dearth of information concerning actual employment conditions in the United States, and the investigation, whose results are recorded in the book, has made a considerable addition to the knowledge of conditions of employment in this country.

Numerous statistical tables are included, giving the number of employees in various industries; the volume of employment, showing the proportion of full-time work by employees in various classes of industry; the hours worked per week; the earnings of employees, both total and per hour or per day.

The statistics collected in the book show the relative responsiveness of different industries to the forces giving rise to the business cycle. It indicates the comparative ability of large and small scale business to resist such forces. Shifts of population from one industrial field to another, and the variations in hours and earnings of employees of a company as it changes from boom to depression are traced. The approximate total reduction in employment brought about by the depression of 1921 is also estimated.

Railroad Electrification and the Electric Locomotive

By Arthur J. Manson, Westinghouse Electric & Manufacturing Company. Simmons-Boardman Publishing Company, New York, 1923.

A sub-title states that this book is an "outline of principles involved in railroad electrification. A comparison of steam and electric locomotives. History of electrification in United States. Data on electrification in America, Europe and Australia." It originally appeared as a series of articles in the *Railway Electrical Engineer* and *Railway and Locomotive Engineering*, but has been enlarged upon and rearranged by the author.

The purpose of the book is not very evident. It is quite elementary, the first six chapters being taken up with the simplest laws of the electric circuit, after which five more chapters deal with the general principles of railway motors and their control and the mechanics of traction. This portion constitutes one-fourth of the entire book.

Following this introductory matter the author considers tractive effort in steam and electric locomotives and energy losses incurred by various methods of acceleration and regenerative braking, three chapters being devoted to these subjects. The next eight chapters are mainly descriptive, covering air brakes, contact lines, pantographs, third rail shoes, transformers and auxiliary apparatus, control apparatus, construction of the railway motor, and mechanical design of the electric locomotive. A short chapter on locomotive inspection follows this.

The next five chapters of the book deal with the theoretical solution of typical electrification problems. Introductory to this there is a discussion of the speed-time curve, with an explanation of analytical and graphical methods of calculation. Then a specific problem is taken up in detail, the train sheet being used as a starting point from which the choice of motive power, distribution system and substation location are worked out. The main portion of the book ends with a short discussion of the electrification system of the future and its cost of operation.

An appendix gives brief descriptions of several American electrifications, followed by tabulated data showing the extent, type of system, construction details, power distribution and generation, locomotives and multiple-unit equipment.

The book is not likely to be convincing to the reader. The illustrations from practice seem to have been taken from the work of one manufacturer only, and the question of systems, which has been such an important factor in the past, is greatly subordinated. Its greatest value would seem to be that it has brought together a large amount of data on existing electrifications, which is thus made available for study.

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Personal Items

Leon H. Johnson Purchasing Agent in Anderson

Leon H. Johnson has been appointed purchasing agent for the Union Traction Company of Indiana with headquarters at Anderson. He succeeds Hudson R. Biery, who recently accepted the position of assistant to the president with the Indianapolis & Cincinnati Traction Company. Mr. Biery's appointment was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Sept. 22.

Mr. Johnson has not been identified with the electric railway business, but brings into it an unusual and valuable store of experience, gained in his association with such concerns as the Toledo Shipbuilding Company of Toledo, Ohio; the Struthers-Wells Company of Warren, Pa., and the Anderson Foundry & Machine Company of Anderson, Ind., serving the latter named concern as general manager. He is a graduate of the University of Michigan, class of 1908, and a member of the Tau Beta Pi.

Supervisor of Accident Prevention in Chicago

Victor T. Noonan, who recently resigned as superintendent of accident prevention for the Cleveland Railway, has been appointed supervisor of accident prevention for the Chicago Surface Lines. Mr. Noonan is one of the pioneer accident prevention engineers of the country and has a national reputation in this work. He was remarkably successful in organizing the accident prevention work of the Cleveland Railway. He was formerly State Director of Industrial Safety for Ohio, holding this position, which was nonpolitical, for six years. Previous to his connection with the Cleveland Railway he was a public consulting accident prevention engineer and had organized accident prevention in some of the largest industries in the United States. Mr. Noonan is the author of five motion picture scenarios on accident prevention. He is a member of the National Safety Council and chairman of the committee on public education of the American Street Railway Section of the National Safety Council.

J. B. Mahan Made Secretary and Treasurer at Schenectady

Another change in the executive staff of the Schenectady Railway has become effective in the naming of J. B. Mahan to the position of secretary and treasurer, succeeding J. H. Aitken, who recently resigned after twenty-one years of service with the company. Mr. Mahan for the past six years has been head of the accounting department of the Terre Haute Traction & Light Company and was closely connected with E. M. Walker when the latter was connected in an official capacity with the Terre Haute, Indianapolis & Eastern Traction Company before Mr. Walker was made president of the Schenectady Railway. In all, he served the Terre Haute company approximately ten years. He is a native Indianian. He went to Schenectady on Nov. 10.

Thomas J. Lynch Had Active Railway Career

Thomas J. Lynch, whose appointment as general manager of the Schenectady Railway was noted in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 3, entered upon his railroad career as a clerk in the passenger department of the Delaware & Hudson Company, Albany, N. Y., filling consecutively various positions in the service of that company in the passenger, freight, traffic, mechanical and transportation departments. He was superintendent of the Susquehanna division with offices at Oneonta, N. Y.; superintendent of Greenwich & Johnsonville Railway with offices at Greenwich, N. Y.; general agent with offices in New York City; assistant to the vice-president and general manager; and later became assistant to that company's vice-president in charge of the subsidiary properties, including the Hudson Valley Railway, Plattsburg Traction Company, United Traction Company, and the Champlain Transportation Company. In the last-named position he was detailed to special investigations of operating practices effective on various street railways throughout the country, and had the handling of all purchases. Later he became assistant general manager of the United Traction Company at Troy, N. Y.; and on July 15, 1923, became assistant general manager of the Schenectady Railway. His ability here was soon noted, for in less than four months he was appointed general manager of the Schenectady property, effective Nov. 1.

T. J. Lynch

Mr. Lynch was born at Troy, N. Y., on Jan. 29, 1886. In charge of operation, he succeeds in his new position William S. Hamilton, who was general superintendent.

Francis Tingley, formerly supervisor of overhead lines, Washington Railway & Electric Company, Washington, D. C., has resigned to become a member of the firm of Over & Tingley, to engage in general engineering work in the vicinity of Philadelphia.

J. Alfred Cote has been appointed superintendent of the Quebec Railway, Light, Heat & Power Company. In this position he succeeds J. A. Everell.

C. M. Cheney, vice-president of the Des Moines & Central Iowa Company, Des Moines, Iowa, has been named president and general manager of the Waterloo, Cedar Falls & Northern Railway. He succeeds C. D. and L. S. Cass, who relinquished all their holdings to the bondholders.

D. E. Byerley has been transferred from the Hattiesburg Traction Company, Hattiesburg, Miss., where he served in the capacity of general manager, to Adrian, Mich., to assume the managership of the Lenawee County Gas & Electric Company, a new property purchased by the Doherty Organization. E. E. Armstrong, formerly general superintendent of the Meridian Light & Railway Company, has been transferred to Hattiesburg, filling the position of general manager.

David G. Fisher has resigned as president and director of the Iowa Southern Utilities Company, Centerville, Iowa. He has held the position since 1916, when he organized the corporation with the plants in the vicinity of Leon, Iowa. Mr. Fisher, also president of David G. Fisher & Company, public utility engineers, will devote his time to the development of extensive engineering projects in which he has for some time been interested.

John W. Ryan has resigned as secretary of the Erie County Traction Corporation, Buffalo.

C. M. Broadhurst, formerly with the Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., has been appointed mechanical superintendent of the Toronto Suburban Railway, Toronto. In this capacity he replaces F. Bazett-Jones, who has been transferred to St. Catherines. Both properties are owned by the Canadian National Railways.

T. L. Beauchamp, formerly district manager of the Alabama Power Company at Decatur, Ala., is now superintendent of the Tuscaloosa Railway & Utilities Company at Tuscaloosa, Ala. The Alabama Power Company recently took control of the railway property.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Volume of Business in Car Building Industry Doubled Since 1909

Although the total number of persons engaged in the business of building electric railway cars was less in 1921 than in 1909, according to figures recently released by the Department of Commerce, nevertheless the total value of the product was nearly double that of the earlier year. The decrease in the number of employees was entirely among the wage earners. The number of salaried workers, on the other hand, showed a marked gain. Moreover, the total sum paid in salaries has steadily advanced, the increase being 43.7 per cent from 1909 to 1919 and 33.2 per cent from 1919 to 1921. Wages increased in the first period, but in the latter two years decreased 22.6 per cent.

	1921	1919	1914	1909	Per Cent of Increase or Decrease 1919–1921	1909–1919
Number of establishments	10	7	14	14	.....	.....
Persons engaged	3,356	3,285	4,286	4,004	2.2	—18.0
Salaried employees	444	365	446	421	21.6	—13.3
Wage earners (average number)	2,912	2,920	3,840	3,583	— 0.3	—18.5
Salaries and wages	$4,334,934	$4,984,941	$3,199,674	$2,770,566	—13.0	79.9
Salaries	1,135,789	852,851	732,647	593,617	33.2	43.7
Wages	3,199,145	4,132,090	2,467,027	2,176,949	—22.6	89.8
Paid for contract work	.....	.....	129,904	233,508	.....	.....
Cost of materials	7,880,405	12,058,942	6,349,779	4,260,470	—34.7	183.0
Value of products	14,856,068	18,441,976	10,494,953	7,809,866	—19.4	136.1
Value added by manufacture	6,975,663	6,383,034	4,145,174	3,549,396	9.3	79.8

Since 1909 the value of the manufactured product has about doubled. The cost of materials was in 1919 nearly triple what it had been ten years earlier, but since that time there has been some reduction. General statistics for the electric railway car building industry are given in the accompanying table.

Barney & Smith Plant Again on Sale

Under an order issued at Dayton by Judge Edward T. Snediker of the Montgomery County Common Pleas Court the Barney & Smith Car Company's plant will again be offered for sale Dec. 5. It is reported that a prospective buyer has been found. The Baltimore & Ohio Railroad is mentioned as the possible bidder. The plant must sell for two-thirds of the appraised value. In successive reappraisals the value set on the plant has been reduced from $3,257,759 to $1,423,839, its present appraisal value. A bid of $949,226 may legally be accepted. As representative of the holders of $2,000,000 in mortage bonds against the company, the Guaranty Trust Company, New York, is requesting the sale at this time. If the plant is not sold it will probably be reappraised and the valuation still further reduced. The last attempt to sell the car company was on April 2, 1923, when the entire plant and equipment were offered at the present valuation.

Large Shipments Made to Chile

Several unusually large shipments of substation equipment and rolling stock for the Chilean State Railway have been made from the Westinghouse plant at East Pittsburgh. One consignment consisted of six freight locomotives completely crated and packed for the ocean voyage. This was claimed to be the largest single shipment of the kind ever made. Another, consisting of complete equipment for three substations, required for overland transportation thirty-three railroad cars. The aggregate weight amounted to more than 800 tons, and the total value of the equipment was about $750,000. An interesting feature of this shipment was the fact that the long train, drawn by an electric locomotive, was started by wireless. These consignments are part of a $7,000,000 order now nearing completion.

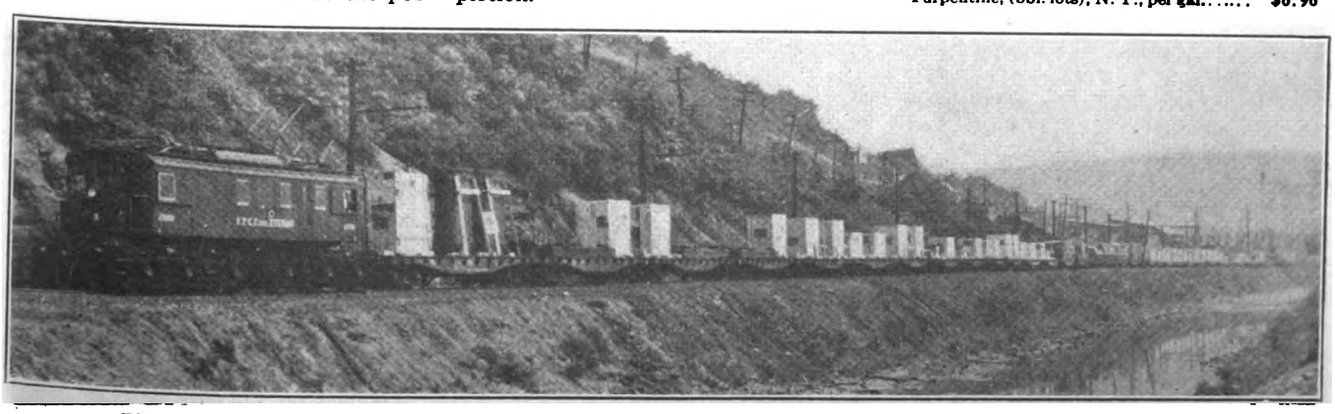
Costs Higher on Supplies Manufactured in Railway Shops

One of the larger railways, which had undertaken to manufacture a number of things in its own shops, such as axle and armature bearings, cast-iron brake shoe hangers, door and step mechanisms and other regularly used maintenance supplies, recently checked its costs against the prices of manufacturers for these same articles. This company had found that it had to add 97 per cent to the prime cost of labor and material to cover its overhead expense. Upon submitting specifications on twelve articles, as manufactured in the company's shops, to several manufacturers, the bids received were lower in every case than the company's costs, a fairly sizable quantity having been specified. Needless to say, the company ceased manufacture in its own shops.

The superintendent of equipment said his shop was supplied with machine tools and handling equipment rather better than the average railway shop. The difficulty is that the average shop is equipped with utility tools, which are maintenance tools and not manufacturing tools. A manufacturing plant is supplied with high-speed tools, and the work is organized and the employees are particularly trained in production work. As soon as a manufacturing program is put into the maintenance plant, it takes the mind of the master mechanic off maintenance and onto manufacturing. This equipment man remarks that the two kinds of shop work simply will not mix, and the railway nearly always makes a mistake in trying to manufacture its own supply parts.

Metal, Coal and Material Prices

Metals—New York	Nov. 7, 1923
Copper, electrolytic, cents per lb.	12.687
Copper wire base, cents per lb.	15.00
Lead, cents per lb.	6.75
Zinc, cents per lb.	6.70
Tin, Straits, cents per lb.	43.50
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.40
Somerset mine run, Boston, net tons	2.275
Pittsburgh mine run, Pittsburgh, net tons	1.925
Franklin, Ill., screenings, Chicago, net tons	1.45
Central, Ill., screenings, Chicago, net tons	1.05
Kansas screenings, Kansas City, net tons	2.25
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.60
Weatherproof wire base, N. Y., cents per lb.	18.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal.	$0.93
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	11.25
Turpentine, (bbl. lots), N. Y., per gal.	$0.96



This Thirty-three-Car Train Carrying Electrical Equipment for the Chilean State Railway Was Started from East Pittsburgh by Wireless

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British and Foreign Prices for Electric Plant

The municipalities of both Leeds and Bradford have appointed committees to consider the fact that the tenders of British firms for electric plants are higher than those of firms on the continent of Europe. The desire of the city councils of course is to give their orders to British firms, and it is hoped to find some way by which the great disparity of prices may be removed. In the meantime, the electricity committees of both towns have accepted tenders from British firms for the supply of large turbo-generators.

London Electric Railway Extension

The first section, about 1½ miles long, of the extension of the Charing Cross & Hampstead Railway from Golder's Green to Hendon is now practically complete. Work is proceeding rapidly on the second section, 3 miles long, from Hendon to Edgware. The extension is mostly on the surface, but there are some tunnels. This work began ten months ago and is well advanced. The total cost of the section from Endon to Edgware, including permanent way, signaling, station buildings, rolling stock, and other works, will be £398,000.

Rolling Stock

Schenectady Railway has ordered one double-truck snow plow, delivery on which will be expected by Nov. 15. The company has overhauled and repaired six sweepers to provide adequate snow removal equipment for the coming winter.

Kansas City Railways, Kansas City, Mo., during the last month has remodeled 190 cars in use on city lines to conform to the safety standards that have been adopted by that company. All the cars have been equipped with automatically closing doors and steps, which are designed to avert accidents and handle the traffic more expeditiously.

Track and Line

San Antonio Public Service Company has been authorized by the City Commission to build an extension on Rulz Street, at an estimated cost of $24,000.

New York, N. Y.—The Board of Estimate has approved the Transit Commission's request for $1,725,000 for the extension of the Brooklyn-Manhattan Transit Corporation subway in Fourth Avenue, Brooklyn, to Fort Hamilton.

Honolulu Rapid Transit Company has adopted plans for extensions and improvements to its system involving an expenditure of more than $300,000, according to H. Stuart Johnson, manager. The residential districts of the city are expanding rapidly and it is stated that the company will make provision for caring for this traffic more adequately than at present.

New York State Railways, Syracuse, N. Y., has been authorized by the Public Service Commission to extend its line on the Syracuse-Bridgeport highway a distance about 2,000 ft. so as to provide transportation service for employees of an industry soon to be operated in Salina. There was no opposition to the company's petition to exercise a franchise in that town and the commission holds the additional tracks are necessary and convenient for the public.

Muskegon Traction & Lighting Company has been granted permission to make an extension of 1 mile from its present Ottawa Street car line to Getty Avenue.

Columbus Railway, Light & Power Company, Columbus, Ohio, following the court award of $1,136,310, announced through President Kurtz that there were many improvements and new construction projects that should be carried out. New cars are needed, as the present equipment is not sufficient. The construction of an additional power plant costing approximately $4,000,000 is contemplated. Extension of car lines into newly built-up property, street improvements, placing of power lines underground and scores of other things must be undertaken in the near future.

Power Houses, Shops and Buildings

Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa, has awarded the contract for the construction of a new brick and concrete carhouse and yard office at Fort Dodge, at a cost of $150,000, to the W. J. Zitterell Construction Company, Des Moines. The old building, which the concrete is to replace, was recently destroyed by fire.

Olean, Bradford & Salamanca Railway, Olean, N. Y., will use power from Niagara Falls on part of its lines beginning early in December. The system is expected to draw its entire supply of power from the Falls next spring. With the completion of the power system now being installed the Ceres plant is to be closed down, but held as an auxiliary source of power for use in emergency.

Louisville, Ky.—Plans and specifications for the new interurban terminal station for the Louisville Railway Company on the west side of Second Street, between Liberty and Walnut Streets will be mailed out to contractors shortly and bids will be opened and considered about Dec. 1. The estimated cost is $200,000. The announcement of the bids was recently made by Frank H. Miller, vice-president in charge of engineering and construction for the company.

Tri-City Railway of Illinois will lay 1,500 ft. of track on vacant property at Thirty-fifth Street and Fifth Avenue, Rock Island, where cars from the East Moline division will be stored. The project will cost approximately $10,000, Frank Skelley, assistant manager of the railway, announced. The cars will be stored on the company's lot on Thirty-fifth Street until such time as a new carhouse is constructed in Moline. The cars were formerly stored in the carhouse at the foot of Sixteenth Street, Moline.

Trade Notes

The General Railway Signal Company of New York City has filed an amended certificate of incorporation in the office of the Secretary of State at Albany increasing its capital from $10,000,000 to $10,500,000. Harris, Beach, Harris & Matson of Rochester, N. Y., are attorneys for the corporation.

Industrial-Utilities Service Bureau is now located at Suite 77, Todd Building, Louisville. A. R. McLean is the principal of the bureau.

Hitchcock & Tinkler, Inc., contractors building the 6-mile Moffat tunnel in Colorado, have ordered from the General Electric Company six electric locomotives, to be used in hauling the debris from the boring of the tunnel. When the tunnel is completed larger electrical locomotives will be used.

General Electric Company, Schenectady, N. Y., announces important rearrangements of certain fields of work within the sales branch involving a change of name of two departments. What has hitherto been known as the lighting department becomes the central station department, and the name of the power and mining department is changed to industrial department.

Transit Equipment Company, New York, N. Y., recently announced through its president, R. W. Marshall, that it would carry a complete line of new and used buses, bus bodies, fare-registering devices and bus accessories, selling exclusively to the electric railway industry. V. C. Ealey is in charge of this branch of the company's business.

New Advertising Literature

American Di-Electrics, Ltd., Brooklyn, N. Y., has issued a pamphlet, describing briefly its principal products, entitled "Electrical Insulation made by Electrical Engineers." This is also known as Price List 123.

Foamite-Childs Corporation, Utica, N. Y., issues the "Industrial Fire Chief" "in the interest of fire protection engineering."

National Tube Company, Pittsburgh, Pa., has issued the "Seven Wonders of Wrought Pipe." With the aid of pictures and descriptive matter the importance of each wonder is shown in its relation to industry as the "seven wonders of the world" are of importance to science and literature.

The Thermal Syndicate, Ltd., New York, N. Y., has issued a 16-page pamphlet on Vitreosil data.

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New York, Saturday, November 17, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 20

An Opportunity to Expedite Standardization of Car Parts

THE electric railway industry has had before it for a number of years the general subject of standardization. While the industry is generally agreed that this work is extremely important, it has not been so clear that there are several separate and distinct phases of it that must be treated from different angles.

A letter from the Division of Simplified Practice of the Department of Commerce, dealing with one important phase which has not been given much attention, was published on page 744 of the Oct. 27 issue of this paper. It refers particularly to the work of obtaining more uniformity in the many commonly used car parts which usually differ in some small ways as supplied by the different manufacturers or car builders. As expressed by this division of the Department of Commerce its co-operation with the railway industry would be more in the nature of clearing the field so real standardization could be more effectively and expeditiously accomplished. A review of present varieties of any one article or commodity and a determination of the relative demand for each variety usually suggests the elimination of a large number as being superfluous; and then agreement among manufacturers and users of that item to concentrate on the remaining varieties leads directly into the consideration of improved quality, performance and design of standards. Simplification is a necessary preliminary step in the campaign that is essential in order to carry out successfully any standardization program on a property, no matter of what size.

To obtain some concrete illustrations of the magnitude and importance of this subject a survey was recently made in one of the shop storerooms on a large railway property. The conditions on this particular property are far better than the average, due to the fact that the cars have been purchased in comparatively large groups, thus reducing the number of different groups and consequently the number of different sets of parts. In addition an active equipment engineering organization has been engaged for a number of years in a campaign of simplification which has in many instances materially reduced the number of different lots of parts required for purposes of maintaining the cars and equipment.

Even under these very favorable conditions many examples of the needs for simplification were apparent. There were eight different combinations of hand strap hangers and grips; five different types of bell cord pulley supports; a wide range of cupboard catches, latches, register mechanism fittings and hinges of various sizes for cabinets and folding doors; five different lots of rubber insulating bushings for lead outlets in motors, and various designs and sizes of motor lead terminals which required that sixty different lots of made-up motor leads be carried in stock. Variations in the size and design of control resistors required eight different lots of mica insulating tubes, twelve lots of mica washers and a large number of different lengths and sizes of rods and frame parts. Many examples of special parts which were required in comparatively small quantities but of many different varieties were found. In most cases these parts must be manufactured to order from samples and the problem of keeping a supply of parts on hand is a serious one. Switches, fuse blocks and boxes for auxiliary circuits were stocked in a large range of varieties. Electric heaters of approximately the same capacity per unit were constructed and rated in so many ways that twenty different types of coils were carried in stock. Even then a still larger variety were being wound to order as required. There were six different sizes and types of truck turnbuckle castings and forty different lots of grab-handle castings. The number of lots of corresponding parts for door and step mechanisms roughly coincided with the number of groups of cars on the property. There were forty different types or sizes of motor and gear case oil box covers, nine types of sand hose supports and an extremely wide variety of seat parts and fittings.

These are merely a few examples illustrating a condition which is rather difficult to visualize. But the above description is only the operating side of the general picture, and is taken in one storeroom supplying only a portion of one property that may be said to represent one of the best situations that could be found. Apply these facts to a property whose cars have been purchased in many small lots and then multiply by the number of different railways and we begin to get a view of the manufacturing side of the picture. The net results of the condition are needlessly high prices for parts, high costs of maintenance, high investment in stores and high expense of stores keeping.

Judging by the success the Division of Simplified Practice has had along these lines in other branches of industry, the JOURNAL believes that the American Electric Railway Engineering Association might well give serious consideration to some plan for securing co-operation of the various interests in the electric railway field.

Maintenance Ideas Should Be Put to Work

TRIPS made about the country by the editors of this paper, visiting many electric railways, disclose great variations in the methods of doing maintenance work of substantially the same character. While all of the practices may produce results that are satisfactory, in so far as they keep the property in fair

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operating condition, it is quite noticeable that there is a great difference in the relative efficiency of the various methods. This applies to shop, track and line with about equal emphasis.

The good old term "local conditions" used to be brought forward regularly as an alibi for retaining some backward practice. The term is not heard so frequently now, probably because of the ridicule bestowed upon it. The excuse now used is the lack of money to purchase new and improved shop and construction equipment.

This paper is devoting considerable space, and much thought and effort, to the work of bringing to the attention of maintenance men throughout the industry the best of the methods that have been devised by progressive executives and workmen. Fortunately, many of the methods cost little to install, while they produce excellent results. But of how many of these improvements has your shop taken advantage? And how many maintenance articles have given you ideas for still better methods than those described? And have these ideas been carried out?

It would be well for the maintenance men to check up and see if everything possible has been done to improve the methods in use, keeping in mind that an improvement in the standards of maintenance usually results in an ultimate reduction of costs. In the meantime the transportation department has had the advantage of better tools to work with, and the public, in its turn, undoubtedly has reflected its approval in greater patronage of the cars.

Is Enamel Better than Varnish for the Car Interior?

AN INTERESTING speculation aroused by the exhibits of the paint manufacturers at the recent convention at Atlantic City concerns the value of enamel as a substitute for varnish in repainting of cars. Every electric railway man is familiar with the difficulty of making old and battered woodwork in the car interior fresh and clean looking when the car is renovated. It is a comparatively simple matter to repaint the metal parts, both inside and out, and give them a luster equal to the original appearance when first they came from the car builders. But the problem is not so simple with the woodwork. Inevitably, this becomes dingy with age, battered by the carelessness of trainmen and passengers and otherwise defaced. No matter how carefully the varnish is removed and the new applied, it is impossible to restore the original freshness of the material. Moreover, varnish removal and sandpapering is an expensive process. Many railways simply varnish over whatever dirt is on the wood. In the course of time, by this process, a thick coating of varnish accumulates and acts as a lens to magnify the underlying defacement.

The use of a solid color enamel is being tried to overcome the difficulty. This is in line with the practice on many steam roads, although in the case of their more modern cars, there is likely to be less wood trimming in the interior. That, however, is a minor difference and in no way affects the general principle. By simply smoothing down the surface of the wood and then covering it with a coating of solid color enamel of some dark color, such as maroon, the majority of the blemishes in the woodwork are entirely concealed. In order to relieve the monotony resulting from the use of a solid color, railways which have adopted this method of repainting the car interior apply a little hand striping and trimming.

It is perhaps too early to reach any definite conclusions of the value of this treatment of defaced woodwork in electric railway cars. So far it has been tried only on a comparatively few properties. But it seems nevertheless that there are a number of advantages in the methods and that it deserves careful consideration when any extensive program of car renovation is contemplated.

Co-ordinating Motor Drives for Efficient Shop Work

ELECTRIC railway shops still furnish many conspicuous illustrations of the obsolete plan of group driving of machine tools. The life and service obtained from many of the motors have been so satisfactory that in many shops the replacement of these with more modern equipment having individual motor drive has lagged far behind the advance of engineering design. Power has often been looked upon by railway shopmen as too cheap a commodity to worry about, and the need of getting along in so many cases with old shops and equipment has also precluded systematic improvement of motor drives.

But repair shops that have modernized their drives have reaped the reward of their progressiveness. Elsewhere in this issue are presented views of individual motor installations in the Chelsea shops of the Eastern Massachusetts Street Railway, and the reader who sees beyond the machine "close-up" in these pictures will be impressed with the general value of independent tool operation. Clearer working spaces, more compact tool areas, increased safety to employees, a lighter shop, more flexible use of tools and power conservation, all follow the banner of the individual motor drive into the zone of more efficient shop service.

One word of caution should be sounded in regard to shop electrification, and this warning is an economic one. New machine tools with motors especially designed for them may prove more economical, production considered, than remodeling the drive for the present tools. Within recent years machine tool and motor manufacturers have been drawing closer together in mutual design work, so that today a wide range of high-grade machine tools admirably equipped electrically is available for great varieties of shop operating. The master mechanic confronted with the problem of modernizing his shop drives will thus do well to study the new designs and costs of available unit tools built for high efficiency service on self-contained motor drive basis.

He may find, in this case or that, lower total costs by adapting existing tools and motors to mutually co-ordinated service; but he is more likely to discover that the economic solution is to buy entirely new equipment. General purpose motors can be applied with much success to constant-speed tool driving, and the skillful use of angle-iron and other metal shapes in making up motor mountings often solves a most difficult appearing problem in tool powering. The whole question of how best to drive shop tools is a very important one and examples like those pictured from Chelsea are full of suggestions that will make their appeal to the discerning mechanical eye.

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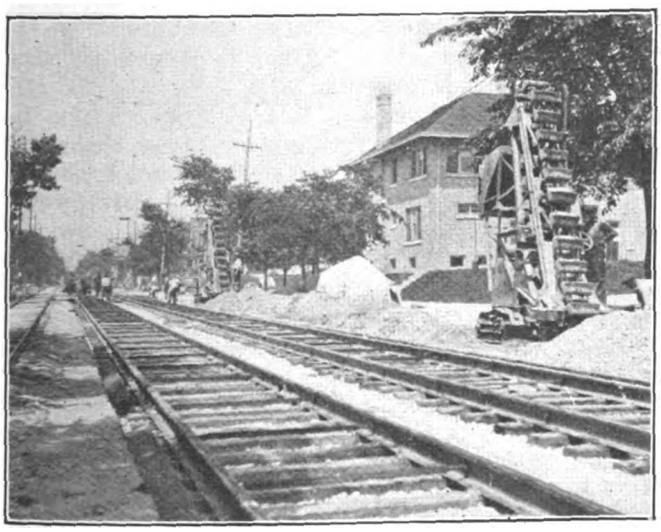
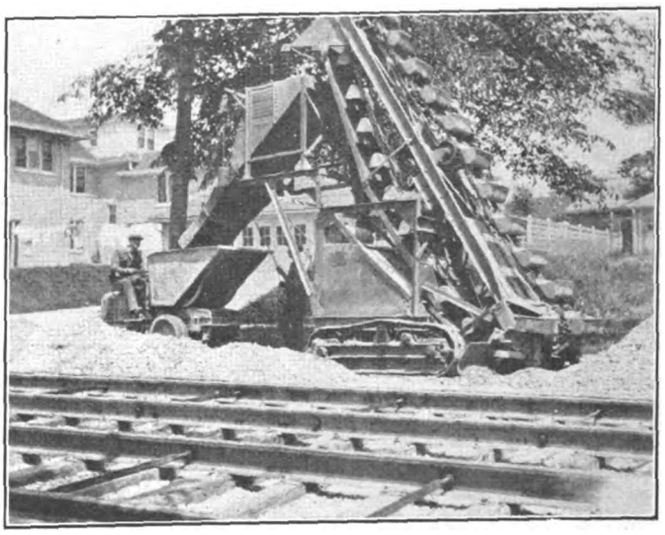
Machines Facilitate Track Zone Pavement

Distribution of Material to Make Convenient Its Delivery to Concrete Mixer and the Use of Loaders and Tractors Have Helped the Milwaukee Electric Railway & Light Company to Get Good Results in Track Paving and Lower the Cost

THE way and structure department of the Milwaukee Electric Railway & Light Company has been paying particular attention to the development of methods and devices for dispensing with hand labor to the fullest possible extent in track and paving work. A recent improvement in this direction is the application of labor-saving equipment to the track zone paving operation.

With the increasing use of concrete pavement the company made a study to find the most economical scheme of placing the material for the construction. The amount of material necessary for pouring a particular stretch of track is figured out beforehand and the materials are apportioned and placed on the adjoining pavement by means of steel Differential dump cars.





Left—Material Distribution and Equipment Arrangement for Concrete Paving Work in Milwaukee. In the Foreground Is the Crushed Stone and Loader; Beyond the Cement Is Piled; then the Sand and Sand Loader, and in the Background the Concrete Mixer. Right—Truck Tractor Receiving Measure of Gravel at Loader

Alternate piles of sand and gravel are supplied, starting 200 ft. from the mixer, in such quantities that each pile provides sufficient material for 100 ft. of pavement. As an example, a particular stretch of track under construction required 22 yd. of sand, 38 yd. of gravel, 290 bags of cement per 100 ft. and a series of unit supplies of these amounts of materials were placed the entire length of the new construction.

The materials are taken up from the street and placed in measuring hoppers, by means of Barber-Greene loaders, and conveyed from the hoppers to the concrete mixer in Clark 1-yd. capacity truck tractors, two loaders and three truck tractors being used on a job. In order to obtain the proper mix and get the most efficient pick-up of materials the mixer is set nearest the sand pile with its conveyor, while the adjoining gravel pile and its conveyor are a little further away from the mixer, with the cement in sacks piled at convenient intervals along the curb midway between the two conveyors.

The procedure is for a truck tractor first to secure its load of gravel. Cement then is placed on the gravel and the tractor proceeds to the sand loader, where it receives its proper measure of sand. Having thus received a charge for a complete mix, the tractor proceeds to the mixer and dumps its load into the elevating skip. A layout of this nature results in the cement being sandwiched between the two heavier materials, eliminating to a great extent the cement dust usually experienced when dumping into the mixer. A 21-cu.ft. motor-driven Chain Belt Company concrete mixer of the latest type, mounted on rubber-tired wheels, is used for preparing the aggregate. The mixture is made fairly dry and is placed on the roadbed by means of a bucket traveling on the mixer boom.

Leaving the mixer, the concrete, which is of 1:2:3½ mix of a dry consistency, is hand-tamped and shoveled into the crevices around the rails and ties. The first layer of concrete is placed to within 2½ in. of the finished top for a distance of about 30 ft. Wire mesh reinforcement is then rolled out into place and the mixer backs up and places the 2½-in. finish surface. The steel tie rods, in general, serve as forms to gage the height of the first level of concrete and act in a way as reinforcing bars, the wire mesh being laid on top of the tie rods. American Steel & Wire Company's 0.058 steel mesh is used for the reinforcement.

The flangeways along the gage side of the rail are formed by laying metal-protected beveled wood strips of the proper shape, which are left in place until the finishing work is well under way. A design is being worked out for a finishing machine which will strike off the concrete, tamp, finish and form the grooves all at the same time. This will still further eliminate hand labor. The curing of the concrete is accomplished by placing a layer of sand over the finished surface and keeping this wet for several days. More recently the company has been trying out the use of a silicate of soda solution for curing, apparently with good results.

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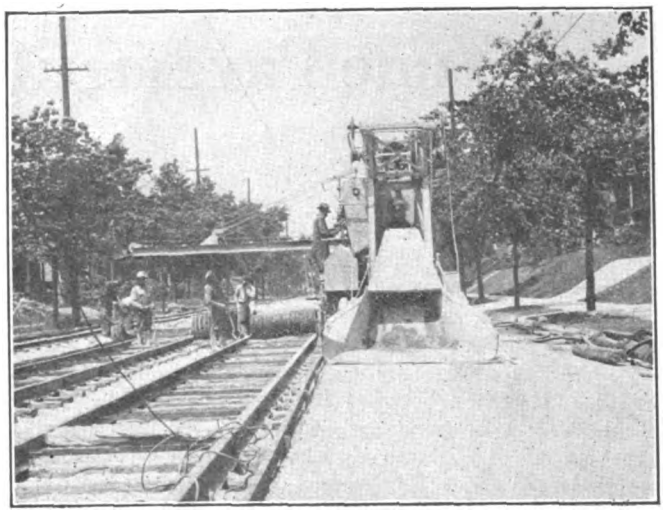
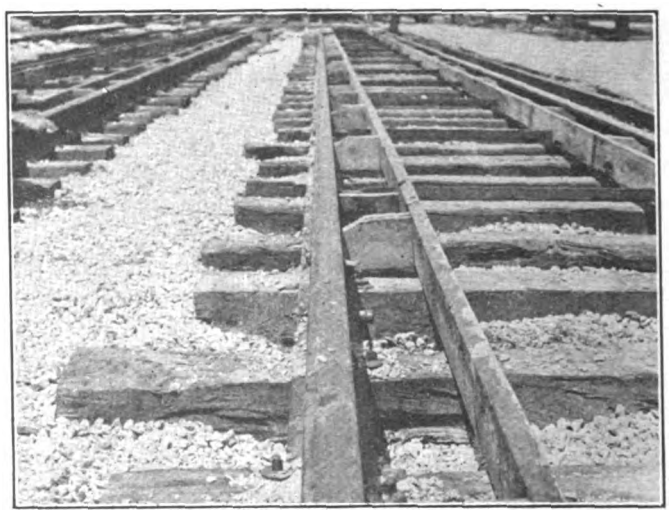




Left—Concrete Mixer in Working Position Ready to Receive Charge. Right—Special Forms Used Where Granite Header Blocks Are Employed for Flangeways

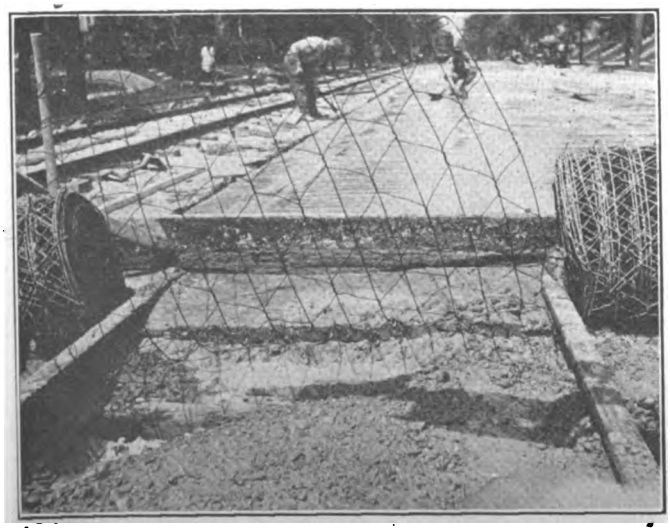
The track being laid in Milwaukee is of the rock ballast type, having 8 in. of mechanically tamped rock ballast under the ties and sufficient ballast between ties to bring it up to within 2¾ in. of the top surface. A 7¼-in. 102-lb. plain girder rail, Lorain section No. 516, is carried on 6 x 8-in. x 7-ft. hewn yellow pine ties spaced at 24-in. centers. A shoulder tieplate is used and ¾-in. screw spikes. Steel tie rods are placed every 6 ft. and serve to maintain the gage as well as reinforce the concrete. For ordinary street crossings, the 4-in. sloping flangeway provides a not objectionable crossing for vehicular traffic. However, at boulevard intersections a granite header is used which has a 2-in. flangeway cut in one corner the depth of the rail head. Suitable wooden forms are provided in a special case of this kind to prevent the concrete being carried up against the rail. These are constructed of 1-in. material braced every few feet. The rock ballast is excavated a few inches between the ties at the point where the granite header is to be placed in order that a 6-in. thick concrete base may be provided for the header. In the case of a certain boulevard, 150 ft. of granite headers were required per rail. This portion of the work requires an extra amount of time and labor, but is encountered at only a few points in the city.

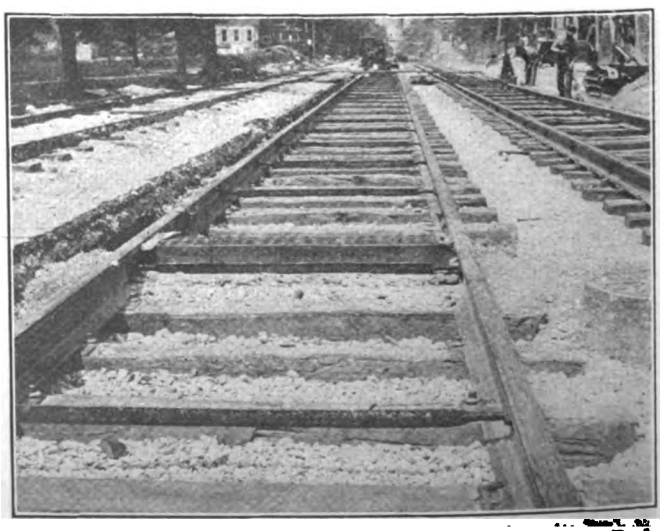
Thermit welded joints are used, a portable track grinder being used to smooth the surfaces.

In general, the concrete paving gang consists of twenty-three men, including equipment operators, working nine hours per day. Approximately 500 sq.yd. of concrete pavement is laid and finished per day. It is expected, through the substitution of additional equipment as described above, further to reduce the manhours on this class of work.

The Milwaukee company was at first reluctant to adopt concrete as a substitute for stone blocks for track zone pavement, due to the difficulty of opening up concrete pavement when track repairs are needed. With the development of the use of air tools and air equipment, however, the difficulties of making repairs in concrete pavement became less, so in 1919 the company laid its first experimental sections of concrete pavement. This was found to be satisfactory in every way and met with the approval of the municipal authorities wherever tried out. So the use of concrete pavement has been greatly extended since that time. During the season of 1923 approximately 50,000 sq.yd. will have been laid, forming about 70 per cent of the track zone paving work done by the company in that period. At the end of 1923 about 18 per cent of all track zone pavement in Milwaukee will be concrete.

The company is also laying this year certain experimental sections of pavement finished with the so-called "Vitrolithic" process to test out this pavement in comparison with the reinforced concrete.





Left—Wire Mesh Reinforcing Placed 2½ In. Below Finished Surface. Right—Track Construction; Note Wood Ties, Tie Rods, Rock Ballast and Track Drain. A Temporary Track Is Laid at One Side to Carry Traffic Past the Construction Work

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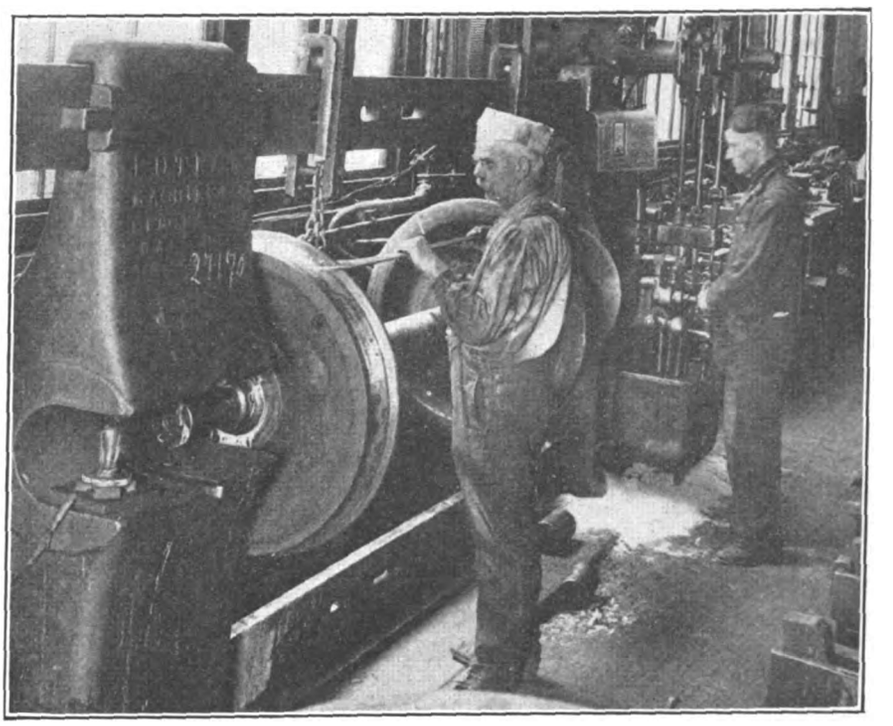
Wheel, Gear and Axle Practice—III

Grinding of Chilled Wheels Done by Pit and Floor Grinders and Abrasive Brakeshoes—Gaging of Wheels for Wear and Rotundity Important—Proper Inspection Insures Removal of Axles Before Failures—Axles Are Straightened by Hot or Cold Processes

PREVIOUS articles in this series giving information obtained from a survey of the wheel, gear and axle practice in use at sixty representative railway shops were published in the ELECTRIC RAILWAY JOURNAL for Aug. 18 and Oct. 27, 1923. Information has been given in regard to mileage obtained, conditions that limit life, methods used to increase mileage, shop arrangement, storage, and method of handling material to and from machines. In this, the third and last article of the survey, the maintenance of chilled iron wheels is discussed, together with maintenance methods and machines used for axle work.



Gaging Wheels in a 300-Ton Hydraulic Wheel Press at the Sullivan Square Shop of the Boston Elevated Railway

OF THE SIXTY electric railways from which information was obtained by personal visits in making this survey, approximately half were using chilled-iron wheels. Ten companies were using both steel and chilled-iron wheels. The most of these used steel wheels in interurban service and iron wheels in city service.

One of the principal differences in shop equipment, where chilled-iron wheels are used exclusively, is that a wheel lathe is not required, as the general practice is to grind the iron wheels. The methods and equipment used for grinding can be divided into three classes: First, where a pit grinder is used; second, where the equipment consists of a floor-type grinder, and third, where wheel-truing brakeshoes are used. In the information collected regarding methods of grinding wheels, the three types were used about equally.

RELATIVE ADVANTAGES OF WHEEL GRINDING METHODS

A canvass was made to obtain information on the relative advantages of the three methods of grinding wheels, and opinions as to when the purchase of a wheel grinder would be warranted. The majority of master mechanics seem to think that on roads having 100 pairs or more of cast-iron wheels the economies obtained would pay interest on the investment in a grinder. Individual opinions varied, however, from a minimum of fifty pairs of wheels to a maximum of 500 pairs. Of course, wheel grinders are obtainable at various prices, depending upon the degree of efficiency, and a selection should be made so as to purchase a grinder commensurate with the actual requirements of the railway.

Electric railways using wheel-truing brakeshoes are obtaining very beneficial results, particularly where the flat spots are small. The great advantage in their use is that the wheels are ground without removing cars from service. It appears, however, that large flat spots cannot be ground out satisfactorily with this method, and some master mechanics have complained about the attention necessary to compensate for the increased coefficient of friction, lest additional flat spots develop. They also find that wheel-truing brakeshoes do not leave the wheels concentric with the journal and that the method is slow as compared to pit or floor type grinders. Several master mechanics stated that they would not know how to handle the flat wheel situation, particularly in winter months, without the use of these shoes.

The main advantage of the pit grinder as compared with the floor-type grinder lies in the saving of expense in jacking up cars, removing and replacing wheels, and handling wheels in and out of the grinder. There is also a reduction in time that the car is withheld from service. Some of the disadvantages given are that the pit grinder does not produce as satisfactory a job as the floor-type grinder, that the wheel treads are not ground concentric with journals and that the driving machinery is in the way of pit work.

The question of the rigidity of the grinder has quite an important bearing upon the results obtained. Some master mechanics feel that a sufficiently rigid con-

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struction could not be obtained from a pit grinder and for that reason the floor-type grinder is best. Many roads grind their wheels before placing them in service, and of course in this case the floor-type grinder is of advantage.

The opinions expressed by some of the men responsible for wheel maintenance are of interest. F. P. Maize, master mechanic of the Portland Railway, Light & Power Company, Portland, Ore., uses pit grinders, as he found it impossible to grind out flat spots successfully with abrasive brakeshoes. This road has a large number of steep grades and as a result considerable trouble is experienced from flat spots. Mr. Maize felt that the advantages of a pit wheel grinder lie in the fact that the wheels do not have to be removed from the car in order to grind them, and there is less expense from changing wheels and less delay in returning the cars to service.

Shop men at Norfolk, Va., find the use of grinders for establishing the rotundity of cast-iron wheels more

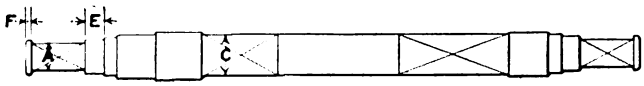

Table of New and Scrapping Dimensions Convenient for Shop Use

Nominal Diameter of Axle	A Journal Diameters		C Motor Journal Diameters		E Width of Dust Collar		F Width of End Collar	
	New	Scrapping	New	Scrapping	New	Scrapping	New	Scrapping
6½ in.	5 in.	4½ in.	6½ in.	6¼ in.	2 in.	1¾ in.	¾ in.	½ in.
6½ in.	5 in.	4½ in.	6½ in.	6¼ in.	2 in.	1¾ in.	....	....
5¾ in.	5 in.	4¼ in.	....	....	2 in.	1¾ in.	....	....
5 5/16 in.	4½ in.	3¾ in.	....	....	2½ in.	2¼ in.	⅞ in.	¾ in.
6 in.	4½ in.	3¼ in.	6 in.	5⅞ in.	2½ in.	2¼ in.	⅞ in.	¾ in.
6 in.	4½ in.	3¼ in.	6 in.	5⅞ in.	2 in.	1¾ in.	⅞ in.	¾ in.
5 5/16 in.	4½ in.	3¾ in.	....	....	2 in.	1¾ in.	⅞ in.	⅞ in.
5 in.	4 in.	3½ in.	5 in.	4⅞ in.	2½ in.	2¼ in.	....	....
5½ in.	4½ in.	3¼ in.	5½ in.	5⅜ in.	2 in.	1¾ in.	⅞ in.	¾ in.
5½ in.	4½ in.	3¼ in.	5½ in.	5⅜ in.	2 in.	1¾ in.	⅞ in.	¾ in.
4½ in.	3½ in.	3⅜ in.	....	....	1 13/16 in.	1 5/16 in.	....	....
6½ in.	5½ in.	5¼ in.	6½ in.	6⅜ in.	2 in.	1¾ in.	¾ in.	½ in.

satisfactory than the use of wheel-truing brakeshoes. With the wheel grinder, the character of the work is absolutely predetermined, and it can be turned out in its most efficient manner. Good results are obtained from wheel-truing brakeshoes if they are watched carefully, and their particular advantage is on roads which are not provided with wheel grinders. At Norfolk, where special shoes are installed in place of the regular shoes for the purpose of grinding out flat spots, particular regard is given to the increased coefficient of friction and the brake leverage is proportioned accordingly. The floor type of grinder is favored at Norfolk, due to its convenience for handling the initial grinding of new wheels prior to their installation. With the shop grinder any number of cars may be jacked up at one time and the wheels of these cars ground more rapidly and slightly more accurately than with the pit grinder, while with the latter a car must be shifted and a new car run in place before additional wheels can be ground.

An important adjunct in connection with any wheel grinder is some provision for removing or caring for the dust removed from the wheels. Several railways are using an exhaust ventilating system to good advantage. This improves working conditions considerably, so that the job does not become so annoying or unfavorable for the workmen.

Some shops find economy in keeping a number of spare axles with wheels mounted, and replace any defective wheels immediately. The defective wheels can then be ground in the shop grinder at most convenient and economical times. Roads having a large number of cast-iron wheels can use this method to particular advantage, as the grinders can be kept in use almost continuously.

The Portland Railway, Light & Power Company uses pit and floor type grinders. Wheels are ordinarily ground with the pit grinders after about 5,000 miles of service, and as the cast-iron wheels average 60,000 miles, each wheel will normally be ground twelve times during its life. The floor type grinder is used for grinding wheels which are out of service and for grinding wheels mated on the same axle.

Inspection and Gaging of Wheels

The American Electric Railway Engineering Association has standards for wheel mounting and track gages as well as plain and rotundity gages for steel wheels. Most electric railways use these standards or a modification of them to suit their particular condition. The standard gage is provided with a pointer for the center line of the axle, so that wheels are located from this center line as well as being located the proper distance apart. Several roads use the "back to back" method for gaging the wheels, in which the distance between the inner faces is determined with a pin gage. They report that this proves entirely satisfactory on their particular railways.

In general wheels are inspected at the same time as other parts of the car equipment. Some roads rely upon the judgment of the man making the inspection as to whether wheels require grinding or turning. Most roads, however, provide their shop men with standard wheel gages giving the proper contour for flange treads, and these are used on regular inspection. Where improper wear occurs, attempts are made to correct it. Methods of doing this were discussed in the first article of this series, which was printed in the Aug. 18 issue.

The British Columbia Electric Railway, Vancouver, B. C., which uses steel wheels exclusively, has an inspector who goes from carhouse to carhouse inspecting wheels. The plan of the company is to have wheels watched so closely that it is never necessary to shop a car for wheels alone. The company finds that by proper attention the work can be done at times when the car is in for regular overhauling, which comes about six times in the life of a steel wheel. Occasionally a new wheel is run beyond its time limit and then is scrapped as under diameter, rather than to shop the car just to save the wheel. Standard gages are used and the spacing of wheels is checked at four places on the rim and hub.

The Kansas City Railways reports that its practice in connection with steel wheels is to gage the contour and flange of the wheels with templets. The minimum thickness of flange allowed is 13/16 in., and 5/16 in. the maximum tread wear. With a wide tread wheel in city service, the tread becomes concave or what is commonly termed rail worn. Wheels are carefully inspected and finally passed upon as to whether they are to be scrapped or reclaimed by the foreman in charge of the wheel shop.

The operating companies in Brooklyn, N. Y., are using an automatic device to indicate when wheels are worn to their minimum diameter. On account of unusual conditions of the elevated lines, the underneath clearances between bottoms of gear cases and motor

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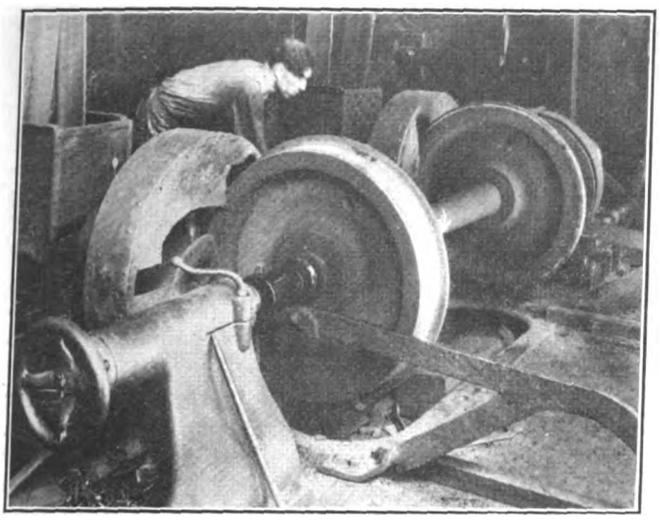
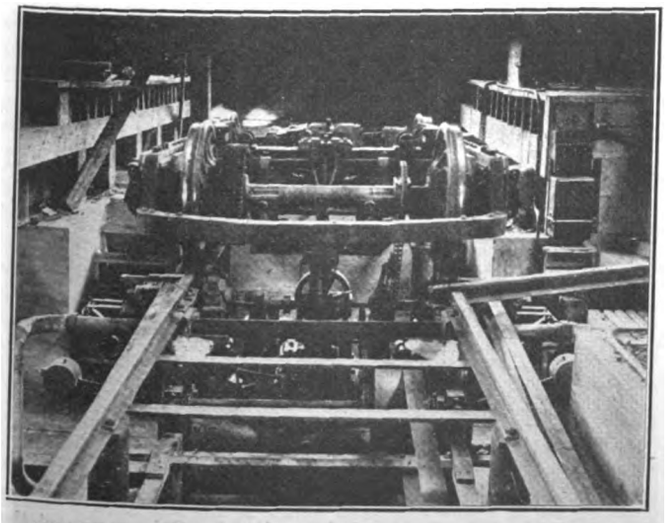


Grinding Out Flat Spots at the Sullivan Square Shop of the Boston Elevated Railway

shells and the top of switch housings, as well as other special trackwork, are very scant. Maximum permissible clearances were determined from a careful study made by all departments concerned, and from this the diameters for wheel removal were specified. In order to simplify the work of checking and seeing that wheels are not allowed to wear beyond these limits, electrical telltales are installed at the head of each track in the three elevated inspection shops. Every car, on entering or leaving the inspection shop, must pass over these telltales. If the predetermined clearances for the motors and gear cases are not present, a bell is automatically rung. As the cars are ordinarily run over the pit made up in trains, the location of the exact part of the particular car which caused the action of the telltale is essential. To accomplish this, the tops of the telltales are whitewashed, and if a motor case strikes the top of this a portion of the whitewash remains on it so as to show readily on inspection.

An engineer of a large company manufacturing car wheels, who considers the gaging of wheels very important, considers the only proper way to gage a wheel is from the throat side of one flange to the back of the mate flange. Where the throat side of the flange is against the head of the outside rail of a curve or a frog, the back of the mate wheel should touch the guard rail.



Novel Type of Pit Grinder. Wheels Are Driven from Motor Located in Pit Through Chain and Sprocket

If wheels are so gaged it is stated that a much better flange can be worked out than can be obtained by gaging from the throat of one wheel to the throat of the mate.

Hollow Treads Are Objectionable

In gaging wheels some roads have a practice of measuring the amount that the wheel is worn hollow, but this practice is not very generally used. The reason for measuring the hollow wear is that when a wheel is sufficiently worn to allow the rim to project below the top of the rail, it is likely to receive blows from frogs and crossings. When the flange becomes so high that the apex is likely to strike the bottom of flangeways, it should be removed from service. Wheels that are excessively hollow are likely to damage tracks and crossings on account of the overhanging rim and of the high flange, which causes excessive pounding and rapid deterioration of the track at these points. Hollow wear is usually caused by running wheels which are wider than the top of the rail. Of course, if the rail were wide enough to cover the whole wheel tread, the wear should continue evenly.

In regard to the amount that a wheel can be worn hollow, the M.C.B. Association proceedings for 1905 recommend that wheels be allowed to wear down $\frac{3}{8}$ in. before they are condemned unless worn through the chill. Wheels originally having the ordinary taper can be worn $\frac{3}{8}$ in. from the original contour at the throat before they can become worn $\frac{3}{16}$ in. hollow. It is also evident that if the rim wears down, a total of more than $\frac{3}{8}$ in. can be secured before the wheel is worn sufficiently to condemn it. It is also possible to modify the taper and especially the drop-off taper in such a manner that more than $\frac{3}{8}$ in. wear can be secured before the wheel is $\frac{3}{16}$ in. hollow.

A peculiar case of trouble from wheels wearing hollow was noted on one electric railway some time ago. This company used T-rails in open track construction, and laminated bonds soldered to the rail head were installed. Only a short time after the bonding was completed it was found that nearly all of the bonds were torn off or loosened. Investigation showed that this was caused by a wheel operating over the line whose tread was worn concave to such an extent that its outside portion struck the tops of the bonds and broke them off so that replacement was necessary.

Railway Axle Practice

One of the chief problems in connection with electric railway axles is to determine when they have reached the end of their useful life. The principal reasons for removal are excessive wear and the occurrence of cracks or breaks. A few electric railways that are operating high-speed service are removing axles after they have reached a certain mileage limit regardless of appearance on inspection, experience having shown that axle breakage is most frequent after this point has been reached.

The British Columbia Electric Railway, Vancouver, B. C., has a practice of scrapping all axles when they have been in service for 250,000 miles. This company finds that proper inspection and tests for flaws or cracks cannot be made without removing the wheels expressly for that purpose. An epidemic of axle failures last year was traced to some tight gage track. This narrowing of the gage was caused by the swelling of wood

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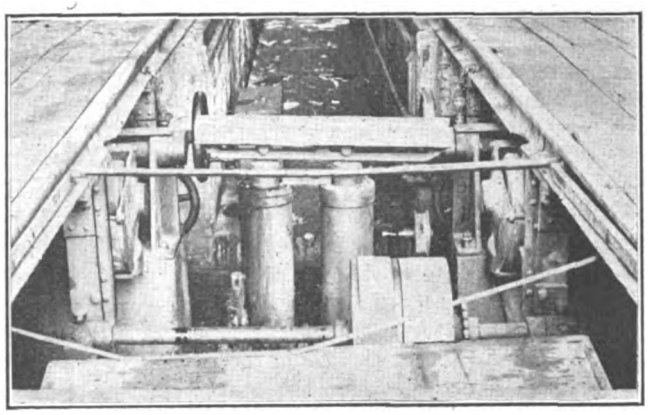
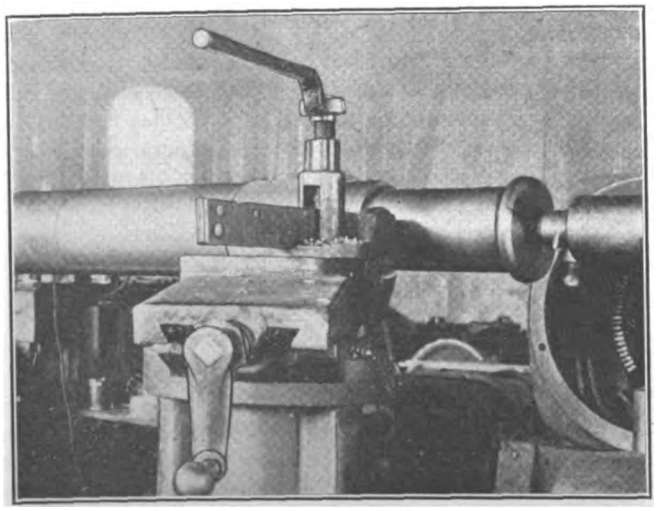


Pit Wheel Grinder Used in the Shop of the Des Moines City Railway

block paving on a bridge over which the cars operated. New axles are now being provided with reinforced wheel seats, and it is expected that a considerable improvement will result. Experiments made by this company with nickel-steel axles did not produce good results, although this steel had a higher tensile strength. It did not resist the effect of fatigue as well as the heat-treated axle ordinarily used. Many axle breaks were found to start at the corner of the keyway at the base of the drilled hole made to start the keyway cut. This has led to a change in the practice of cutting keyways, so that they are now milled at the end instead of being drilled.

The Puget Sound Electric Railway, Tacoma, Wash., stamps on the end of each axle the date that it is placed in service. After four years of service, all interurban axles are removed and annealed, regardless of the mileage which they have made. Careful inspection is made of wear and tests are made for flaws. Most of the broken axles on this system have occurred close to the wheel. The fillet at this point is tested for flaws or cracks by gouging up a groove in the fillet with a small diamond pointed chisel. If it traverses a flaw a square chip will be thrown off.

On the Portland Railway, Light & Power Company, Portland, Ore., when axle cracks are discovered in an incipient stage by a test, an attempt is made to turn the axle down below the depth of the crack. If this proves feasible, the roughly turned axle is annealed and is afterward finished by further turning to a smaller diameter.



Rolling an Axle Bearing Fit on Shaft in the Shop of the Chicago, Lake Shore & South Bend Railway

Many electric railways specify a wear allowance, and axles are either scrapped or turned down to smaller diameters when this wear has been reached. Twenty railways reported using this system, the wear allowances varying from $\frac{3}{16}$ in. to $\frac{1}{2}$ in. of diameter of bearing fit. An accompanying illustration shows the form of instructions which are sent to shops in Brooklyn for scrapping axles or removal for turning to smaller sizes.

Several electric railways report that they are following the rules of the Master Car Builders' Association. Rule 22 requires that axles broken or having seamy or pitted journals, fillets in the back shoulder worn out, or collars broken off or worn to $\frac{1}{4}$ in. or less, should be removed. Rule 23 prescribes limit of wear for different sized axles, and rule 24 provides for the removal of axles with cut journals, bent axles, or axles rendered unsafe by unfair usage, derailment or accident.

Rough Machining Causes Axle Failures

Axles are usually received in the rough state from the manufacturers and are finish-turned in the railway company's shops. Careful machining is most essential, as many failures have been traced to bad machining. The radii of fillets should be maintained accurately, as a sharp corner or tool marks may defeat all the care used in the design and preparation of the axle. A roughly turned axle may be compared to a threaded bolt, the length and thickness of the thread being dependent upon the cut and speed used in the lathe operation. The lathe tool shears small particles of the material, so that a turned axle is in reality a sheared surface, from which small particles of steel have been torn away. Small gaps in the material are caused by the edges of the tool pushing away the layer of steel. When the distorted steel breaks, additional gaps are formed. These gaps lie along the axle, and in general across the direction in which the axle will be bent in service. The grooves lie in the direct line in which fracture is most likely to occur under working stress. Car axles, to give the best service, should have smoothly ground surfaces and be free from sharp angles and accidental notches or dents. Most electric railways know that the manufacturer is not responsible for all the ills which may occur to an axle, that careful machining after it is received is quite essential, and finally that periodical inspection of axles in service is most important.

Testing Axles for Cracks

The general practice used by electric railways in testing axles for cracks is first to place the axle in a lathe and rotate it so that its trueness can be determined. After this a hammer test of some form is quite generally applied.

The test used by the Connecticut Company consists of painting the axle with a coat of black lead and oil over the entire surface. The axle is then wiped clean and again painted with a coat of white lead and oil, after which the axle is struck with an 8-lb. sledge on each end. If there are cracks, flaws, breaks or other defects the oil and black lead will show through the white paint. A large number of railways reported as using practically this same test except that the first coat of black lead and oil is omitted. Others report that if the axle is carefully cleaned and then struck several

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sharp blows on the ends with a sledge, the oil which remains in any cracks will be forced out and thus indicate the position of the crack. In this latter case no painting of the axle is done.

One railway reports a method of testing axles without removing the wheels. This consists of immersing the axle with wheels mounted in a tank of hot oil. After removal, the oil is carefully wiped off, and the axle is covered with whiting. The axle is then supported on a block at the center with the wheels hanging free, and is struck several blows with a heavy sledge. Wherever there is a crack, a fine thread of oil works up from the crack under the vibration, and can be seen against the white. Several roads report that they clean axles very carefully and then go over them with a magnifying glass.

A test used by the Empire State Railroad Corporation, Syracuse, N. Y., consists of taking a very fine cut with a sharp lathe tool over the section where the crack is most likely to develop. If the axle has a crack, it is then apparent to the operator.

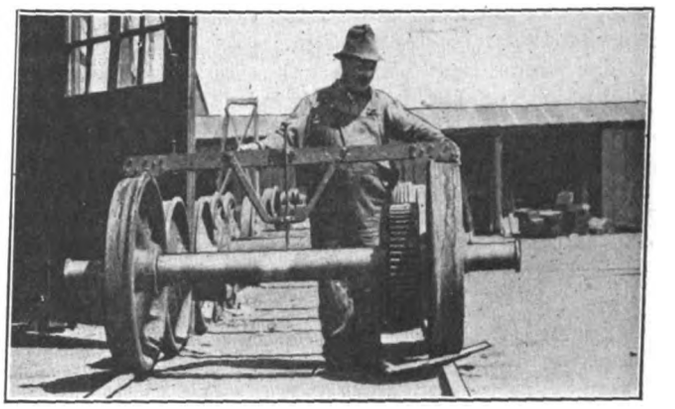
In discussing with master mechanics the question of what might be considered as a safe operating maximum mileage, opinions vary, depending upon service conditions, from 500,000 to 900,000 miles.

Hot or Cold Straightening of Axles an Open Question

The controversy as to whether it is best to straighten axles cold or heat them is a very active one, and the information collected in this survey indicates that opinions are about equally divided. There is no doubt that if axles are but slightly sprung, the best method is to straighten them cold, as this can be accomplished quite successfully with a proper axle straightening machine, and there is no danger of destroying the original properties of the steel through heat. Many railways find that mild heating does not injure the original properties to any great extent, and if cooled properly, that satisfactory results will be obtained.

The practice in Brooklyn is to straighten slightly bent axles cold, as it is believed that while the straightening process will cause further distortion of the fiber of the material and so tend to weaken the axle, there is probably less danger from this source than from heating, especially in the case of cold-rolled or heat-treated material, and where proper facilities are not available for re-treating the axle, so as to retain its original properties. The heating of axles of quenched, tempered, and cold-rolled material will affect the physical properties in amounts depending upon the degree of temperature and the rate of cooling. If heated above the critical point of the steel, about 700 deg. C., and then allowed to cool slowly, the result will be materially to reduce the strength with a slight increase in ductility. Annealed axles may be heated to the original annealing temperature, without seriously affecting the physical properties, provided care is taken in the heating and cooling processes.

F. R. Phillips, Pittsburgh, considers it the best practice to straighten axles cold, provided the straightening process does not require more than 10 tons pressure for a 5-in. axle. Heating of axles as usually carried out will change the original physical properties, and if it is necessary to heat cold-rolled or annealed, quenched and tempered axles to straighten them, they should be then restored by re-rolling, re-annealing,



Type of Wheel Gage Used by the Waterloo, Cedar Falls & Northern Railway

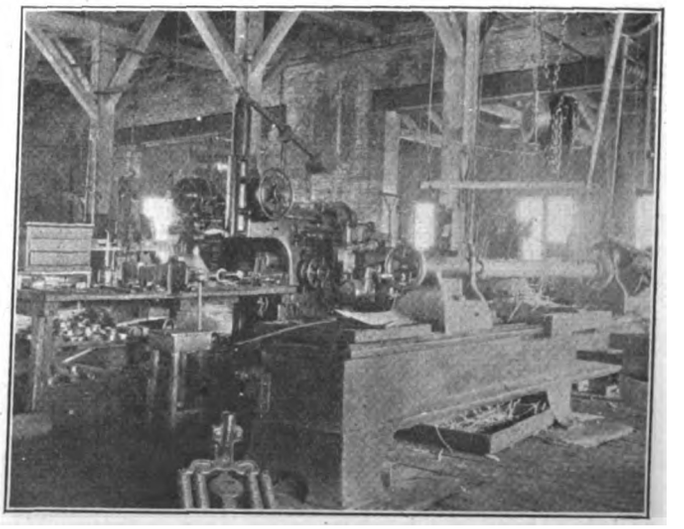
and re-treating, as the case may require, in accordance with the methods originally specified for this treatment.

Many railways follow the practice of straightening cold axles, which are bent only slightly, but when out of true to such an extent that this method cannot be done readily the axles are turned down to smaller sizes, or else scrapped.

The Portland Railway, Light & Power Company has had successful results from heating axles for straightening. It is considered better by this company to heat the axles to such an extent that there would be no danger of damage, taking particular care not to overheat them.

Welding of Axles Regarded with Suspicion

The question as to whether it is advantageous to build up wheel, gear and bearing fits on axles by welding is another one on which there is considerable difference of opinion. Several railways have experienced trouble from breaking of the axles after they were built up, so that this practice has now been discontinued. Others apparently are obtaining quite satisfactory results. Where welding is practiced, the most general custom appears to be to lay the metal on longitudinally. In the shops of the Spokane United Railways bearing fits are built up. The metal is laid on longitudinally by covering first one-quarter of the circumference and then turning the axle 180 deg., where another weld is made. The axle is then turned back 90



Turning an Axle in the Shop of the Columbus Railway, Power & Light Company, Columbus, Ohio

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deg., so as to fill in between the two layers, and finally the fourth quarter is filled in.

The Connecticut Company has built up axles to a limited degree, but has found that this seemed to make the material more brittle. Probably this condition is in part due to the fact that the metal is already somewhat fatigued. The company finds that there is no great economy in the practice, even if it proved mechanically desirable.

Finishing Bearing Surfaces

Careful finishing of the bearing surfaces of axles has much to do with keeping bearing troubles to a minimum. The two principal methods used in electric railway shops, after the bearings are turned in a lathe, are to file and then polish with emery cloth and oil, and to roll the surface with a steel roller. Several roads report a considerable reduction in hot bearings after changing from the use of emery paper for polishing to the use of the rolling method. When finishing with a roller after the last finishing cut is taken on the bearing surface, the rolling tool is substituted in the lathe tool post for the cutting tool. The roller most commonly used is of about 2½ in. diameter and has either a flat or rounded face. Where a flat face is used, it is common practice to round off the corners. The roller is forced up against the bearing surface of the axle by means of the cross-feed screw of the lathe carriage and is run back and forth over the surface as it rotates, by using the regular lathe feed. In passing over the surface of the axle, the roller compresses the metal ridges left by the cutting tool and leaves a smooth, polished surface.

Loose gears are almost unheard of, now that railways are using the solid type. There are, however, quite a number of split gears still in use. The general tendency is also to press gears on axles without keys, although about half of the properties from which information was obtained still use keys with their gears. The pressure used for pressing on gears ranges from 15 tons to 80 tons, with the great majority of roads using approximately 50 tons. Many railways specify a pressure for pressing on gears in proportion to the diameter of the bore. This ranges from 4½ tons per inch diameter up to 10 tons per inch. For the convenience of the shop men many railways have prepared charts of pressures for pressing on in proportion to the diameter of the axle. For example, the Puget Sound Electric Railway, Tacoma, Wash., keeps the pressures within the following specified limits: for 3½-in. axles, 30 to 40 tons; 4-in. axles, 35 to 45 tons; 4½-in axles, 40 to 50 tons; 5-in. axles, 45 to 55 tons; 5½-in. axles, 45 to 60 tons; 6-in. axles, 50 to 65 tons. It is stated that danger of springing axles is avoided when the pressures are kept within these limits.

The question as to whether the finished diameters for the gear fits of axles and the finished bores of axles could be specified was discussed with operating men on several properties. Most of them seemed to feel that it would be safer to continue the practice of specifying the pressures at which gears should be pressed on, although some felt that diameters of bore with tolerances could be worked out which would be satisfactory. The Kentucky Traction & Terminal Company, Lexington, Ky., has been using for its gears 0.001 in. under size bore per inch of diameter, to allow for press fit, and has been obtaining very uniform pressure for pressing gears on.

Enameled Signs Prove to Be Economical

THE use of enameled signs to mark trolley stations, section insulators, private rights-of-way has proved to be so satisfactory in Brooklyn that no other type is now used. It was formerly the practice to designate stops, etc., by painted signs of wood or sheet iron. A number of years ago it was decided to try enameled signs. While such signs cost a little more in the first place than painted signs, they last so much longer that they are more economical in the end. Paint will wear off a painted sign or become dimmed by weather or dirt in a few years, whereas the enameled sign will last indefinitely unless it is subjected to some severe blow, such as that from a wild trolley pole, which chips off the enamel.

When the sign becomes so dirty that the lettering begins to appear faint, it is an easy matter to wipe it off with a rag soaked in kerosene and restore the original freshness. Where a large enameled sign is attached to a tubular steel pole or to a column of the elevated railway structure, it is slipped into an iron frame, and to prevent the wear that might occur between the sign and its frame, thin pieces of rubber are placed between the two surfaces.

Cold Paving Patch Saves Money

ALTHOUGH the Beaver Valley Traction Company, New Brighton, Pa., first tried the use of a cold paving patch with the idea that it was only a temporary expedient, it has proved so satisfactory that the company is now using this method widely in New Brighton, Rochester and Freedom. Throughout this territory brick paving predominates, and small repairs often entailed considerable expense when it was necessary to take up the old brick. With the cold patch method none of the old brick is taken up. Limestone, sand and oil are prepared in a concrete mixer and hauled to the desired location, where the patch is made without any interruption to traffic. The oils used have been Tarvia and Texaco and both have given satisfactory results.

COST OF PREPARATION AND INSTALLATION OF COLD PATCH FOR PAVING REPAIRS

Material		
1 ton limestone	$2.30	
½ ton sand	0.30	
Tarvia, 16 gal. at 20 cents	3.20	
Gasoline	0.15	$5.95
Mixing		
Labor, fifteen hours at 45 cents	6.75	
Supervision, five hours	4.50	11.25
Installation		
Labor, forty hours at 45 cents	18.00	
Supervision, twenty hours	18.00	36.00
Grand total		$53.20

One cubic yard of material will cover approximately 66⅔ square yards. This is at the rate of 80 cents per yard.

The estimated cost is about 80 cents per square yard, as shown in the accompanying table. Vehicles are not closed off at any time, but are allowed to run over the cold patch as soon as it has been installed. No detrimental effect has been noticed from this practice.

The various communities through which the railway operates have expressed their approval of this method of repairing the pavement and have been agreeable to the extension of its use rather than urging more permanent repairs. The accompanying figures show the cost of this kind of patching.

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Car Mileage Records with a Posting Machine

Plan Adopted in Toronto Based on Use of a Bookkeeping Machine Gives Cumulative Mileage for Each Car and Group—Original Records Made on Perforated Sheets Are Torn Apart and Assembled by Car Numbers to Get Individual Records — Wheel, Axle, Motor and Gear Mileage Also Obtained—One Machine Posts Records for 970 Cars Within One Day's Time

A NEW method of determining individual car mileage has been developed by the Toronto Transportation Commission, making use of a Burroughs posting machine, the addition and printing being done automatically. The use of this method has simplified greatly the detailed work of obtaining individual or group car mileage records, and the distance covered by the equipment between any two dates is obtained merely by subtracting the cumulative figures. The results also are applicable to determine the mileage of all parts of the equipment, such as motors, gears and pinions.

The following description outlines in detail the method employed in obtaining the original data and in working it up to give the final record. The system has been developed under the supervision of W. R. McRae, superintendent of rolling stock.

The mileage of the individual car is based on the route schedule, which is of standard form, giving the run for each crew and the corresponding trips and mileage for the day's work. The car assigned to each run is listed on the "Daily Record of Cars in Service," Form D-63 (No. 5 in the illustration on page 856), by a clerk at the carhouse. Spaces are provided on this form so that if more than one car is assigned to a run, as for instance happens when it is broken into several sections that cover parts of the day only, the full information will be recorded. It will be noticed that for the Yonge Street line several car numbers are shown for each run number. This is because the motor cars, which are in service all day, have trailers attached to them during the rush hours.

The information of the daily record of cars in service is confirmed by the "Motorman's Signing-in Sheet," Form D-35. On this the motorman at the end of his work records the run number, car number, time in and condition of the car. In case a car has to be replaced during the run, this information is recorded for the division on Form D-22, "Car Change" (No. 2 in the illustration), on which the route, run number, time and cause of the change are given, in addition to the numbers of the cars involved.

The next form is the first one which is distinctive to this method of calculating car mileage, those already described being similar to forms used elsewhere. This form, X-3, known as the "Daily Record of Cars and Wheel Mileage," both sides of which are reproduced on page 857, is made out in the offices of the divisional superintendents, the run number, car number, time out, time in, miles lost and miles run being entered. The distinctive feature of this form is that the thirty sections on the sheet are separated by perforations so that they may be detached individually. Each section bears a code letter in its lower left-hand corner which indicates the division. When the form is filled out each of the sections will contain a car number with the other information for determining mileage. In case of a change-off a new ticket is filled out for the car making the change, thus giving a ticket for each individual car on every run. In the event of error it is necessary to know not only the division but the route and date, so that each section of the form is marked on the back with a number in Roman numerals, representing the route, and the date in Arabic numerals. This is done easily and quickly by means of roller self-inking rubber stamps.

Passenger cars are divided into groups according to type and equipment. Service cars, motor buses and trolley buses are similarly separated into groups. The sections of the form are separated on the perforations and are sorted according to car number, then being made up into bundles, each of which has car numbers corresponding to a single group of cars.

From the above it is seen that the tickets contain all the information necessary for the record, consisting of the date, division, route, run number, car number, time out, time in, miles lost and miles run.

Accompanying the "Daily Record of Cars and Wheel Mileage" is the "Daily Mileage Report," Form D-10, on which route mileage and divisional mileage are reported. This is made up from the scheduled mileage, by adding the miles for extra cars or trips not scheduled, and subtracting mileage lost.

The Mileage Calculation Is Made by Machine

The mileage shown on the small slips is then posted on the "Daily Mileage Record," Form X-4 (No. 3), by a Burroughs type 2406 split-platen posting machine with an automatic carriage. In order to facilitate the operation, the sheet for the previous day and the sheet to be posted are placed together in the machine, so that the column headed "total miles to date" on the record for the previous day shows to the right of the new sheet. This simplifies the work of transferring the amounts from one sheet to the other and minimizes the chance for error. When an error is made it may be detected easily by comparison and by checking the sheet totals.

The daily mileage record for the entire system is placed on thirty-five of the sheets. The car numbers are printed in the right-hand column, being segregated by groups of equipment. Group L, for instance, consists of forty cars, numbered from 2500 to 2578, which are all of the same type and are all equipped with English Electric DK-83 motors.

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Toronto Transportation Commission.

MOTORMAN'S SIGNING-IN SHEET

Car No. | Time In | NOTE HERE ANY DEFECT FOUND TO EXIST IN CAR. IF NONE, MARK "O.K." OPPOSITE CAR NUMBER. | Trace No. | I Certify to my Car Work in Condition as Stated in Column 4 | Foreman's Column

Badge No. | Signature of Motorman | Action Taken

2

TORONTO TRANSPORTATION COMMISSION — Eglinton Div

CAR CHANGES, FOR Tues. Aug. 7th. 1923

Route	Run	Time Date and Hour	Cause	Car No.	Type Run	Replaced By Car No.	Type to Do Run	Date Mileage	Badge No.
Yonge	7	1.50 P.M.	Placed	2510		2550			1928
"	7	1.50 P.M.	Emergency Valve	2921		3022			677
"	18	11.17 P.m.	Line switch & Lights	2504		2502			802

3

TORONTO TRANSPORTATION COMMISSION — Group. L.

DAILY MILEAGE RECORD Date JUL 31 1923

Total Miles To Yesterday	Miles Run						Total Miles To Date	Car Number
1937686	2685	16.90	5240				1967801 T	2500
1860842	13153						1873995 T	2502
2065887	1690						2067577 T	2504
2045117	7405						2052522 T	2506
1895338	1310	43.73					1899221 T	2508
2032671	10484						2043155 T	2510
1992467	7855						2000317 T	2512
1715592	14909						1730501 T	2504
1790091	2150	2157					1802398 T	2506
2013520	7866	7038					2028403 T	2508
1796564	17603						1814167 T	2570
1816965							1818965 T	2572
1696349	14582						1710731 T	2574
2098399	888	9235					2108522 T	2576
1951007	16385						1967392 T	2578

(YEAR) TOTAL MILES TO DATE 761747.97 E

TOTAL MILES TO YESTERDAY 75690139

GROUP L. TOTAL MILES FOR DAY 484638

(MONTH) GROUP L. TOTAL MILES TO DATE 150872838

4

TORONTO TRANSPORTATION COMMISSION — DUNDAS DIVISION

DAILY MILEAGE REPORT Date Saturday, Aug. 4 1928.

MILEAGE	DUNDAS Schedule No. 786	CARLTON Schedule No. 659	DOVERCOURT Schedule No.	BLOOR Schedule No. 776	DUNDAS TRAILERS Schedule No. 786	BATHURST Schedule No. XXX
PER SCHEDULE	3,702.92	1,384.41		496.32	1,822.50	
CAR CHANGES						
EXTRA CARS						15.34
SCHEDULE TOTAL	3,702.92	1,384.41		496.32	1,822.50	15.34
LOST MILEAGE	22.04				1.94	
TOTAL	3,680.88	1,384.41		496.32	1,820.56	15.34
LIGHT CARS		107.98				
LOST MILEAGE						
TOTAL		107.98				
TRAILERS	1,320.56					
SUMMARY	5,001.24	1,492.39		496.32	1,820.56	15.34

RAW.

5

TORONTO TRANSPORTATION COMMISSION

DAILY RECORD OF CARS IN SERVICE

Friday DAY 10 August 1923 Eglinton DIV.

Route Yonge Schedule No. 85H					Route Yonge Schedule No. 85H					Route Yonge Schedule No. 85H				
Run	A.M.	Noon	P.M.		Run	A.M.	Noon	P.M.		Run	A.M.	Noon	P.M.	
1	2502				1	2993		3027		Light Car				
2	2506				2	2951		2989						
3	2506				3	2913		3011		1	2518			
4	2527				4	2969		3005		2	2530			
5	2564				5	2953		2981						
6	2500				6	3021		2971						
7	2564				7	2991		2963		Extra Motor				
8	2572				8	2971		2999		1	2576			

Checked by ..... Car Starter

Certified Correct ..... Division Foreman

This report showing condition of all cars used in passenger service, must be made daily, proper record showing that cars have been "REPAIRED," "HELD IN," or sent "TO SHOPS" should be noted by Division Foreman, whose signature must then be affixed. Report will then be carefully checked over by Car Starter and copies of same sent to the Traffic Supt. and Master Mechanic.

Some of the Principal Forms Used in Toronto Mileage Record System

No. 1—Each motorman must certify to the condition of his car when ending work for the day.

No. 2—When cars are changed it is indicated on this form.

No. 3—The daily mileage record is printed automatically by the posting machine.

No. 4—The route mileage is furnished by the division superintendent, with scheduled mileage and variations therefrom to give the actual car miles run for the day.

No. 5—The daily record of cars in service is made up from information on the time table.

Form X8-8m-6-23 Toronto Transportation Commission

MILEAGE RECORD WHEEL No.

CAR NUMBER	INSTALLED REMOVED	CAR MILEAGE		WORN OUT DEFECTIVE	CHIPPED FLANGE BAD FLAT

Form X33—2m-10-22 Toronto Transportation Commission

Type..... MILEAGE RECORD GEAR No.....

Date In	Car Number	Date out	MILES RUN	Set	Make	Axle Number

Form X34—3m-10-22 Toronto Transportation Commission

Type..... MILEAGE RECORD PINION No.....

Date	Motor Number	Armature Number	MILES RUN	Set	Make

Form X31—3m-10-22 Toronto Transportation Commission

Type..... RECORD OF ARMATURE No.....

Motor Number	DATE	MILES RUN		Set

Form X30—3m-10-22 Toronto Transportation Commission

Type..... RECORD OF MOTOR No.....

Armature Number	Date in	Car No	Date out	MILES RUN	Set

Form X32—3m-10-22 Toronto Transportation Commission

Type..... MILEAGE RECORD AXLE No.....

Gear No.	Date	MILES RUN	Set

TORONTO TRANSPORTATION COMMISSION

COMPRESSOR RECORD - TYPE ..... No. .....

DATE IN	CAR NUMBER	DATE OUT	MILES IN SERVICE	ARMATURE NUMBER	FIELD NUMBER

Individual Cards Give Records of Mileage of Various Parts of Equipment

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As the cumulation is computed from Jan. 1 to Dec. 31 of each year the mileage must be added on each day, the record for July 31 being taken as an illustration. The "total miles to yesterday" is transferred from the similar sheet for the day before, which gets the previous mileage into the adding wheels of the machine. To this is added the mileage for the current day, as shown on the small slips which have been sorted out by car numbers. For instance, the mileage previously recorded for car 2500 (up to July 30) was 19,578.86. This car made three trips July 31, with mileage of 26.85, 16.90 and 52.40, the sum representing the run of the car for the day. These figures are set up by the operator and added automatically as printed, after which the total miles including July 31, or 19,675.01, is printed as a subtotal.

The total miles run by Group L is shown at the bottom of the sheet, the "(Year) Total Miles to Date," 761,749.97, being the summation of the group car mileage from Jan. 1 to July 31, inclusive. This is carried on a separate set of adding wheels from those giving car totals and is totaled and printed automatically by the machine. From this the total miles to the day before, 756,901.59, is subtracted, giving the miles for Group L for the day as 4,846.38. The total miles for the month to date for Group L is obtained by adding to the day's figures the group miles for the previous day. Since the sheet shown is for July 31, the total miles for the month to date, 150,872.83, represents the mileage for the month of July for the group. Taking off the similar items from each of the thirty-five sheets gives the monthly mileage for the system.

The mileage of any car from one given date to another is the difference between the amounts shown on these dates opposite the car number, except in case of a period which extends beyond the first of the year, in which case it is necessary to take the difference from the first date to Dec. 31 and add to it the amount shown on the last date.

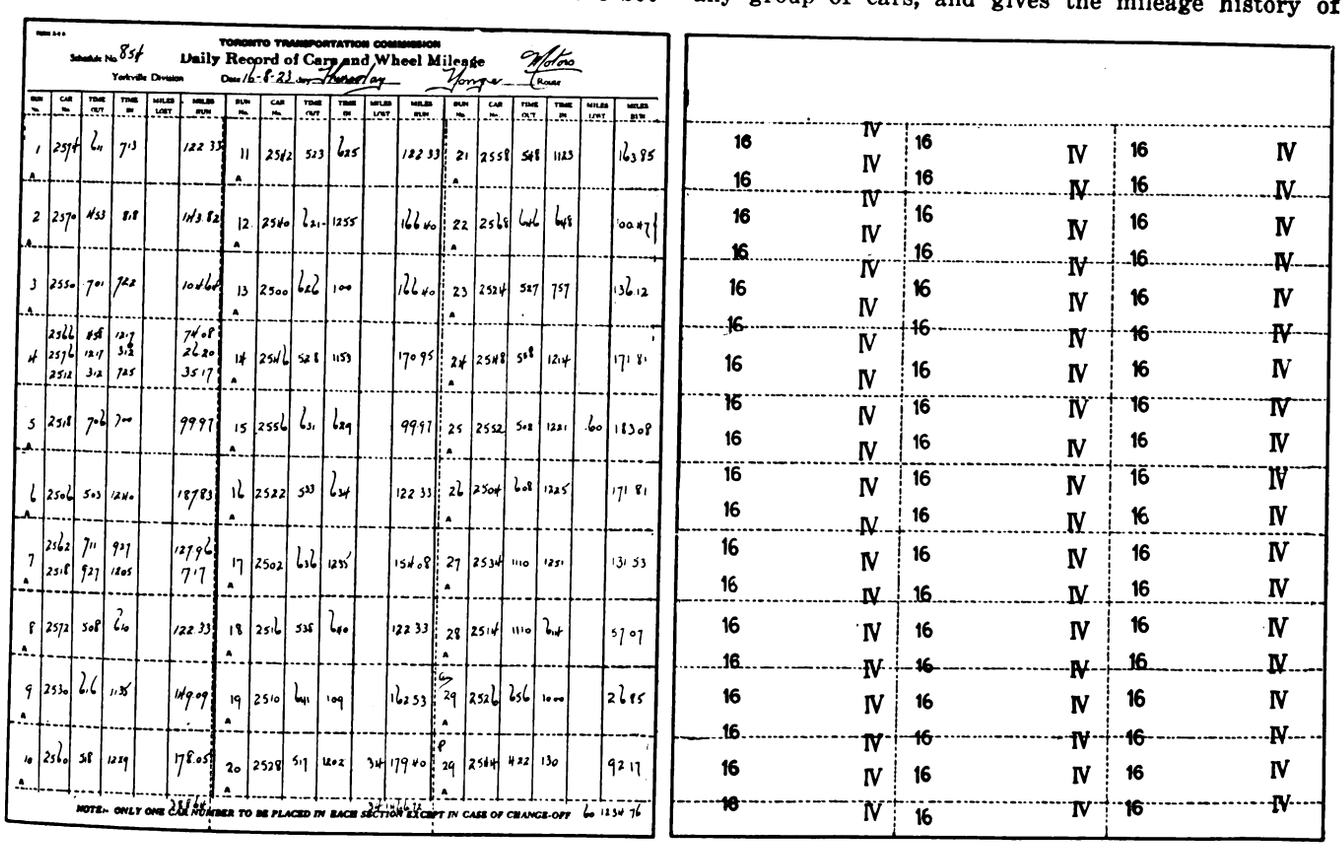
The daily mileage records are filed on post binders and are handy for reference, so that information can be taken off from them with little difficulty.

One Posting Machine Handles Entries for the Entire System

During the month of July, with approximately 970 cars in operation, there were 43,555 entries of mileage, giving a total of 2,297,558.79 miles. Working a forty-four-hour week, 223 entries per hour had to be made. This was accomplished easily using only a single machine.

This system is useful to get the mileage record of any group of cars, and gives the mileage history of each individual car and piece of equipment that can be identified by a serial number, such as trucks, wheels, axles, gears, motors, armatures, pinions, compressors, etc. This mileage record is cumulative, giving a daily total for each car and group of cars. It simplifies the finding of the mileage operated from one given date to another.

Individual mileage records are kept for various parts of the equipment on 3x5-in. cards. Since the car mileage is kept by the posting machine, it is only necessary to record mileage of the parts when they are subject to change from the car. Mileage records are given for wheels, compressors, motors, armatures, axles, gears and pinions. In addition to the information shown on the faces of the cards, those for compressors, motors and armatures have spaces on the reverse sides for a record of repairs, columns being provided for report number, date, description and cost. These forms are reproduced on page 856.



Individual Car Mileage for Each Run or Part Is Indicated in One of the Blocks of This Perforated Sheet

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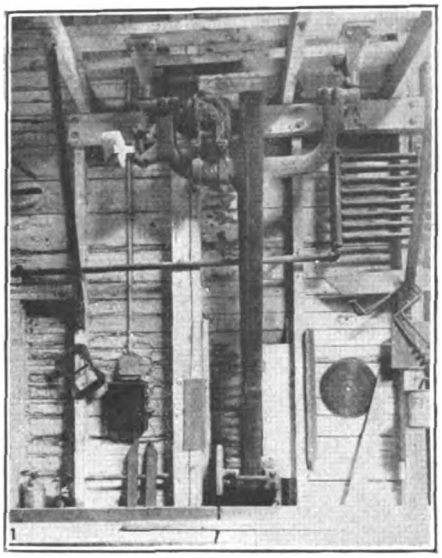
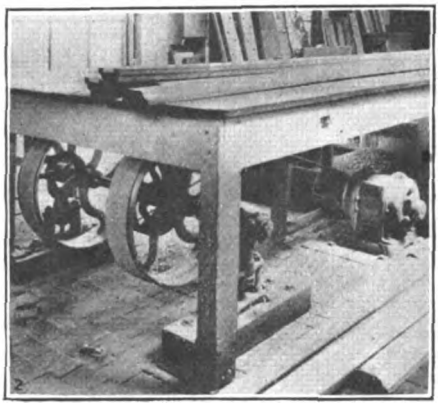
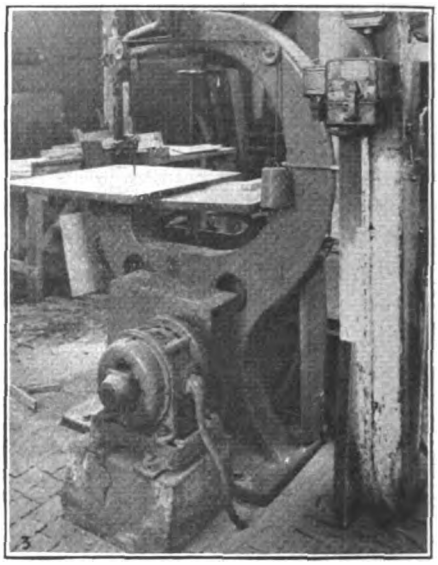
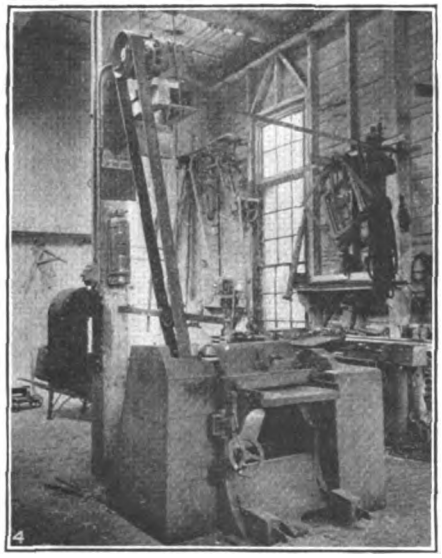
Individual Motor Mounting Improves Shop Drives









THE illustrations on this and the following page show what can be done in the way of improving motor drives by adapting the mounting of individual units to existing tools, and also, in one or two cases, the convenience with which motors can sometimes be located directly upon or below the machines driven.

In some quarters the use of "home-made" motor mountings has been criticised as not representing the latest thought of the electric motor and machine tool maker. This however, would be a poor reason for failing to improve old-established drives at low relative cost in shops where it is an advantage to get rid of long lines of shafting, oily drips, excessive belt friction, and poor power factor due to running motors unloaded or lightly loaded for long periods.

The machine tool drives that are described in this article are installed in the Washington Avenue, Chelsea, shops of the Eastern Massachusetts Street Railway.

No. 1. The motor-driven circular saw at cutting-up bench has a 3-hp. induction motor mounted in a swinging yoke above the bench, with compact belt drive to the circular saw pulley. A counterweight drops the motor and saw out of the way when not in action, and a conveniently located starting switch on the wall at the operator's left provides easy control of the service. The arc through which the motor travels is so small as to cause no trouble from wiring distortion when the machine is run.

No. 2. Driving a cutting-up saw by a 5-hp. motor mounted on the shop floor below the working surface of the tool. In this case a speed reduction was required and easily obtained by belting the motor pulley to a short jackshaft under the table, with concealed drive by belt to the pulley on the saw shaft. The motor occupies no otherwise useful space, and because the space on and above the table is needed for working the material effectively, the starting switch was located on a post at the right of the table, not shown in the photograph, but within a step of the working position.

No. 3. Here is a bandsaw gear-driven by a 5-hp. motor mounted on a floor pedestal of concrete at the side of the saw frame, with intermediate gear box. The motor service is brought through the floor by means of rigid conduit, and the gearing is protected by a thin but effective metal housing. A starting box on the adjacent post provides quick and easy control. In this case the disadvantage of being obliged to mount the motor on the floor at the side of the tool is considerably lessened by the use of the very compact gear drive and by the location of the motor out of the line of travel of workmen.

No. 4. Pony planer drive by belting from 5-hp. motor mounted on bracket platform about 12 ft. above shop floor. Here the motor is entirely out of the way even in handling long pieces of board; the wiring is direct in rigid conduit with convenient starting and stopping switch with push-button stop attachment on the post at the rear of the machine. The location of the single belt drive at the side of the tool frees the space around the working table for handling stock, and a close-up view of the motor mounting, which is unusually thorough for an overhead job on the side of a post, is shown in the next illustration, No. 5.

No. 5. Close-up of motor mounting for driving pony planer from post. The motor, a 5-hp. machine running on 220-volt service, is bolted to two 2-in. x 9-in. timbers carried on 4-in. x 5-in. sills resting on a 2½-in. x 12-in. extension piece attached to the post by bolts as shown. The bolts are ⅝-in. diameter. Strap-iron pieces as shown reinforce the ends of the improvised platform, and right-angled bracing in the form of a tie-rod from above

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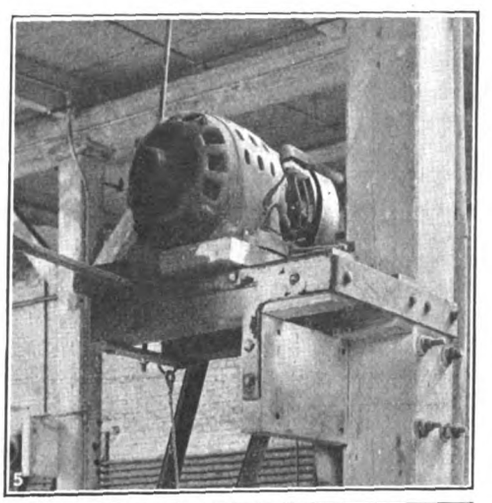
and a horizontal stiffener piece from the left are used.

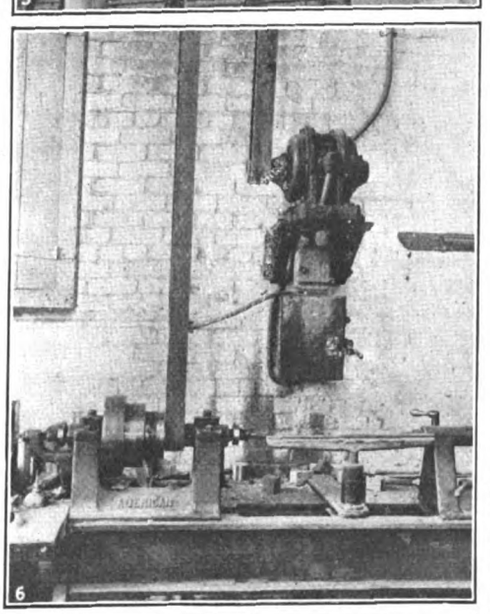
No. 6. Lathe driven by 2-hp. motor mounted on wall-bracket directly over tool and with starting switch and fuses between motor and tool. Space was readily available here for belting the motor to an overhead shaft and pulleys from which a flexible down-drive to the lathe could be had. While many self-contained lathe-motor combinations are now available for shop service, the arrangement shown was put into use at moderate expense, takes up little room useful otherwise and provides an effective and economical drive.

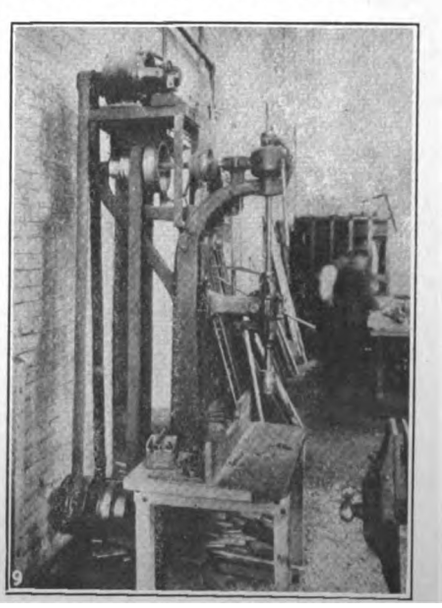
No. 7. Simple and convenient drive of buzz planer by overhead 5-hp. motor. Directly behind is a self-contained motor-driven mortising machine, the 3-hp. unit required being mounted on top of the frame, and at the rear, left, is shown a vertical drill with overhead mounted motor. The absence of overhead line shafting and belting complications is a convenience in material handling. The planer motor is mounted simply on a 2¾-in. x 16-in. plank bolted to the post.

No. 8. An irregular molder individually driven by a 5-hp. motor located beneath the working table. Here the drive is extremely simple, with the motor bolted to the under side of the table and served by a short vertical run of rigid conduit brought up from the floor to the terminal cap on the motor frame. The drive is out of the way and yet the motor is readily accessible for inspection or repairs.

No. 9. Close-up of drill press and overhead mounted motor shown in No. 7. The motor, a 3-hp. direct-current unit, is carried on a platform supported on a ⅜-in. x 1½-in. strap bracket carrying 1¾-in. x 5-in. planks to which the motor base is attached. The belt driving is at the rear and thus out of the way of the workmen.







The drives shown herewith were worked out under the direction of W. C. Bolt, superintendent, and H. S. Wray, assistant superintendent of rolling stock and shops, Eastern Massachusetts Street Railway, Boston.

Since the Eastern Massachusetts Street Railway had available both alternating current and direct current at the Washington Avenue shop, it was possible to select the type of drive best suited for each machine tool. While in general the most convenient system of power supply is direct current, motor manufacturers recommend the use of alternating-current induction motors for constant-speed machines where possible, with direct current for machines that must run at variable speeds or have heavy starting conditions. The wide variety of machines illustrated in this article shows the adaptability of the motor drive to a number of different conditions such as exist in most electric railway shops. Where the electric installation is designed as a part of a new machine tool, speed changes may be provided by means of gears built as an integral part of the machine. This allows a constant-speed motor to be employed, but to obtain the speed increments necessary with a direct-current adjustable-speed motor requires abnormal gear combinations. Very often a single gear change is used with an adjustable-speed direct-current motor to obtain a wide speed range.

The comparative freedom of the Washington Avenue shops, as rearranged, from overhead shafting and belting is not shown in the illustrations. Where new machinery with individual motor drive is installed, it is, of course, possible to eliminate the shafting and belting. In this case, however, the shafting had been removed from the machines on which individual motor drive was installed, but long belts were necessary where the motors were placed overhead.

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Reconstructed Cars for Open Air Line

A DEMONSTRATION run with a train of four reconstructed Manhattan elevated cars was given on the Second Avenue line in New York on Nov. 7, as mentioned in the news colums of this paper in the issue of Nov. 10. The reconstructed cars have vestibuled platforms, with sliding doors in place of the old platform gates and railings. The sliding doors are of sheet steel construction with two panels, one with glass and the other closed. The doors slide on the outside of the car. This construction is of particular advantage as a pocket does not have to be provided inside, which would otherwise disturb the interior equipment. The motorman's operating cab is still retained in its original position just back of the platform.

The sliding doors are electro-pneumatically operated by door engines installed under the longitudinal seats at the ends of the car. The control of these door engines is by control switches installed on the ends of the car. The operator's station is on two elevated footrests between the two cars. By having a train line control cable, multiple operation of the doors is provided, so that one operator can control the doors on as many cars as found advisable. Cut-out switches for the door control lines are installed inside the cars, so that the control connections can be dead-ended at the operator's station or connected through to the next car as desired. Indicating signal lamps are installed at the center of each car on the outside. The circuit for these signal lights passes through both the door contacts and the door-locking contacts, so that it is necessary to have the doors both closed and locked before the lights are extinguished to indicate that the train is ready to start. The motorman's cab is also equipped with a starting signal, which lights when all doors are properly closed and locked. The locking of the doors is accomplished by a small projecting stirrup, which is pulled in when the doors are unlocked and is extended for the locking position.

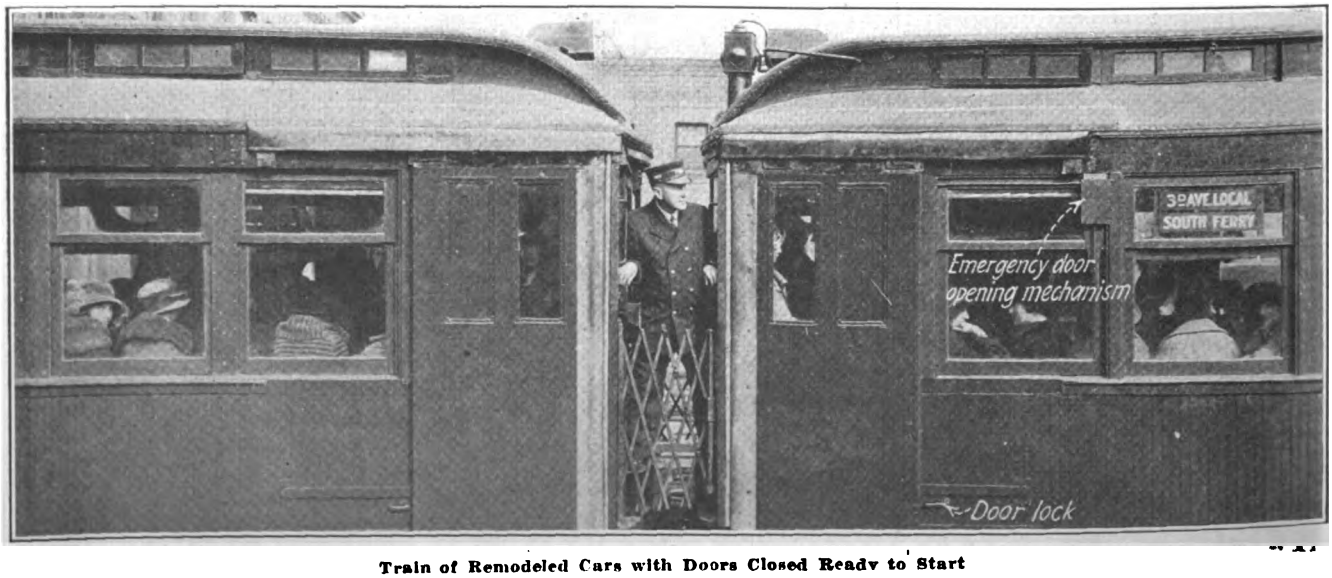
Provision is made for the emergency opening of doors by a glass-inclosed mechanism at each end of the car. The glass is lettered "To Open Door in Emergency, Break Glass and Pull Weight." The pulling of the weight raises the operating arm of the door engine beyond its center so that the door can be readily pushed back. Similar emergency operating equipment is provided on the outside of the cars as well. These are intended for use of platform attendants and hooks for the emergency operation are kept at each station. The first test train had ventilators installed on the roof over the vestibule portions of the car. It has not been definitely decided whether all future cars will be so equipped or not. The cars remodeled have been thoroughly overhauled and painted and varnished on the outside with the new standard color goldenrod orange. The inside has also been renovated and painted. The lower woodwork is finished in mahogany and the ceilings in white enamel to improve the lighting conditions.

Sign Tells How Many Windows to Open

IN ORDER to insure uniformity in regard to the number of windows open in the cars, the New York Railways has installed a changeable sign in the inspector's shanty at the West Twenty-third Street and Eleventh Avenue carhouse. The sign is lettered in black on a white board in the shanty window on the Twenty-third Street side, where it can readily be seen by all passing cars. It reads, "Windows Each Side All Down," as shown in the accompanying illustration. The fourth word is not permanently lettered on the sign, but is on a second board behind the main sign and is read through an opening therein. The rear board rotates and the word appearing through the opening may be changed at will to read "one," "two," "three," etc., or "all."

Sign in Window of Inspector's Shanty Gives Instructions as to Windows

The windows of the cars of the New York Railways are of the drop sash type, so that having the windows down means having them open. The device is somewhat similar to those whose object is to control the use of electric heat on the cars. Such arrangements have already been described in the ELECTRIC RAILWAY JOURNAL, but they are useful only during parts of the year, while the instruction board telling the conductor how many windows to open is useful throughout the entire twelve months.



Train of Remodeled Cars with Doors Closed Ready to Start

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N. & W. Line Trouble Record Analyzed

Total Period of Interruptions to Traffic Chargeable to Electric Equipment and Transmission in 1922 Was About Sixty Hours—During Entire Month of March No Line Trouble Was Reported—Pantograph Proved to Be Most Liable to Injury of All Parts of Electric System

THE log of line troubles for 1922 compiled by the electric traction department of the Norfolk & Western Railway, reproduced herewith, shows that most of these are of a trifling nature, a relatively small number causing any interruption to traffic. The electric traction department requires that all defects be reported, hence the table contains many that may seem trifling, but these are included for completeness.

In compiling the records the total delay caused is included. If, for instance, an insulator flashover causes a power interruption of thirty minutes, the delay shown is equal to the number of locomotives delayed multiplied by thirty minutes. The delay, therefore, does not mean the length of time the line was out of service. For example, on June 4 a wooden pole gave way on one of the mine outlet tracks, causing the trolley wires to get out of line and wrecking a pantograph on locomotive No. 2,505. Power was off this section from 5:02 p.m. to 5:44 p.m., or forty-two minutes. As a result locomotives No. 2,507, No. 2,505 and No. 2,502 were each delayed forty minutes, and No. 2,500 was delayed twenty-five minutes. The delay shown is thus two hours and twenty-five minutes, due to this particular case of trouble.

The tabular summary of the causes of interruption to traffic shows that there were fifty-one of these, or slightly less than one per week. Of these fifty-one, eleven are chargeable to wrecks and bad track, for which the electric traction department is in no way responsible, so that the actual number is forty, or an average of three and one-third per month.

The total period of delays to movement, including those due to wrecks and bad track, is 161 hours and twenty-five minutes, and excluding these, 101 hours and twenty-five minutes. This is two and one-half hours for each of the forty delays, or an average of eight and one-half hours a month.

LINE TROUBLE ABSENT IN MARCH

It will be noted in the log that in one month, March, 1922, there were no line troubles reported, and further, as would be expected, that the interruptions are very light in the summer and relatively heavy in the winter.

For purpose of study, it is interesting to segregate the troubles into classes, in each of which there is a common element. Taking up first the transmission and contact line system, there were six short circuits on the line from unknown causes, none of which resulted in delays to traffic. Lightning was responsible for six trouble reports, accompanied by negligible delay. The

TABLE I—LOG OF LINE TROUBLE

Date	Place	Nature of Trouble	Delay Hrs.	Delay Min.
Jan. 5	Eckman	Insulator flashed in Eckman Yard	3	17
Jan. 7	Bottom Creek	Loco. No. 2,503 wrecked pantograph. Ran onto non-electrified track	..	30
Jan. 16	Maybuery	Loco. No. 2,506 wrecked pantograph. Broken spring on truck and track bad.	..	50
Jan. 16	Powhatan	Loco. No. 2,506 wrecked pantograph, due to broken driver spring	..	45
Jan. 17	Empire outlet	Loco. No. 2,502 wrecked pantograph, account of bad track	1	20
Jan. 17	Bluestone	Cab 24 turned over and broke off wood pole	..	..
Jan. 18	Vivian	Trolley burned in two on crossover to old main line	1	25
Jan. 21	Morgan	Insulator flashed over on pantograph of Loco. No. 2,503	1	..
Jan. 22	Pocahontas	Bus line on Loco. No. 2,502 burned off at three-way connector and dropped on roof	2	..
Jan. 23	Clift Yard	Loco. No. 2,508 wrecked pantograph, due to pin falling out of live insulator and allowing it to catch pantograph	..	..
Feb. 6	Ruth Hill	Loco. No. 85, steam engine, flashed set of insulators and burned messenger in two	6	45
Feb. 9	Keystone	Disconnect switch flashed to ground when opened	..	..
Feb. 9	Bluefield Yard	Wood stick flashed on No. 7 track	..	15
Feb. 9	Bluefield Yard	Loco. No. 2,509 wrecked pantograph on Cab 22, coming in on west end of pit track	..	25
Feb. 12	Bluestone	Loco. No. 2,502 wrecked pantograph in Bluestone Yard	..	10
Feb. 25	Bluestone	Loco. No. 2,508 wrecked pantograph on crossover east of power house	..	..
Mar.	.....	No line trouble reported for month of March	..	..
Apr. 1	Bluestone	Pantograph raised with ground on another pantograph	..	..
Apr. 4	Coaldale	Main lead to transformer grounded in conduit on Loco. No. 2,505	..	30
Apr. 7	Cooper	Loco. No. 2,506 wrecked pantograph at Cooper crossover	1	25
Apr. 20	Lick Branch	Loco. No. 85 wrecked and knocked down one signal bridge and one tubular bridge	60	..
Apr. 20	Bluefield Yard	Body span burned in two	1	15
Apr. 28	Bluefield Yard	Radford lead burned in two at Mercer Street	..	30
May 2	Ruth	Piece of fishpole on top of cab caused ground	..	40
May 7	Switchback	Appalachian Power Company's 25-cycle circuit breaker blew up	1	..
May 9	Maybuery to Bluestone	Short circuit, cause unknown	..	..
May 12	Eckman	Set of insulators flashed due to lightning	..	40
May 13	Vivian	Loco. No. 2,507 had ground, due to piece of fishpole on top of engine	2	44
May 16	Ennis	Loco. No. 2,504 wrecked pantograph, due to pantograph unlatching while running	3	54
May 21	Kimball	Engine No. 9, popping off under set of insulators, caused insulators to flash	..	..
May 24	Coaldale	Loco. No. 1,507 had ventilator up and struck wire in tunnel	..	..
May 29	Bluestone	Loco. No. 2,509, wrecked pantograph on crossover; board from bridge struck wire	..	40
May 31	Delta	Loco. No. 2,503 wrecked pantograph, ran onto non-electrified track	..	..
June 1	Upland	Short caused by bird, burned steady-span in two	..	..
June 1	Bluefield	Short circuit, cause unknown	..	..
June 1	Bluefield	Short circuit, cause unknown	..	..
June 2	Switchback	Loco. No. 2,500 wrecked pantograph in Switchback Hollow; operator did not give crew copy of embargo order	3	..
June 2	Switchback	Loco. No. 2,500 pulled out on line but had pantograph grounded, causing another short	..	..
June 3	Ruth	Piece of fishpole on roof of Loco. No. 2,508 grounded	..	20
June 4	Bluefield	Short circuit, cause unknown	..	..
June 5	Bluefield	Short circuit caused by bird at Grant Street bridge	..	..
June 8	Keystone	Loco. No. 2,510, oil circuit breaker blew up due to resistance grounding in breaker	..	..
June 13	Bluefield Pit	Short circuit, caused by opening yard switch with power on locomotive transformer	..	..
June 14	Bluestone	Short circuit caused by raising of pantograph with one ground hook in	..	..
June 15	North Fork	Loco. No. 2,507 wrecked pantograph coming out of Byrd Yard. Bad track.	2	45
June 17	Eckman Yard	Loco. No. 2,507, breaker blew up	..	..
June 19	Switchback	Short circuit, caused by wreck in Switchback Hollow	..	..

(Table continued on next page)

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TABLE I—LOG OF LINE TROUBLE—(Continued)

Date	Place	Nature of Trouble	Delay Hrs.	Delay Min.
June 27	Eckman	Loco. No. 2,501 wrecked pantograph on east end No. 10 track. Bad track	3	30
June 27	Bluefield Yard	Insulator on No. 5 track, east of Grant Street flashed, due to activities of sparrow	..	..
June 27	Houston	Dead end insulators flashed on Houston outlet, due to lightning	..	..
June 30	Coaldale	High-tension cable on Loco. No. 2,508 grounded in conduit	1	..
July 2	Vivian	Loco. No. 2,507 wrecked No. 2 pantograph on crossover to old main line	5	..
July 3	Maybuery	Feeder burned in two, probably due to lightning	..	..
July 9	Bluestone	Switch closed on ground on pit	..	..
July 11	Bluefield	Short circuit, due to lightning	..	..
July 11	Vivian	Fire on top of high-tension oil breaker	..	..
July 12	Bluefield Yard	Short circuit, cause unknown	..	..
July 24	Graham	Wood stick broke in two	..	..
July 26	Nemours	Loco. No. 2,508 reported lightning struck cab, flashing insulators	1	55
July 28	Bluefield Yard	Yard crew ran Loco. No. 2,506 onto grounded line at freight house	..	50
Aug. 8	Empire	Trolley burned in two at Empire outlet	..	..
Aug. 13	Pulaski	Loco. No. 2,503 wrecked No. 1 pantograph, due to bad track	1	..
Aug. 18	Keystone	Fireman burned, putting up pantograph on Loco. No. 2,510; climbed on roof of cab	..	30
Aug. 21	Dans' Branch	Loco. No. 2,508 wrecked pantograph, due to wood pole splitting and allowing dead end to slack off	..	45
Aug. 22	North Fork	Loco. No. 2,508 wrecked pantograph, cause unknown	..	20
Aug. 24	Flat Top	Set of insulators flashed	1	10
Aug. 24	Simmons	Tree fell across line; also three insulators flashed, due to lightning	..	..
Aug. 28	Ruth	Loco. No. 2,510 knocked horn off pantograph	..	..
Aug. 30	Flat Top	Loco. No. 2,501 bus line burned in two	..	..
Sept. 1	Ennis	Loco. No. 2,509 wrecked No. 1 pantograph at Ennis crossover	..	..
Sept. 7	Bluefield Pit	Motor run onto grounded line	..	..
Sept. 12	Bluefield Yard	Loco. No. 2,502 wrecked pantograph, No. 10 track, west yard, ran engine onto non-electrified track	..	45
Sept. 12	Eckman Yard	Loco. No. 2,509 wrecked No. 1 pantograph on No. 6 track; pantograph out of line	2	15
Sept. 13	Vivian	Loco. No. 2,503 wrecked No. 1 pantograph on No. 5 track in Vivian Yard. Bolt came out of clip	1	25
Sept. 15	Bluestone	Loco. No. 2,501 ran onto non-electrified track	..	..
Sept. 16	Bluefield Pit	Switch opened on pit track with locomotive spanning breaker	..	..
Sept. 27	Bluefield Yard	Loco. No. 2,510 wrecked pantograph on crossover at passenger station	..	..
Oct. 2	Eckman	Loco. No. 2,509 wrecked pantograph on No. 6 track	..	..
Oct. 6	Bluefield Pit	Switch opened while motor was running.	..	..
Oct. 7	Powhatan	Set of insulators flashed over at Powhatan Coke track	..	..
Oct. 12	Bluestone	Loco. No. 2,505 burned wire in two on Pocahontas Branch while standing at tower	..	..
Oct. 12	Bluefield	Solder melted out of terminal on disconnect switch lead and allowed lead to drop	2	50
Oct. 16	Peerless	Set of dead-end insulators flashed	..	..
Oct. 22	Eckman	Loco. No. 2,500 wrecked pantograph No. 2 on east cab coming out of Eckman Yard, due to bad track	..	50
Oct. 23	Bluefield	Loco. No. 2,507 wrecked pantograph at Mercer Street Bridge	..	..
Oct. 23	Bluefield	Loco. No. 2,500 wrecked pantograph on crossover at west end of No. 11 track in Bluefield Yard. Had knocked horn off at Eckman	..	..
Oct. 28	Bluestone	Helper shocked in Bluestone Yard	..	..
Oct. 29	Elkhorn	Loco. No. 2,502 wrecked pantograph on Elkhorn Siding	1	30
Nov. 1	Pin Hook	Loco. No. 2,502 flashed insulator on pantograph	..	55
Nov. 9	Coaldale	Loco. No. 2,506 wrecked pantograph at Coaldale crossover. Blew up Maybuery substation when breaker was closed on short circuit	20	..
Nov. 24	Eckman	44,000-volt line burned in two at Eckman, smoke from steam engine	3	30
Nov. 25	Eckman	Wood stick flashed on crossover, west end of Eckman Yard	..	..
Nov. 26	Eckman	Loco. No. 2,504 wrecked No. 1 pantograph east end of No. 10 track. Bad track	1	30
Nov. 28	Bluefield Pit	Trolley burned in two on storage track. Improper handling of pantograph	..	40
Dec. 1	Eckman	Loco. No. 2,504 wrecked pantograph on No. 10 track, east end of Eckman Yard	2	35
Dec. 2	Eckman	Loco. No. 2,504 wrecked pantograph on No. 10 track. Bad track and pantograph out of line	1	10
Dec. 12	Eckman	Loco. No. 2,508 wrecked pantograph on No. 10 track. Bad track	2	..
Dec. 19	Bluefield Yard	Set of insulators flashed on lead. Engine No. 2,036 standing under insulators popped off	..	20
Dec. 20	Eckman	Steady span burned in two	3	45
Dec. 26	Clift Yard	Cat climbed wood pole and bridged set of insulators	..	..
Dec. 26	Bluestone	Insulator flashed on pantograph on Loco. No. 2,502. About 4 ft. of messenger wire found on cab	..	..

storm of Aug. 24 was a severe one, causing a tree to fall across the line, as well as three insulators to flash, but with no delay to traffic. The worst that the lightning did was usually to flash insulators, although in one case the burn-off of a feeder may be attributed to this cause.

In the electric zone it was not possible to use the ordinary rope "ticklers" which are customary on steam railroads to indicate to trainmen on the roofs of the cars that a tunnel or a low bridge is being approached. Instead, a reed fishpole hinged to the catenary side column is substituted. This extends over the track in such a position that the pantograph of an approaching train strikes it and causes it to swing parallel to the track. Occasionally in striking the pole the pantograph breaks off a piece of it, which drops down on the roof and grounds the pantograph. This is particularly true during heavy rainstorms. A total delay of three and three-quarter hours was attributed to this cause.

The smoke and steam from steam engines caused difficulty on four occasions, a negligible number in view of the fact that all passenger and freight trains go through the electric zone behind steam engines. Two engines popped off under insulators, one short circuited the 44,000-volt line by means of smoke, and another flashed over an insulator and burned out a messenger. These four accidents account for more than a sixth of the total year's delay.

Aside from the insulator troubles mentioned, the line insulators gave a good account of themselves. Occasionally there was a flashover, usually with a trifling delay or none, although an insulator flash early in January did cause a three-and-one-quarter-hour delay. The regular inspection and renewal of insulators described in the article in the issue of this paper for Aug. 11, 1923, page 203, insures a minimum of insulator troubles in service.

Something over one-sixth of the total time of delay tabulated may be charged to the burning off of contact and span wires and difficulties with switches and circuit breakers. The total for the year, however, is only ten, mostly minor troubles.

Locomotive troubles, aside from the pantograph wrecks already referred to, were of minor importance, having caused less than five hours' delay during the year. These include pantograph insulator flashovers, circuit breaker failures and wiring burnouts. The number coming within this class is ten, or less than one a month.

The Pantograph Is the Most Sensitive Part of the Equipment

The pantograph is naturally the part of the locomotive which comes in for the most severe punishment. In construction it must be light and flexible to function properly. It is liable to injury from causes which have nothing to do with the electric equipment. For example, during 1922 nine pantograph wrecks were due to the track being out of alignment, another was caused by the splitting of a wood pole, another by the breaking of a driver spring, and still another by a pin falling out of an insulator. In another case a board from a bridge struck the contact wire and wrecked the pantograph. A large proportion of the pantograph wrecks

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TABLE II—SUMMARY OF LINE TROUBLES CAUSING TRAFFIC DELAY

Number of Cases	Nature of Trouble	Delay to Movement Hrs.	Min.
2	Insulators flashed on pantograph	1	55
2	Steam engine popped off under insulators	7	5
6	Wrecked pantograph, cause not determined	9	10
1	Wood stick flashed	..	15
2	Wrecks	63	0
1	Body span burned in two	1	15
3	Defective insulators	5	7
4	Ran onto non-electrified track	3	35
6	Defect on electric locomotives	6	30
9	Bad track	16	20
2	Trolley burned in two	1	55
1	Steady span burned in two	3	45
4	Foreign material on locomotive roof	4	20
7	Miscellaneous	13	9
1	Lightning	1	55

occur at crossovers, where the overhead line has to be more complicated than on tangent track.

In a few cases pantographs are wrecked due to their own defects, not more than three, however, during 1922. Occasionally one is injured through an unknown cause. On the whole, the pantograph is the cause of more delays than all other pieces of apparatus together.

In spite of watchfulness on the part of employees of the electrified section, men will occasionally forget or misunderstand instructions, causing unnecessary delay or inconvenience. There were from fifteen to twenty cases last year which can be thus classified, but among them all they caused but a little more than three hours delay. Such accidents as raising a pantograph with the ground on another pantograph, raising a pantograph with a ground hook on it, opening switches with power on, running onto non-electrified track or grounded line, etc., illustrate this class of trouble.

The log includes the result of a train wreck which caused a total delay of sixty hours. One signal bridge and one tubular bridge were knocked down and a short circuit was caused by the wreck.

The Readers' Forum

Additional Information on Steel Wheel Mileage

WASHINGTON RAILWAY & ELECTRIC COMPANY
WASHINGTON, D. C., Nov. 5, 1923.

To the Editors:

In the article appearing in the Aug. 18 issue of ELECTRIC RAILWAY JOURNAL under the heading "Wheel, Gear and Axle Practice" (on page 250) is shown certain data in the nature of mileages obtained on our property from different types of wheels for the year 1920. Since you obtained the figures as shown we have prepared similar statistics for the years 1921, 1922 and the first six months of 1923 which I think are more representative.

The Davis wheels that were scrapped during the year 1920 because of being unfit for further service were mostly put in service during 1918. Because of the stress of war conditions at that time, the factory did not turn out the high quality product that it is now doing. This directly affected the mileage obtained from the wheels of the Davis type that were installed during that year.

The mileage shown as obtained from 31-in. rolled steel wheels during 1920, while correct, is also misleading because we did not commence the extensive use of rolled steel wheels until the spring of that year. We did have a few rolled steel wheels that were put into service in 1918 for experimental purposes, and during 1920 four of these first wheels were scrapped because of being worn out. The average mileage for the four wheels was 90,000, but the mileage obtained from such wheels does not conclusively prove that similar results will be obtained from such wheels when used extensively. In the table below are shown the mileages of wheels on our property for the years 1920, 1921, 1922 and six months of 1923.

You will note from this that the Davis wheels have steadily increased in mileage and decreased in cost per 1,000 miles each year. In order to get the mileage shown for the rolled steel wheels it was necesary to remove them from service twice for turning, while in the case of the Davis wheels they were not removed after first installed until ready to scrap. This is decidedly in their favor.

We obtain the mileage of wheels scrapped by keeping an individual card record for every wheel on our system from the time it is put into service new until it is removed and scrapped. The number of wheels by types and sizes that were removed and scrapped during each month is also compiled, which shows the total mileage actually made by the scrapped wheels. This divided by the number scrapped gives the figures used for average mileage.

The reason we obtained better mileage from 30-in. Davis wheels than from 33-in. Davis wheels is because the latter are used entirely under 54,000-lb. cars operating at fairly high speeds and with frequent stops and severe braking conditions. The 30-in. wheels are used under cars weighing around 35,000 to 40,000 lb. in strictly city service. A large amount of our track is grooved rail with a very narrow groove which has only ⅛-in. clearance over wheel flange. Consequently the rolled steel wheel flanges wear very fast on the back side of the flange, which necessitates frequent turning, resulting in low total mileage when worn out. The Davis wheel having a very hard flange does not wear anywhere near as fast as the steel wheel.

R. D. VOSHALL,
Superintendent of Equipment and Buildings.

WHEEL MILEAGES FOR THE YEARS 1920, 1921, 1922 AND FIRST SIX MONTHS OF 1923
WASHINGTON RAILWAY & ELECTRIC COMPANY

Type of Wheel	Year 1920 Average Miles	Year 1920 Cost per 1,000 Miles	Year 1921 Average Miles	Year 1921 Cost per 1,000 Miles	Year 1922 Average Miles	Year 1922 Cost per 1,000 Miles	First Six Months, 1923 Average Miles	First Six Months, 1923 Cost per 1,000 Miles
20-in. cast iron	44,665	0.15	47,051	0.11	41,974	0.14	43,222	0.13
22-in. cast iron	41,841	0.206	39,552	0.18	38,221	0.22	37,705	0.19
30-in. cast iron	41,009	0.276	36,700	0.27	35,300	0.32	37,069	0.24
33-in. cast iron	41,577	0.304	51,993	0.17	39,005	0.25	20,982	0.58
30-in. Davis	48,725	0.688	66,559	0.41	91,278	0.30	102,244	0.27
33-in. Davis	65,254	0.559	71,651	0.46	79,076	0.41	90,997	0.38
31-in. rolled steel	90,000	0.383	52,180	0.66	84,702	0.41	81,271	0.44

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Maintenance of Equipment

Selection of Waste for Motor Bearings

BY HENRY S. DAY*
Railway Department, Westinghouse Electric & Manufacturing Company

WITHOUT good wool waste bearings of motors and truck journals cannot be properly lubricated, and the ratio between good and bad lubrication and good and bad waste is about the same. Probably there is no one article in the storeroom of the electric railway that varies so in quality and grade as the waste used for packing bearings.

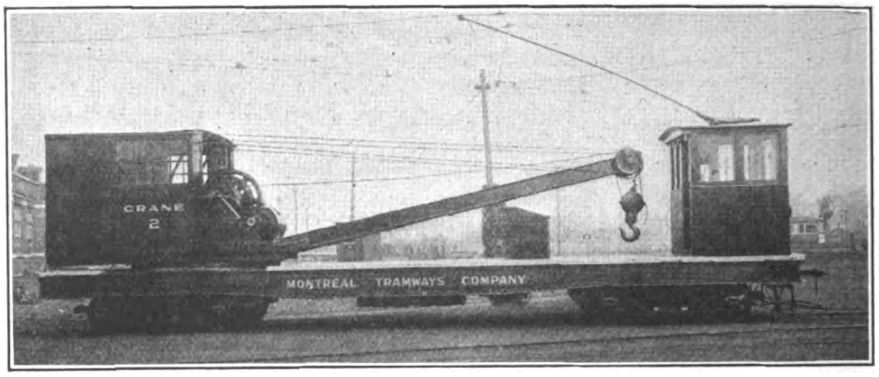
The amount expended for lubrication which covers oil, grease and waste packing is only a very small percentage of the total cost of equipment maintenance, but poor lubrication causes a very large percentage of the troubles. Frequently a railway that has low lubrication costs has high costs for repairs. Many factors enter into poor lubrication besides poor waste, and there are many opinions as to what constitutes good packing. Years of operation have demonstrated that to feed oil properly and to prevent sagging the packing should be composed of pure wool yarn with few short strands. Strands should not be less than 12 in. or 15 in. long, should also be of a good diameter and well mixed. Such wool yarn will feed oil and at the same time retain a resiliency sufficient to hold it in place against the journal without sagging or matting.

Many specially prepared types of packing waste are composed of various grades of wool yarn mixed with cotton strands and different kinds of fibrous substances. Some of these prepared packings give fairly good results. If the packing is of an inferior grade and has a high percentage of cotton and fiber, it cannot lift sufficient oil to carry away dirt, dust and foreign substances that all tend to shorten the life of the bearing and wear the journal.

An additional cause of lean feeding in a mixed packing is the tendency for cotton and fibrous substances to bunch up and mat from vibration and thus introduce barriers which break the path of oil in its upward flow and reduce the amount that reaches the journal. Mats or pads formed this way also catch and hold sand and dirt which cannot fall to the bottom of the housing or journal box. Cotton and fibers when they come in contact with a moving journal will also form a glazed surface which will frequently cut off the oil flow. Another advantage of high-grade wool packing is that it can be washed and reclaimed and so be used over again.

Bearing and journal wear is costly and the source of much trouble. Good packing, oil and grease are a comparatively small item in the operating cost, and a liberal use of the best that can be procured will prevent much expense and many failures.

*Formerly superintendent of equipment Kansas City Railways.

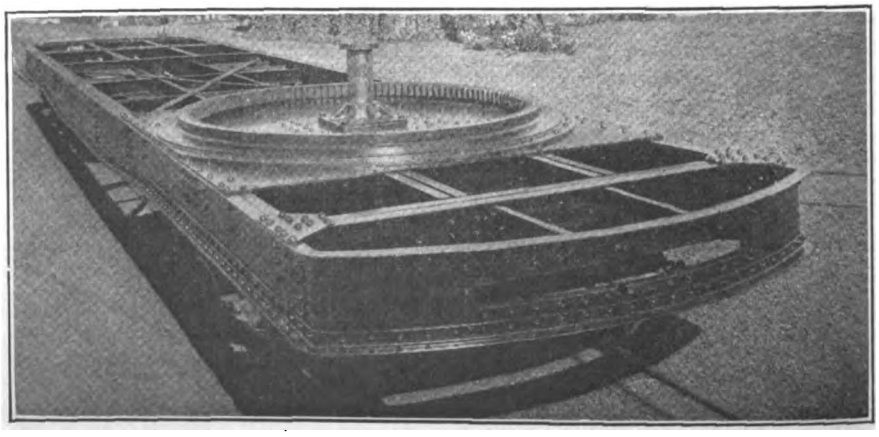


Montreal's Crane Car Ready for Service

Well Constructed Crane Car for Montreal

THE Montreal Tramways has recently added a new crane car to the present work car equipment. The underframe was designed and built in the shops at Youville. It has an over-all length of 42 ft., width 8 ft. 5 in. and 41 in. body height, with an over-all height over top of rotating crane cabin of 11 ft. 5 in. The low body height was necessary to give the required subway clearances.

The body is of very rigid construction, consisting of two fish belly girders of ⅜-in. plate and 2½-in. x 2½-in. x ⅜-in. angles, connected by intermediate girders of ⅜-in. plate and 2½-in. x 2½-in. x ⅜-in. angles and heavy channel box bolsters. The rear end is covered by the half-inch plate to which the base ring is fastened, this forming the bolster top plate, also tying the whole structure together and preventing any twisting of the body due to swaying loads



Underframing of New Crane Car

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when the crane is revolved. The body and trucks are equipped with interlocking side bearings which transmit the load directly to the truck side frame, thus relieving the bolster of the lifted load.

The trucks, which were built in the company's shops, are placed at 27-ft. centers. They are of 6-ft. 3-in. wheelbase with 30-in. wheels and special axles. The front end is fitted with a 5 x 6-ft. cab for the motorman.

A K-35 controller handles the driving equipment of four Westinghouse 533 motors connected in series, series multiple, to allow for slow movement with a lifted load. The weight of the car equipped is 77,600 lb.

The crane proper, which was purchased from the Ohio Locomotive Crane Company, weighs 37,100 lb. and is driven by a Westinghouse 37-hp. type K motor. It has a lifting power of 17,000 lb. at 12-ft. radius, 12,000 lb. at 15-ft. radius and 8,500 lb. at 20-ft. radius, these limits being fixed by the stability of the whole structure on the limited base of the 4-ft. 8½-in. rail gage. Much greater loads can be handled over the rear end of the car and, when suitable, struts are inserted between underside of car frame and the ground to give a wider effective base.

Maintenance of Bearings and Welding Practice

By O. A. Norene
Assistant Master Mechanic Omaha & Council Bluffs Street Railway

BOTH cast and malleable iron axle collars are being replaced with cast steel collars in Omaha. We are also discarding the cotter keys in all the collars and replacing them with plain locknuts which lock the screws rigid to the collar and prevent the threads from wearing on both screw and collar.

We are using cast steel axle shells, babbitt lined, on all our motors where a thickness of shell is ½ in. or over. The shells are machined in a specially designed jig in which they are held rigid without distorting them in any way. Two sets of jigs are used for each type of bearing, to permit the operator to change one pair of shells while the other set is being machined. The babbitting is done in a special mold where the bearings are cast finished complete with oil grooves. All halves are interchangeable. It has not been found necessary to tin these shells, as anchors cast in the flanges and body of the shell are ample to hold the babbitt.

Repairs by Welding

For repair of broken truck frames, cast steel bolsters, motor cases or for any heavy welding we are using the thermit process. Armature shafts are welded in this manner if broken at the pinion end and if the winding is found to be in good condition. The weld is always made from 2 in. to 3 in. from the end of the pinion taper. This is done principally to get as large an area for weld as possible.

Worn pinion fits and broken and worn keyways in armature shafts are built up with oxyacetylene torches and the shafts machined to standard sizes. We have discontinued entirely the use of so-called liners of sheet iron, canvas or paper, and by so doing we have also elimi-

The Roadmaster Catches H—

And he takes it because he knows he's been asleep. General manager of Jinxville Railway says roadmaster's slackness was responsible for justified complaint of riders as voiced in newspaper editorial. Insists that fault be acknowledged and conditions rectified and makes deep impression

"MR. REDFIELD, did you see the editorial in this morning's Jinxville *Clarion*, complaining about our track on Main Street?" asked Charlie Riter, Mr. Redfield's clerk, on the boss' arrival at the office.

"Yes, Charlie, I did, thanks, but I'm pleased to note that you take enough interest in the property to call my attention to it. That track ought to have been fixed up long ago. I'll see Tom Fairweather about it today. He's roadmaster and it's his job to forestall such complaints. Here's the superintendent; we'll see what he has to say.

"Good morning, Bill, I see the *Clarion's* after us about our Main Street track."

"No wonder, Mr. Redfield, that track's a disgrace. The joints are the main trouble and they are awful. John O'Neill and I learned something about track at the Atlantic City convention that we ought to apply here. I wish you'd have Tom put in some of the welded joints that we've heard so much about."

"I'll see him today, Bill. Something's got to be done. We must make a start anyway before next Sunday. Charlie, get hold of Mr. Fairweather as soon as you can and tell him to come to my office."

On Fairweather's arrival the G. M. lost no time in coming to the point.

"Good morning, Tom. This morning's paper says our Main Street track might be improved. What about it?"

"Sure, Mr. Redfield, it's the worst piece of track in town, but I don't think they ought to roast us about it that way. I intended to patch it up next spring."

"Look here, Tom, don't you realize that if the public has good reason for a complaint like this it makes it mighty hard to maintain good terms with our car riders?"

"Oh, it's just one of them young reporters who wanted something to complain . . . ."

"Stop right there, Tom. You're all wrong. Gainway says there's good reason for the complaint and, as superintendent, he ought to know. Trouble with you is you're not keeping up to the times. What kind of track joints have we on Main Street?"

"Fish-plates; same as we've always used. I never took much stock in these newfangled joints."

"Well, you've got to take stock in them from now on, Tom. You had better get yourself posted right away on these welded joints and jointboosters and one thing and another that Bill and John say stirred up so much interest at the convention. I want to put an ad in the *Clarion* telling the people of Jinxville that improvements are going to be made. If we've been slack, let's say so, but saying at the same time that we're going to fix up the track right away. We'll tell them, too, that we have done a lot of other things to improve service on this property in the last year.

"Now don't fall down on this job, Tom, even if you have been working here for thirty years. You can keep up to date if you'll read the JOURNAL and think and keep up with what other people are doing. You know I don't want to get a new roadmaster unless I have to. Let me know tomorrow what we ought to do on Main Street and how soon we can get it done, so I can write my advertisement."

"I guess maybe you're right. Chief, I have been a little slack. I'll get right after this."

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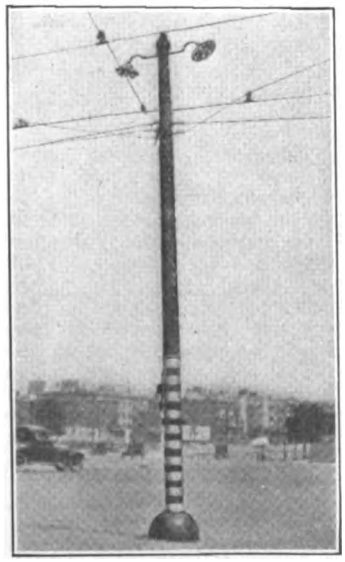
nated almost all the loose pinion trouble we used to have. No attempt is made to build up the worn bearing surface on an armature shaft by welding. When worn down too small, a seamless steel tubing is shrunk on to bring the shaft to standard size.

Reducing Exposed Pole Hazard

THE trolley pole shown in the accompanying illustration is located in the plaza at the entrance to Prospect Park, Brooklyn. It had to be set well out toward the center of the plaza in order to support the overhead work at the intersection of two streets, on both of which there were electric railway lines. In this location it was in constant danger of being struck by passing vehicles. In order to make the pole conspicuous at night as well as during the day, a cluster of ten lights was installed at the top of the pole. Then to make it stand out even in the daylight it was painted, in accordance with a city ordinance, with alternate white and black stripes for a distance of approximately 12 ft. above the ground line.

It was further protected by a cast-



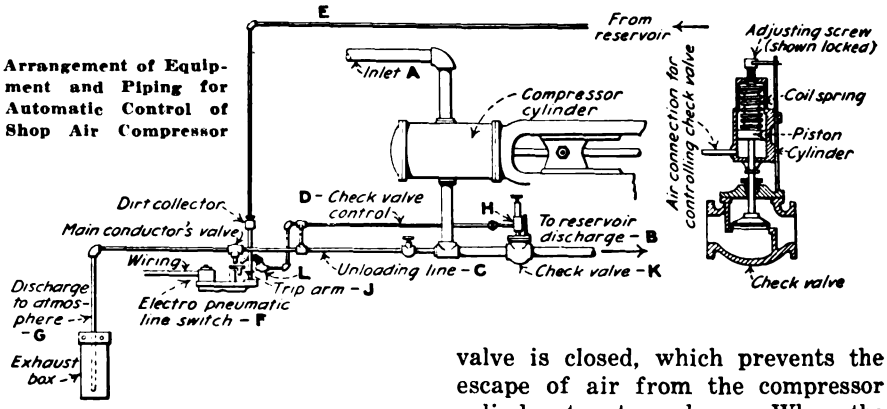
A Thrice-Protected Pole

iron wheelguard at the base of the pole. This wheelguard will deflect wheels of passing vehicles to one side and greatly lessen the blow as well as cause the wheel to be struck rather than the body of the vehicle, so that if the automobile or wagon were damaged it would be in a part that would not also cause injury to any persons who might be riding in the vehicle.

Automatic Control for Shop Compressor

By H. Cowen
General Foreman New York Railways, New York, N. Y.

AT THE Fiftieth Street shops of the New York Railways compressed air for hoists and pneumatic tools was supplied by a "Platt" straight-line, single-stage, double-acting compressor, driven by duplex belts from an overhead countershaft belted to a 75-hp. motor. This compressor had been in operation over twenty years and increased demands



Arrangement of Equipment and Piping for Automatic Control of Shop Air Compressor

for air imposed excessive duties on it and necessitated the use of larger supply reservoirs. The only ones available were ample in size for maximum requirements, but excessively large for the normal shop needs. This resulted in the compressor running idle for a major portion of the days and caused overheating.

Frequent shutdowns were necessary for repairs, such as renewing main and crankpin bearings, crosshead gibs, inlet and discharge valves and seats. The two latter resulted from deposits of carbonized oil, caused by excessive temperatures. These troubles were not anticipated, as an unloading device formerly part of the compressor and connected in the inlet pipe was expected to control the compressor operation during rush and normal periods. Its function, however, was merely to restrict the inlet flow of air and it did not eliminate idling, with its attendant waste of power and rapid wear of parts. Automatic control was therefore added by the use of several spare air-brake parts. A shop-made automatic controller was used for stopping and starting the compressor motor, at a minimum reservoir pressure of 40 lb. and maximum pressure of 65 lb. These, together with the spare air-brake parts, such as the General Electric type MC Westinghouse 275 line switch, conductor's valves, fender trip cylinder and a standard 5-in. check valve were piped, as shown in the accompanying diagram.

Referring to the diagram, *A* is the inlet to the compressor, *B* the discharge to the reservoir, *C* an unloading connection, *D* a check valve control line, *E* the connection from the reservoir to an electropneumatic line switch, *F* the line switch and *G* the discharge to atmosphere. During compressor operation, the line switch *F* is de-energized and the conductor's valve is closed, which prevents the escape of air from the compressor cylinder to atmosphere. When the air pressure in the supply reservoir reaches the required maximum of 65 lb. the G.E. governor, previously adjusted, opens the main motor circuit and the compressor comes to rest.

As air is consumed the reservoir pressure diminishes to 40 lb., when the governor cuts in and closes the motor circuit, simultaneously energizing the magnet valve in *F* so that communication is established between the reservoir and the conductor's valve trip cylinder. This moves the trip arm *J* upward and opens the conductor's valve so that a rapid release of the air confined in the compressor cylinders occurs, which removes the resistance against starting. Without this arrangement, proper acceleration of the compressor was impossible because both the motor and countershaft belts slipped and in many instances these were damaged.

After the motor circuit is closed, the automatic contactors on the switchboard gradually cut in resistance as the acceleration progresses. When the magnet valve in *F* is de-energized, the trip arm *J* drops and closes the conductor's valve and the atmospheric discharge line from the compressor cylinder. Air now passes through the main discharge and check valve into the main supply reservoir.

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The check valve *K* functions only during the acceleration period, when air passes from the unloading pipe to the cylinder *H*, which contains a piston and rod integral with the check valve stem. By adjusting the screw pressure on a coil spring as shown in the enlarged section of the check valve the air pressure, for completed acceleration, is regulated. When the piston moves up the check valve is held open, allowing air to flow from the compressor to the supply reservoir. This eliminates pounding of the check valve on its seat.

To prevent a general discharge of air from the supply reservoir through the unloading and atmospheric lines, at the instant of starting, a conductor's valve *L* with a multiplying lever is connected to the check valve control line, so that the air in the check valve cylinder discharges to atmosphere and allows the valve to seat before the main conductor's valve opens.

A series of tests made after installing this apparatus showed that during 50 per cent of the working day the compressor was not required to operate. The reduction in power consumption and the elimination of shutdowns have produced a substantial saving. Furthermore, renewals of main valves, seats, bearings, etc., have not been necessary during the past two years, and an improved shop output has resulted from the successful operation of the compressor.

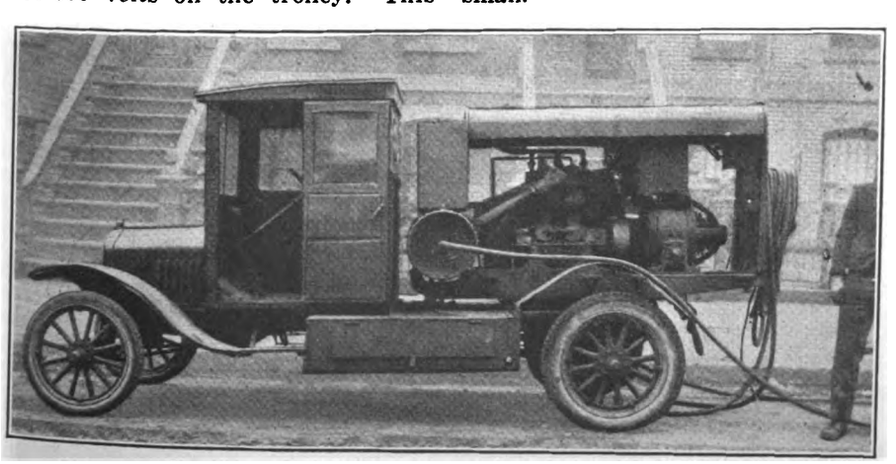
New Equipment Available

Truck-Mounted, Electrically Driven Compressor

TO MEET the demands of electric railway track departments for an electrically driven air compressor, which can be readily and conveniently moved about, the Ingersoll-Rand Company, New York, N. Y., is placing on the market a new type 20 equipment shown in the accompanying illustration. A standard Ingersoll-Rand duplex air compressor, with 5-in. x 5-in. cylinders and having a capacity of 91 cu.ft. piston displacement per minute, is direct-connected to the compound-wound direct-current motor used for driving.

The motor obtains its current from the overhead trolley and is designed to operate at practically constant speed within a range of 400-600 volts on the trolley. This takes care of the voltage variation commonly experienced in electric railway service and maintains the capacity of the outfit under practically all conditions. This outfit has sufficient capacity so that it will operate four tie tampers or two paving breakers.

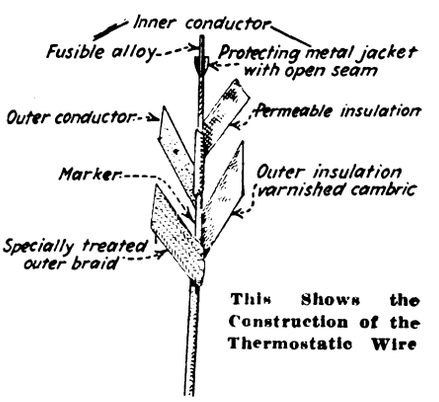
The use of an electric drive which can be operated directly from the overhead trolley supply is a particularly attractive feature to electric railway track men, and the constant speed feature is of advantage. The type 20 equipment is offered either ready for mounting on any standard Ford truck or complete with truck as specified. Some companies have found it convenient to make use of old motor trucks with this unit, as the amount of actual travel in miles which such a unit is required to make is comparatively small.



Air Compressor for Trackwork Mounted on Truck

Continuous Thermostatic Wire for Fire Alarm Systems

AN AUTOMATIC fire alarm system applicable to railway carhouses, substations, etc., is marketed by the Fire Detecting Wire Corporation, New York, and is said to possess several advantages over other systems now widely used. It consists of various circuits of continuous thermostatic wire, each connected with a centrally located control panel and with alarm gongs. In the event of fire, or even of undue heat, an alarm will be given before the fire has become dangerous. This thermostatic wire consists of a core of special fusible alloy covered with a protecting metal jacket having a narrow open seam. Superimposed upon this is a permeable wrapping of cotton yarn which provides insulation between the core and an outer conductor of spirally wound brass tape. On top of this is a layer of



This Shows the Construction of the Thermostatic Wire

varnished cambric to protect the wire against grounding and a varnished cotton braid outer covering to give mechanical protection.

The soft metal in the interior of the wire has a fusing temperature of 160 deg. F. The wrapping material outside, however, has a retarding effect equivalent to about 20 deg., so that the actual fusing temperature of the wire is about 180 deg. under normal conditions. Under a very slow heat the fusing point is reduced to approximately 160 deg., because the whole mass has time to become thoroughly heated.

When the metal core fuses, it spurts through the seam in the protecting cover and through the permeable insulation, making electrical contact with the outer conductor of brass tape. This shunts out a resistance, and the alarm box, indicator, etc., give their warning.

Although the fusing point of the

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metallic alloy is theoretically about the same as that for sprinkler heads, nevertheless experience has demonstrated that the alarm will always be sounded some time before the sprinkler system operates. The reason for this is that the metal pipes of the sprinkler system and the water contained therein tend to carry away the heat from the sprinkler head and thereby postpone its melting.

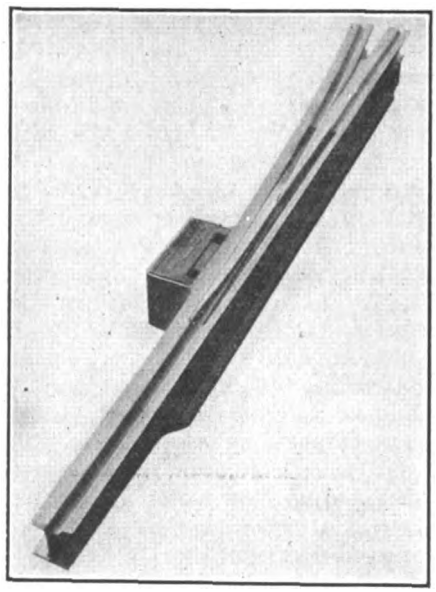
A supervisory current passes continuously through all parts of the system, including the core and brass wrapping of the wire. Any interference with this supervising current, such as that caused by an open circuit, results in a trouble signal. False alarms have been eliminated.

Wires are spaced about 10 ft. apart or approximately the same distance as sprinkler pipes. A single circuit may contain from 1,000 to 1,500 ft. of thermostatic wire. With the 10-ft. spacing 1,000 ft. of wire will protect 10,000 sq.ft. of floor area. When desirable smaller sections may be used, giving a finer allocation of alarm.

An interesting possibility in the thermostatic wire is its use in automatic substations. Stations may be wired not only for fire but for protection against overheating of transformers and other apparatus. The installation of the thermostatic wire makes it possible to sound an alarm and automatically shut the station down in case of fire or the overheating of any of the equipment, which is particularly desirable for older type manually operated stations.

New Switch Provides Unbroken Main Line Rail

A TYPE of switch which embodies several new features is being marketed by the Railway Safety Equipment Company, Inc., Philadelphia, Pa. It is called the Freeburg Heel-less Safety Switch. The throw is made through the medium of a camshaft set in the switch block. This operates two tongues vertically. The use of two tongues eliminates the usual heel of other type switches and provides an unbroken main-line rail as well as unbroken curved rail. One tongue counterbalances the other, so as to provide for a simple and easy throw, whether by hand or automatic operation. The elimination of the heel prevents pounding which results in breaking down the switch bed. Excessive noise, as well as wear and tear on car equipment,



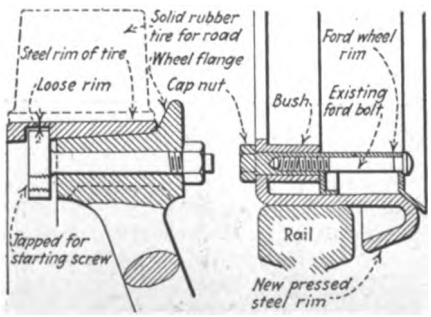
The Moving Part of This Switch Consists of Two Tongues and a Camshaft

is also reduced. When thrown for either the curve or main line, the tongues are locked in position and the vertical action of the tongues between solid steel centers prevents splitting of switches.

Wheels for Either Road or Rail Service

A WHEEL system which can be converted from that used on highways to a form suitable for operating on rails is described in *London Engineering* for Oct. 12. The device is being manufactured under the trade name of "Motorailer" by the Motorailer Transport Company, Ltd., London, England. Two applications of the system are now in service.

One design shown in the accompanying illustration consists in using a motor wheel of the rail-car type



Wheel Rim Design for Use on Either Track or Road

made of high carbon steel. To convert this to a form suitable for road service, a tapered loose rim is used. This slips over the main rim of the wheel and forms an intermediate member between it and the steel ring at the base of the rubber tire. This loose ring is machined at an angle and is mounted in a manner similar to that used for holding piston rings. It is held in position by six ¾-in. hardened steel bolts with sector-shaped heads. These fit into a milled slot in the loose rim.

Another design of rim construction is for use on a standard Ford truck. With this construction a pressed steel rail rim is attached to the wheel rim, the steel rim replacing the ordinary detachable rim generally used with rubber tires. An accompanying illustration shows the type of construction and method of fastening.

Non-Magnetic Cast Iron for Resistance Grids

NON-MAGNETIC cast iron has been produced by Messrs. Ferranti, Ltd., Lancashire, England, and has been patented by them in Great Britain and the United States. Its registered name is "Nomag." The magnetic permeability is practically the same as brass, while its electrical resistance is 50 per cent greater than ordinary cast iron. This combination in one metal is of advantage in electrical machinery construction. An increase of temperature causes a slight reduction in the permeability of the metal.

The mechanical properties generally are the same as cast iron, but Nomag has advantages in greater toughness and malleability, which are observable both in its high transverse deflection and in its resistance to shock. These qualities render the metal peculiarly suitable for resistance grids, especially when used for electric railway purposes.

In the design of electrical machinery and apparatus non-magnetic metals such as brass, gunmetal and aluminum are used where an alternating or rotating flux is present, in order to avoid hysteresis. The metals are not only relatively expensive but, as they are good conductors of electricity, they are susceptible to eddy currents.

The new metal is similar in appearance to ordinary gray cast iron and can be cast with the same facility and with the ordinary foundry equipment, although its shrinkage is $\frac{3}{16}$ in. per foot as compared with ⅛ in. per foot for ordinary cast iron. It compares very favorably with ordinary cast iron in machining.

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Association News & Discussions

Progress in West Virginia Railway Electrification*

By Stephen Q. Hayes
General Engineer Westinghouse Electric & Manufacturing Company

WEST VIRGINIA is one of the most important states of our country from a power development standpoint, and must be considered as a pivotal point around which will doubtless center a large part of the super-power system that may ultimately tie together all the Eastern and Southern sections of the United States.

The coal deposits of a single county of West Virginia if sold at $2.50 per ton would clear off the national debt of the United States. The water powers of West Virginia have been practically untouched, as the demand for power in the sections near such power sites has not warranted development. It most cases it has seemed more economical to generate the power by steam used in local power plants or in larger stations transmitting to the point of utilization. Later it may prove highly desirable to develop all possible water power so as to conserve the supply of coal, and to transmit power electrically from such water-power plants to points where it can be utilized advantageously.

The demand for West Virginia's coal for domestic and foreign use is such that anything that may be done to improve the coal-handling facilities of the important railways traversing the state is of vital importance to all users of coal. The Norfolk & Western Railway has already electrified its Elkhorn grade, relieving the congestion formerly existing at that point and greatly increasing the possibility of coal shipment over that railroad. The Virginian Railway is now arranging an extensive electrified section, while the Baltimore & Ohio and Chesapeake & Ohio railways are laying their plans for similar work.

The report of the Hoover super-power conference brings out the advantages to be gained by interconnection, and great economies in distribution through the interchange of loads between neighboring systems, securing a reduction of the amount of reserve equipment needed by having a better load factor. In the super-power survey made in the Northeastern States under the direction of W. S. Murray, it was calculated that the super-power systems proposed would conserve about 50,000,000 tons of coal per annum, with an annual saving of $500,000,000 at an additional capital outlay of $1,250,000,000.

Electrification of the railroads and a direct connection between them and the power resources available will be considered by the Giant Power Survey Board of Pennsylvania. One-third of the present railroad haulage in Pennsylvania is coal. By eliminating much of this low-grade freight the railroads will be free for other purposes.

The electrification of the Elkhorn grade on the Norfolk & Western Railway has now been in service for such a length of time that the benefits are fairly well known. The purpose of this substitution of electricity for steam was to increase the capacity of the railway line by materially reducing the time required to handle trains, and also to provide a more economical and efficient service over the heavy grades. With this end in view, the electric locomotives were designed to handle the heavy freight trains up the grade at a running speed of 14 m.p.h. as compared with about 7½ m.p.h. under steam operation.

Two Electrics Do the Work of Three Steam Locomotives

The coal trains formerly handled in this service weighed 3,500 tons and were hauled up the grade by three Mallet steam locomotives. Two of these, a road engine and a helper, were used over the entire division. The third engine located at the rear served as a pusher at the 1.5 per cent and 2 per cent grades, and was cut off at the summit. Now a single electric engine is used over the electric division, and a second electric engine is used as a pusher up the heavy grade. One electric engine, therefore, takes the place of two Mallets over the division; and two electric engines take the place of three Mallets up the grade. A 4,800-ton train has been hauled in this manner. The constant-speed feature of the locomotive is considered a decided advantage in dispatching traffic through the single-track tunnel.

In all cases, the electric locomotives handle the train at approximately double the speed obtained with steam. On the 9-mile grade between Cooper and Graham, where the maximum rise is 0.4 per cent, and some stretches are level, the speed of the electric locomotive is 28 m.p.h.

The electric installation was designed for handling a daily total of twenty eastbound trains of 65,000 tons over the division, and ample provision was made for additional traffic and extension of the electrified track when required.

A notable achievement on this electrified section was the handling of 90,000 tons eastbound over the Elkhorn grade and through the single track tunnel at the summit in a single day.

The increased train speed and reduction in road delays obtained with the electric locomotive have greatly increased the track capacity on the mountain grade section. The officials of the Norfolk & Western Railway have stated that the electrification approximately doubled the track capacity of the electrified section and that the capacity of their entire system has been materially increased due to the speeding up of traffic on the grade section.

Another notable railway electrification of vital interest to West Virginia is that of the Virginian Railway, which has been recognized as a leader in mass transportation. This railroad is today operating the heaviest trains in the world with the most powerful steam locomotives. It is handling approximately 7,000,000 tons of coal per year, but the potential capacity of the mines it serves is far in excess of this amount and extensive new mine developments are under way.

The initial electrification of this railway will extend from Mullens, W. Va., where the coal is collected from nearly all of the mines served, over the heavy grade section to Roanoke, Va. There is an equivalent 2 per cent grade for approximately 10 miles just east of the western terminus of the electrification. This hill section is double track, but the remainder of the line is single track. The electrification will cover a route distance of 132 miles, and the track mileage to be electrified is approximately 213.

Under the present plan of steam operation, trains of maximum weight of 5,500 tons are hauled from the Elmore yard to the top of the hill at Clark's Gap with two Mallet pusher engines of the 2-10+10-2 type and a road Mallet engine of the 2-8+8-2 type. The speed on the heaviest grade section is 6 to 7 m.p.h. From Clark's Gap to Princeton, this train is handled by the road locomotive. At Princeton, which is an engine terminal, trains of a maximum of 8,500 tons are made up and taken east to Roanoke with the same road engine and a helper out of the Princeton yard, and up the Allegheny mountains from Whitehorne to

*Abstract of a paper presented at the Charleston meeting of the West Virginia Public Utilities Association, Nov. 9, 1923.

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Merrimac. These Mallet pusher engines have a tractive power rating of 147,000 lb., operating compound, with a weight of 617,000 lb. on their drivers, and a total weight of engine and tender of 898,000 lb. The Mallets used as road engines have tractive power rating of 101,000 lb.

With the contemplated electric operation, trains of 6,000 tons will be handled from the Elmore yard to Clark's Gap with one road locomotive and one pusher, each being composed of three cabs or units. The speed will be 14 m.p.h. At Clark's Gap trains will be filled out to 9,000 tons, and the road locomotive will take this train all the way to Roanoke without a helper at a speed of either 14 or 28 m.p.h., depending on the grade and alignment conditions.

Each locomotive unit will weigh approximately 200 tons, and the weight per driving axle will be 75,000 lb. Each unit will have a continuous rating of 1,700 hp. at 14 m.p.h., and 2,000 hp. at 28 m.p.h. These electric locomotives are of the so-called split-phase type, similar to those used on the N. & W. Power is supplied from a single-phase trolley at a frequency of 25 cycles at either 11,000 or 22,000 volts.

Since the driving motors of these locomotives are of the induction type, the locomotive automatically becomes a generator and returns power to the trolley when the train tends to drive the motor above synchronous speed on descending grades. In this case, the speed rises slightly with load, but the total variation from maximum load motoring to maximum load generating is only about 10 per cent.

Turbo-Generating Station to Supply Power

Power for the Virginian electrification will be supplied from a steam turbo-generating station to be installed by the railway on the New River at Narrows. The initial capacity of this plant comprises four units, each with a maximum rating of 15,000 kw.

Two single-phase, 88,000-volt transmission lines carried on steel towers will supply outdoor transformer stations along the right-of-way, where the voltage will be stepped down for the trolley supply.

The initial power supply equipment will be sufficient for handling approximately double the present tonnage and sufficient for a maximum day traffic of 60 per cent in excess of the average corresponding to that figure.

Moreover, while three locomotive units will normally be coupled to form a service locomotive for handling 9,000-ton trains initially, the locomotives are so designed that four units may be coupled to handle 12,000-ton trains when the rolling stock is improved so that trains of that weight are feasible.

Power is to be supplied from a single-phase trolley at a frequency of 25 cycles and 11,000 volts. The locomotives and transformers and the distribution system are so designed that when trains of 12,000 tons are handled, the trolley voltage can be changed to 22,000 by making a simple change in the transformer connection.

As the Virginian Railway and the Norfolk & Western Railway parallel each other for a considerable distance on either side of the New River and are only a short distance apart at other portions of their lines, the use of the same general scheme of electrification on the two lines will permit the ready interchange of power between these systems in case of necessity and will allow each system to act essentially as spare capacity for the other.

There is a tie connection between the Appalachian Power Company and the Norfolk & Western Railroad through the frequency changer equipment at Switchback, and there may be a similar connection to the Virginian. The probable interconnection between the Appalachian Power Company and Virginian Power Company at Scarboro, and the future tie connection between the Virginian Power Company, the Kentucky-West Virginia Power Company and other power systems may ultimately lead to a general interconnection of the railway and power systems throughout West Virginia and the neighboring states.

In addition to the Norfolk & Western, and the Virginian Railway, the Baltimore & Ohio Railroad has been seriously considering electrification of certain portions of their lines in West Virginia. At present, the general limiting conditions for the B. & O. are not due to conditions on the railway lines as they now exist in West Virginia, but the terminal facilities at the ports on the Atlantic seacoast. Particular sections in West Virginia can be greatly improved by electrification.

In a somewhat similar manner, terminal facilities for the Chesapeake & Ohio Railway are possibly limiting features rather than their lines in West Virginia.

However, when the terminal facilities of the B. & O. and the C. & O. railroads at the seaboard have been increased it will then be advisable to increase their railway facilities.

West Virginians Hold Annual Convention

THE Public Utilities Association of West Virginia held its eighth annual convention in the Kanawha Hotel at Charleston, W. Va., on Nov. 9 and 10. A number of papers of particular interest to electric railway men were presented.

W. R. Power, general manager Ohio Valley Electric Railway, Huntington, W. Va., explained various methods of curtailing accidents caused by either mechanical or human errors. He urged every member to install every real safety device on machinery, as the cost would be but small compared to safety, and he urged that all see that the employees use the safety equipment provided for them.

Martin J. Insull, vice-president Middle West Utilities Company, Chicago, declared that the two most essential needs of the public utilities are favorable public opinion and finances to permit them to provide the public with the service it demands. Most Americans, he said, were in what might be classed as a commodity business, which turns its money over several times in the course of a year, while the public utilities turned their money over but once in five years. Thus talk of profits in utility business to a commodity man was something he couldn't really understand. Profits made him think of lower rates.

The speaker said this was because utilities are a natural monopoly. The monopoly, which sometimes puzzled the public, was an economic-born thing, he said. Builders couldn't afford to install two systems of gas, electric light and telephone. One was enough, and this creates the monopoly. To make this popular, companies must do more than provide the right kilowatt hours and legal service. The public naturally falls into ways of shopping around and is antagonistic to a monopoly, unless it was impressed with its benefits. This imposed a duty on the utility companies, Mr. Insull said.

Alexander Forward of the Virginia Corporation Commission, Richmond, Va., talked on "The Future of Public Regulation." He said he had yet to find a public utility problem of rates that could not be satisfactorily arbitrated on behalf of the public.

Stephen Q. Hayes, Westinghouse Electric & Manufacturing Company, read a paper on super-power development and railroad electrification which is abstracted elsewhere in this issue.

Other speakers included J. A. Morris, district manager American Railroad Association, Cincinnati, Ohio, on "Relation of Railroads to Utility Commissions"; W. B. Clarkson, general commercial superintendent of the C. & P. Telephone Company, Washington, D. C., "Gaining Support of the Public"; Harry Reid, president Interstate Public Service Company, Indianapolis, Ind., "Electric Interurban Possibilities," and John S. Bleeker, who explained publicity methods of the Indiana, Columbus & Eastern Railway.

The association elected the following officers: C. H. Brues, Wheeling, president; Mentor Hetzor, Moundsville, W. R. Power, Huntington, and J. E. Harsh, Charleston, vice-presidents; A. M. Hill, Charleston, treasurer, and Bliss McCrum, Charleston, secretary

Pennsylvania Street Railways Association

THE Pennsylvania Street Railways Association will hold a convention at the Penn-Harris Hotel in Harrisburg on Dec. 4.

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American Association News

Executive Committee

AN ENTHUSIASTIC meeting of the executive committee was held at association headquarters, New York, on Nov. 16. The members present were President Britton I. Budd and Executive Secretary Welsh, C. D. Emmons, W. H. Sawyer, R. P. Stevens, J. H. Pardee, J. N. Shannahan, C. E. Morgan, F. R. Coates, J. H. Hanna, C. L. Henry, L. S. Storrs, Paul Shoup, Gen. George H. Harries, A. W. Brady, C. R. Ellicott, M. B. Lambert for H. D. Shute, A. A. Hale, Barron Collier, C. S. Hawley, H. A. Johnson, J. K. Punderford, E. M. White and W. H. Hyland.

Mr. Pardee reported for the finance committee that the association's finances are in very satisfactory condition. A budget was recommended for 1924 and approved by the executive committee. This carried with it provisions for an increase in salaries of approximately 11 per cent for virtually the entire association headquarters staff, an increase in salary for the executive secretary, the renting of additional floor space. The committee also made recommendations as to the investment of certain surplus moneys. President Budd said that he had had the Bureau of Commercial Economics examine the conditions at headquarters, without expense to the association, and had received a report which spoke very highly of the efficiency of the personnel and the manner in which work was being conducted, but criticised severely the cramped office arrangement and lack of space for efficient operation. Mr. Budd said he thought it would be necessary for the association to move to some other building at the expiration of its present lease, with the idea in mind of setting up an office that would possibly serve as a model for railway men to come to.

Mr. Stevens reported for the committee appointed to nominate a new member of the executive committee to fill his unexpired term arising out of his election as vice-president. The committee recommended the appointment of Harry Reid, president Interstate Public Service Company, Indianapolis, and the executive committee approved. A motion was made and adopted that it was the sense of the executive committee that the election of a member of the executive committee to fill the unexpired term of another member should not be construed to prevent his re-election to fill one full term.

Mr. Storrs reported for the special sub-committee appointed to consider the association's relationship to the motor vehicle industry. The committee recommended that the executive committee accept the offer of the manager of the National Automobile Chamber of Commerce to organize a committee of that body to co-operate with the railway association for mutual benefit, and made the suggestion that a committee of the railway association confer with a similar committee of executives of the National Automobile Chamber of Commerce for the purpose of considering further the working out of the suggestions.

In regard to the invitation of the Society of Automotive Engineers to co-operate in the development of standards, it was recommended that this be referred to the railway engineering association with instructions to appoint a committee for that purpose. Other matters of co-operation were left for the consideration of the above joint committees to work out in conference. The executive committee adopted these recommendations.

President Budd added to the report of this sub-committee that it was his feeling that the bus manufacturers want the co-operation of the American Electric Railway Association. He said that there is a very strong feeling that the future great market for buses is going to be through the electric railways. In time the railways are going to dominate the situation. If the manufacturers generally realize that the great market for their product is the electric railway field and find that their output is going to be taken there, they will be inclined to co-operate with the association in fostering the use of buses in non-competitive services.

Mr. Shoup expressed the view that if the manufacturers are willing to co-operate, that is very good, but there is no evidence of it yet in California. He said that much of the difficulty there has been caused by the granting of extensive credit by bus manufacturers If they are willing to cease that sort of thing the railways will be glad to co-operate with them, but whether this is a fact is to be determined.

President Budd expressed the view that the association ought to have a continuing committee to study the whole bus situation and the best way of working out the railway problems jointly with the motor vehicle industry. The executive committee approved the appointment of such a committee and President Budd named the following members: L. S. Storrs, chairman; C. D. Emmons, F. R. Coates, Paul Shoup, A. W. Brady, J. G. Barry and M. B. Lambert.

Mid-Year Meeting at St. Louis March 4

Mr. Lambert, reporting for the special committee on date and location of the Mid-Year Meeting, recommended that St. Louis be selected as the place and Tuesday, March 4, as the date. He said that St. Louis has adequate hotel facilities, is near the geographic center of the railway field, and the conditions in St. Louis are deserving of this honor more than any other city that has not recently been the center of an association meeting. The executive committee approved these recommendations.

President Budd requested authorization to appoint two new committees, one on city operation and one on interurban operation to cover in a comprehensive way, so that it may be disseminated to other member companies, information as to progressive operating methods and equipment, with the idea of speeding up the modernization program in the industry. A more elaborate description of the organization of these committees will be published next week.

Mr. Welsh reported that the American Committee on Electrolysis had recently met in Chicago to consider the advisability of renewing its work. The consensus of opinion was that the work should go on and a resolution was adopted authorizing Chairman Bion J. Arnold to communicate with each association having representation on the electrolysis committee and ask that it reaffirm the appointment of its representative and its intention to support the work financially. The executive committee approved the continued support of the A.E.R.A.

The executive committee discussed at some length the question of whether it should indorse the National Transportation Institute and encourage membership of electric railway companies in that organization. Bert M. Robinson of the Transportation Institute was invited to speak before the committee and he outlined its purposes and answered various questions. As there was insufficient time to give the matter full consideration and as it was realized that the proposed work is an extremely important one, action was deferred to a subsequent meeting and President Budd appointed a special committee consisting of P. H. Gadsden, C. D. Emmons, Paul Shoup, J. H. Hanna, F. R. Coates and W. H. Sawyer to give the matter further study and report back with a definite recommendation.

Mr. Emmons reported for the committee on the Charles A. Coffin prize, recommending that an award of merit be sent to each contestant whose brief contained one or more contributions of special value to the industry; that the committee give further consideration as to which companies should receive these awards of merit; that a letter of appreciation be sent to each of the seventeen companies which took part in the 1923 contest; and that the briefs be edited and prepared for possible publication in book form at the expense of the association. The executive committee approved all of these recommendations.

President Budd was authorized to appoint a special committee on arrangements for the Mid-Year Meeting.

President Hyland of the Claims Association requested approval, which was granted, to appoint a new committee of the claims association which would undertake to bring about uniform grade crossing laws.

The next meeting of the executive committee will be on Jan. 18 at association headquarters, New York, at 10 a.m.

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The News of the Industry

Los Angeles After Subways

Railroad Commission Holds Hearing on Projected Subway System of Pacific Electric Lines

The California Railroad Commission held a hearing in Los Angeles on Oct. 29 on the application of the Pacific Electric Railway for authority to construct a rapid transit subway in Los Angeles from its present Hill Street passenger terminal to Glendale Boulevard. The railway sought permission to proceed with its original plan to construct the subway as proposed to come to street grade at its Hill Street terminal.

The railway stated to the commission that it had expended $800,000 for rights-of-way and had the funds in hand to proceed at once with its original plan with the view of giving relief to the congestion on Hill and Sixth Streets in Los Angeles, and for the purpose of furnishing rapid transit service between Los Angeles and Hollywood, as well as San Fernando Valley points; that the subway would take 116 interurban trains a day off of Sixth Street alone; that the work could be started immediately of digging the bore and completed within eighteen months, should the commission see fit to act favorably on the company's application.

Difficulties Before City

As an alternative proposal the suggestion was made that the eastern terminus of the proposed subway might be diverted southward to Pershing Square. The company explained that the alternative proposal was submitted primarily to meet prevalent views that such a tunnel ultimately should become part of a general system of subways.

The city of Los Angeles in presenting its views to the commission indicated that many obstacles had to be removed before it could entertain further authorization of the terminus underneath Pershing Square. First, there were charter provisions to be met. In addition there were engineering problems to be overcome. It was outlined by the city's representative that Pershing Square would have to be excavated with steam shovels and then be remade, and if the requirements of the Park Department were met the station in the park would be 35 ft. below the street level.

It developed at the hearing that the board of engineers, representing the city of Los Angeles, the Los Angeles Traffic Commission, the Los Angeles Railway and the Pacific Electric Railway, had been unable to agree. This board was appointed thirty days ago to endeavor to bring about an agreement regarding a comprehensive subway system for the city of Los Angeles. In the absence of such an agreement it is evident most any plan will be favored that can be carried out at once.

It is stated that any comprehensive subway system would cost the city from $5,000,000 a mile upward with a total expense of $100,000,000 for from 20 to 40 miles of line.

Super-Power Plant for Davenport

A super-power plant generating at least 200,000 hp., for consumption in the Tri-Cities and for long-distance transmission, will be located on the banks of the Mississippi River 2 miles above Davenport. Formal announcement to this effect has been made by B. J. Denman, vice-president and general manager of the United Light & Railways Company.

Located along the right-of-way of the Clinton, Davenport & Muscatine Interurban Railway and also along the line of the Milwaukee road, the power site will be easy of access for coal deliveries. It will also have river wharfage in case coal barge transportation on the Mississippi from lower Illinois and Ohio River mines proves practical in the future.

The first section of the new plant will be 160 x 220 ft. in ground dimensions and 110 ft. in height, of concrete and steel construction with brick exterior. The initial capacity will be 35,000 hp.

The engineering and construction work will be done by the United Light & Railways Company construction forces, the completion of the power plant and dam at Iowa City and the new power house at Fort Dodge making it possible to concentrate construction equipment and forces on the new Tri-City plant.

New Public Service Plan Not Yet Ready

Statements are unofficial which were made in the daily newspapers of Nov. 12 and 13 indicating that the Public Service Railway contemplates putting sixty buses in operation at this time in northern New Jersey. As has been indicated before, the company has in preparation a new plan looking toward unified railway and bus operation in New Jersey, but it appeared unlikely on Nov. 14 that this plan would be ready to be announced for a week or ten days. Out of terms they thought might be included in the forthcoming statement by the company, the newspapers of Nov. 12 and 13 built up and published a story that had the appearance of having been obtained from official sources.

Subway Amendment Carries

Detroit Electors Approve Proposal to Permit Construction of Subway or Elevated Lines

Two charter amendments carried at the Nov. 6 election in the city of Detroit have an important bearing on the city's street railway system.

One amendment, called on the ballot the "Subway Amendment," allows the city to bond up to 4 per cent additional to all other purposes for the construction of a rapid transit system, either subway or elevated. The other amendment permits the Street Railway Commission to sell property and equipment no longer needed by the system, and requires that the proceeds from the sale of such property be reinvested in other equipment and capital assets, or that it be so applied as to reduce the street railway's bonded indebtedness. Property now held by the commission and regarded now as salable has an estimated value of $500,000.

The Subway Amendment, which required a 60 per cent favorable vote, was carried with a margin of 7 per cent. The other street railway measure was carried by a margin of 11 per cent.

Although called the "Subway Amendment," the measure which paves the way for rapid transit in accordance with the Culver-Wilcox bill passed by the Michigan State Legislature a year ago provides also that the city may own, operate and maintain an elevated railway. Under the terms of the amendment the city is authorized to proceed with plans for the construction of a rapid transit system and to finance construction by an issue of bonds for more than $80,000,000 at 4 per cent of the present valuation of approximately $2,100,000,000.

Power is conferred upon the city to make an initial appropriation to plan and fix routes; to make the city's annual assessment roll show in a separate column the assessment on any property because of the subway and the assessment on any property built and acquiring its assessable value because of the subway; to exercise the power of eminent domain if necessary for the purpose of the subway; to transport therein persons and property and to construct, own and maintain, with like powers, privileges and limitations, an elevated railway.

The Subway Amendment also provides for a board of three members called the subway board, appointed by the Mayor by and with the advice and consent of the City Council. The salary provided for the members of the board is not less than $10,000 a year each,

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until the work of constructing the subway is completed, after which the board's members shall serve without pay.

Mayor Frank E. Doremus was reelected. He received about 90 per cent of the votes cast for Mayor.

Service Changes and Jitney Regulation Recommended

John A. Beeler, reporting to the city of Houston, says that faster service, rerouting of several lines and a redistribution of cars will effect economies that will result in increasing the earnings of the Houston Electric Company. He says, however, that a complete solution of the transportation problems of Houston will be impossible so long as the jitneys are allowed to operate as at present.

The report is in two parts. One covers the details of the railway situation and the other deals with the jitney problem.

Some of the things which Beeler suggests are a few changes in present lines of the company, the adoption of all double truck one-man cars on all lines except the Liberty, the abolition of the present plan of making sixteen stops to a mile, the elimination of all unnecessary delays, more stringent regulations regarding transfers and the placing of men in the downtown districts to assist in loading and unloading passengers during the rush hours. He estimates these changes will increase the earnings to $602,000.

Mr. Beeler states in his report that he has made a careful survey of the railway situation from every angle and that the suggestions which the report contains will tend to reduce the operating cost and increase the desire of people to ride.

On jitneys, Mr. Beeler says:

> A plan successfully adopted by many regulatory bodies is to limit jitney service to territory where the railway service is inadequate and unsatisfactory.
>
> Among other things that are desirable in order to bring about better conditions are the following: A bond of at least $10,000 should be required of each jitney to cover personal injuries and other liabilities; loading should be limited to the seating capacity, and the matter of taxation should be equalized between the two systems.
>
> The jitneys in nearly every case operate along the railway routes in the old settled and comparatively close-in districts. They receive 6 cents for a single short haul ride, while the railway, which serves the outlying territory, receives an average of 6.45 cents for a much longer ride, and furnishes a free transfer if desired.
>
> The jitneys run 55 per cent faster than the street cars. Because of this saving in time the people will put up with intolerable crowding and take chances on personal injuries. The public demands rapid transportation and the railway will suffer as long as it cannot supply that demand.

Mr. Beeler says that the solution lies largely within the power of the railway. It must revamp its slow, halting service, eliminate the unnecessary stops and delays and reduce the waste in all the factors involving the time element.

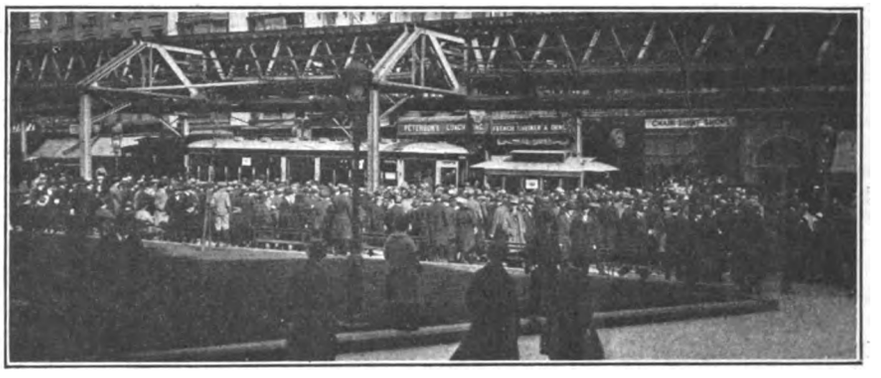
The report by Mr. Beeler was made in connection with the action by the company against the city to secure greater revenues.

Old and New Side by Side in Brooklyn

A half century's advance in street railway transportation in Brooklyn was pictured on Nov. 1, when the Brooklyn City Railroad placed on public view at Borough Hall a horse car of 1868 and one of its new front-entrance, center-exit, pay-as-you-pass cars, described in detail in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 27, page 739.

Following an inspection at the Fifty-eighth Street carhouse by Transit Commissioner LeRoy T. Harkness and other representatives of the Transit Commission, as well as by officers of the United Railways of Baltimore, the "Brooklyn," as the new car is known to the railway industry, was run to a siding at Borough Hall.

There it was joined by the old horse car, long since discarded, and manned by John Orleman of 170 Snyder Avenue, one of the few surviving drivers of horse cars in Greater New York.



Contrast in Cars Collects Crowds

Snyder, who recently retired with "a perfect record" after forty-seven and a half years of service, wore a part of the garb and used the same whip that was a part of his equipment when, after apprenticeship as a towboy, he worked as a driver on the Flatbush Avenue line.

The oil lamps of the car of the days following the Civil War contrasted strongly with the lurid front of the 1923 car. Between the vestibule windows and bumper of the latter the dash is painted a peacock blue, and, from the headlight as the center, there radiated a series of irregular streaks, producing a weird but striking effect. The new car, built for heavy city traffic, and designed from experience in Brooklyn surface transportation, is 44 ft. long over bumpers and seats fifty-three passengers. This is said to be the largest seating capacity yet attained in a car of this size. Two of the cars have already arrived and 200 of them will be in operation before 1924.

The old car was towed from its refuge in Fifty-eight Street to be exhibited with its modern companion, from 11 a.m. to 7 p.m. Many thousands of the Brooklynites viewed the spectacle before the veteran driver conducted his charge back to the carhouse that night.

The 200 new cars, part of a progressive betterment program being carried out by the Brooklyn City Railroad, represent an outlay of more than $3,000,000. They are painted red and are trimmed with yellow. Each car costs approximately $15,000. The cost of the old horse car which was shown in contrast to the new vehicle was about $650.

Railway Tangle in Monterey

Transportation facilities in the vicinity of Monterey and Pacific Grove, Cal., are at present in an unsatisfactory condition. The difficult situation in which the Monterey & Pacific Grove Railway finds itself dates back to July, 1922, when the City Council of Pacific Grove brought suit against the railway praying for the annulment of the franchise. Its complaint was based upon non-payment of franchise taxes amounting to $605 and the abandonment of a portion of line along Nineteenth Street to the Southern Pacific Depot, about half a mile, which could not be operated at a profit. Judgment was rendered in November, 1922, in favor of the city of Pacific Grove and the company's franchise was declared forfeited.

The railway continued to operate until Sept. 11, 1923, on which date the company was served with an injunction prohibiting the operation of cars within that city. Since Sept. 11 cars have been operating from the city line of Pacific Grove through the city of Monterey to Del Monte.

The city of Pacific Grove signified a willingness to grant a new franchise provided the railway would lay new ties and rails and pave the streets for a width of 9 ft. along its right-of-way. This the company declared it could not do owing to its unfavorable financial condition and the unfair requirement of paving.

Bus operation has also played a part in the controversy. At the time the city brought suit for annulment of the company's franchise there was a bus line operating between the two cities at a 10-cent fare. The bus line failed financially twice in fifteen months. The bus line is now operating at a 5-cent fare between the business district of Monterey and Pacific Grove, but it does not furnish local service to Del Monte.

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Renewal of Marietta Franchise Grants Approved

Residents of Marietta, at the election on Nov. 6, defeated the referendum petition prepared in opposition to the Monongahela-West Penn Public Service Corporation. As a result the company will continue its operations there and carry out the proposed improvements as soon as possible.

The City Council of Marietta recently passed three orders: One authorized the renewal of the interurban franchise held by the company, another renewed the franchise for railway operation in the city and another renewed the lighting franchise.

Action of the Council on these matters was questioned by some of the residents of the city and a petition was prepared for a referendum. It was this referendum which was defeated in the election. The civic clubs of Marietta were active in the campaign for the service of the company. The Rotary Club, Chamber of Commerce, Woman's Club, Kiwanis and Ad Clubs prepared advertising setting forth the probable condition of Marietta without the services offered by the company and stating the proposition which was made.

The company proposes not only to operate the railway system in the city, but to supplement this with bus service.

New York Central Seeks Electrification Details

Applications by the New York Central Railroad to the Public Service Commission for an order specifying detailed methods of electrification of its steam lines in New York City and to the Transit Commission for elimination of all its grade crossings under the general grade crossing law were made public on Nov. 11. The two applications, which were made necessary by the Kaufmann law requiring the electrification of all railroads in New York City, reopen the question of the relocation of the New York Central's tracks on the west side of Manhattan and the removal of the danger of tracks at grade on so-called "Death Avenue."

In its application to the Transit Commission the New York Central has asked that the expense of eliminating the grade crossings on its west side tracks, estimated at from $15,000,000 to $25,000,000, be borne one-half by the company, one-fourth by the city and one-fourth by the State, under the provisions of the general grade crossing law. By special laws, enacted in 1911 and 1917, the company is required to meet the expense of track relocation alone.

George McAneny, chairman of the Transit Commission, expressed doubt that the grades could be changed under the general statute in view of special legislation on the same subject, and said he did not believe that there would be any satisfactory solution of the west side problem or any of its phases until the railroad accepted the principle of the special acts and paid for an improvement from which it would derive great gain. Mr. McAneny said, however, that the Transit Commission would fix an early date for a hearing on the company's application and might unite with the Public Service Commission in a joint hearing.

The application of the New York Central to the Public Service Commission for an order specifying detailed methods of electrifying its steam lines in the city mentions as such lines its west side freight line from Spuyten Duyvil to St. John's Park and its Putnam Division. Freight trains on the Harlem Division also are operated by steam.

$500,000 a Year More for Chicago Trackmen

Union shop and track employees of the Chicago Surface Lines have been granted an increase in wages by the arbitration board, which settled the wage controversy that resulted in a strike during the summer.

The wage increases average 8 cents an hour for the 2,200 men involved. They mean an increase in the annual payroll of the railways of approximately $500,000.

The old and the new wages of craftsmen who will benefit by the increase follow:

	Old	New
Wreck wagon drivers (horse)	$5 a day	$5.80 a day
Wreck wagon drivers (motor)	$5.20 a day	$6 a day
Carpenters, per hour	54 to 81 cents	64 to 91 cents
Painters	75 to 83 cents	85 to 93 cents
Electricians	90 cents	$1 an hour
Linemen	$1.10	$1.20
Blacksmiths	87 to 92 cents	97 to $1.02
Armature winders	90 cents	$1
Machinists	83 to 95 cents	93 to $1.05
Sheet metal workers	85 to 90 cents	95 to $1
Track dep't foremen	67 cents	73 cents
Pavers	62 cents	68 cents
Track dep't laborers	54 cents	60 cents
Watchmen	39½ cents	45½ cents
Moulders	81¼ cents	91¼ cents

The new wage agreement is for one year and is retroactive to Aug. 1, 1923. This is the second wage increase given employees of the Chicago Surface Lines this year, 13,000 trainmen and other employees receiving a 3 cents an hour increase after an arbitration hearing early in the summer.

Sum Appropriated for Engineering Education

The Carnegie Corporation of New York made an appropriation of $108,000 recently for the study of engineering education to be conducted by a director responsible to a committee of the Society for the Promotion of Engineering Education. The resolution adopted by the corporation sets aside for the purpose $24,000 during the present fiscal year and $12,000 during the fiscal year 1924. W. E. Wickenden has been chosen to conduct this work. Mr. Wickenden is assistant vice-president of the American Telephone & Telegraph Company. From 1909 to 1914 he was assistant professor of electrical engineering at the Massachusetts Institute of Technology and associate professor until 1918.

Public Utility Study Courses Expanded

The Institute for Research at Madison, Wis., in co-operation with Wisconsin University, proposes to expand the study of public utilities so as to put more emphasis on research and individual instructive work.

The proposed program, Prof. Martin G. Glaeser of the Institute staff explains, has a threefold emphasis: A general liberal education; selection of courses which will provide training in method; acquaintance of student with the historical, legal, economic and factual background of the field. Professor Glaeser contends that instruction representing greater detail tends in the direction of the vocationalism and should, therefore, be discouraged. He said:

> Special courses in transportation have long been an integral part of the graduate and undergraduate instruction in economics at the University of Wisconsin. Coincident with the beginning of state regulation by commissions in 1905, the work was expanded to include instruction in the field of the local public utilities.
>
> Within the field of public utilities, opportunity can be given for a comprehensive survey course in the history and regulation of public utilities. This should include the local utilities along with railroads and national utilities generally in order to economize time and be available for those who have no interest in the work beyond its "public interest" features. This can then be followed with special courses in the administration of local utilities and railroads.

Burden of Rhode Island Wage Demand $3,000,000

An increase of $3,045,689 a year in operating costs of the United Electric Railways, Providence, will result, according to an estimate by the company, if the wage advance asked by the men is granted

The additional operating expense, according to the company's statement, would necessitate a 12-cent fare, or eleven tokens for $1, for transportation in the present zones.

Among the increases asked were the following:

> Motormen and conductors from 58 cents an hour to 80 cents an hour.
>
> Brakemen from 49.6 cents an hour to 65 cents an hour.
>
> Trolley tenders from 28.7 cents an hour to 40 cents an hour.
>
> Warehouse men from 49.6 cents an hour to 60 cents an hour.
>
> Receiving clerks from 49.6 cents an hour to 65 cents an hour.
>
> Cashiers from $28.75 a week to $40 a week.
>
> Bill clerks from $26.75 a week to $35 a week.

An offer to arbitrate the new working agreement submitted by its employees has been made by the company to the union officials. The proposal was that the present agreement which expired at midnight Oct. 31, be continued until the arbitration board had considered the matter as presented by both sides and had then submitted its findings on the terms of the new proposal.

As was reported in the ELECTRIC RAILWAY JOURNAL, issue of Nov 10, the men are opposed to arbitration, but have renewed their request for a conference on their recently submitted draft agreement including a wage increase and the closed shop.

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News Notes

Thirty-three Years Without Accident.—John Donahue, motorman, and John Murphy, conductor, of Peoria, Ill., are charter members in the "Safe Drivers Club." They have a record of thirty-three years as a railway crew without an accident of any kind. Since 1890 they have covered more than 1,250,000 miles together. They are known as the original "Safe Drivers."

Wins Paving Suit.—The city of New York has won its paving suit against the Union Railway by a decision of the Appellate Division of the Supreme Court, which rules that the company was not exempt from provisions of the law requiring street railways to keep in repair not only the space between the rails of each track, but the space between the tracks and for 2 ft. on the outside of each track. The result will be that the company will have to pay the city the cost of paving its entire roadbed area, which will amount to more than $100,000 a year above the amount conceded by the company. The suit heard by the court involved a claim of only $395 for work done on Melrose Avenue.

Examination Date Announced.—The United States Civil Service Commission will hold an examination on Dec. 5 to fill vacancies in the Bureau of Standards. The optional subjects for junior engineers include civil, electrical, mechanical and radio engineering.

Only Electric Trains in Tunnel.—R. H. Keays, chief engineer of the Moffat tunnel, which is to be a little more than 6 miles long, at a recent address before the Denver, Col., Civic and Commercial Association, explained that only electrically operated trains would use the Moffat tunnel and in consequence there would be no need for artificial ventilation. The work on the tunnel is going right along, both portals having been bored so far in that the winter snows will not interfere with further progress.

"At Your Service" Gives Facts.—The Virginia Railway & Power Company, Richmond, Va., has been running advertisements in the form of a bulletin in the *Times-Dispatch*, entitled "At Your Service." Bulletin No. 2 gives some facts with regard to the operation of the trolley in Richmond during September.

A "Make-Up" for the Ladies.—Every now and then the "Public Service News" published by the Winnipeg Electric Railway, will set aside an issue specially for ladies. The company says in the first number devoted to women patrons that it has endeavored to get a "make-up" as neat and as dainty as the sex to which it is addressed. A patron suggested the plan because from his observation the women were the worst offenders against speeding up service, etc. The Winnipeg Electric Railway declares that it does not share this view, but rather thinks the women observant of principles upon which good service is built.

Honor Men Listed.—Appreciation of long and faithful service given by ten veteran employees of the Indiana Service Corporation on the city lines of Fort Wayne is expressed by officials of the company through the formation of a "Personal Service Honor Roll." The ten men have service records ranging from twenty-five to more than fifty years and all are still in the service of the company. Cards bearing the names of these employees have been placed in all the city cars, under the caption "Personal Service Honor Roll." Four of the men were in the service of the company in the days of the old horse cars.

One Day off Without Pay.—Employees of the Seattle Municipal Railway lines will have one day off in eight, under a bill introduced in the City Council by Chairman E. L. Blaine of the finance committee. The bill calls on Superintendent D. W. Henderson to rearrange schedules to permit the day off without pay. This policy was agreed on by the budget committee two months ago.

Mountain Division Electrification Report Renewed.—From official sources it is learned that there is nothing new in the report from Pittsburgh to the effect that while no final plans have been adopted for the running of Pennsylvania trains by electricity in the mountains from the Conemaugh section to Altoona, it has reached the point of a definite intention to electrify parts of the Allegheny Mountain lines on both sides of the watershed, which begins at either Galitzin or Cresson.

Tells Its Own Story.—The Vicksburg Light & Traction Company, together with other utilities, is getting out some joint publicity on the things it is doing and for what it stands in the development of the city of Vicksburg, Miss. The railway is a member of the Louisiana-Mississippi Committee on Public Utility Information and suggests that patrons keep in touch with the committee if they want information about their railway property.

Reprints Into Book Form. — The North American Company, New York, N. Y., has put into book form various articles reprinted from the *Wall Street Journal* relating to that company's activities. The pamphlet is called "An Unusual Record of Achievement." It tells all about the company's earning power, expansion, etc.

Will Call Election.—Mayor McInich of St. Joseph, Mo., will call a special election to submit the proposed railway contract for furnishing electric current to the city for lighting purposes as soon as he receives a report from the State Public Service Commission that the form of the contract, which was contained in an ordinance passed by the Council, is approved. No bond issue is involved in the proposed election. The question will be merely whether or not the city will enter into a contract for electric current with the railway at a cost of 1.8 cent per kilowatt-hour for the first 500,000 kw., and 1 cent for all over that amount.

What Houston Is Doing.—How it served its patrons in 1891, 1901 and 1923 was shown by the Houston Electric Company in a recent advertisement in the Houston *Post* entitled "That Houston May Fulfill Her Destiny." Accompanying the pictures the company tells something of its accomplishments and aspirations. It states that from July 31, 1920, through July 31, 1923, the company spent about $7,000,000 in the extension, improvement and operation of the railway system.

One-Man Car Service Discontinued.—The Tacoma Railway & Power Company has discontinued its one-man car operated to Clover Park from Lake City, connecting with the American Lake line. The district is now served by a motor bus, operated by the City Transportation Company. Fare on the new bus line will be 35 cents one way, with a 25-cent rate to the Lakeside Club. Cars on the south side to Murray will continue as usual.

Ford Gives Another Loan.—The Ford Motor Company has again come to the aid of the city of Detroit by recently agreeing to advance another $2,000,000 to take care of electric railway extensions and to enable the city to meet payments on sewer work already contracted for. The recent loan brings the city's debt to the Ford company up to $5,000,000.

Names New Director of Bureau.—The Illinois Committee on Public Utility Information has announced the appointment of Keith Spade as director of its department of public speaking, known as the Public Service Speakers' Bureau.

Better Health Among Employees.—At a meeting of the board of directors of the United Railways, St. Louis, it was brought out that there was a great improvement in the general physical condition of members of the Employees' Mutual Benefit Association. Colonel Perkins remarked that the increased care of the fellow men was beginning to bear good fruit. For a period of sixty days recently there were no deaths reported.

Chair in Transportation Endowed.—Senator William B. McKinley, chairman of the board of the Illinois Power & Light Corporation, Chicago, Ill., has presented to the University of Illinois securities yielding $7,000 a year for the endowment of a chair in the economics of transportation.

Transit Plan Coming.—The Rapid Transit Commission at Detroit is making plans for the development of a financial and legislative program intended to further the rapid transit project. It has been announced that the commission hopes to develop a plan to finance a rapid transit system that will not be dependent for its success on the ability of the city to borrow within its present debt limits.

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Financial and Corporate

Independent Receiver Sought

Holders of St. Louis & Suburban Bonds Want Road Separated from United Railways

Appointment of an independent receiver for the St. Louis & Suburban lines and segregation of those lines from the United Railways system of St. Louis are demanded by the foreclosure suit filed in the Federal court during the week ended Nov. 10 by holders of Suburban bonds on which default has occurred.

A separate valuation of the Suburban properties is demanded to determine among other things, whether the present rate of fare is too high or too low. In demanding an independent receiver the petition states that Rolla Wells, the receiver of the United Railways, is not qualified to act in that capacity for the Suburban, as he represents interests that conflict with those of the Suburban claimants.

The bondholders' committee, members of which appear as plaintiffs in the foreclosure suit, professes to represent about 80 per cent of the holdings of the $4,500,000 issue of general 5 per cent bonds of the Suburban, which matured on April 1 last, and have not been paid. Marion C. Early and Sam B. Jeffries appear as counsel for the petitioners.

The Mississippi Valley Trust Company, trustees under the Suburban general mortgage, heads the list of plaintiffs, and the individual plaintiffs, members of the bondholders' committee, are Herman C. Stifel, A. C. F. Meyer, J. L. Johnston, John G. Longmire, Craig McQuade and A. H. Reller.

The defendants named are the St. Louis & Suburban Railway, United Railways, St. Louis & Meramec River Railroad, St. Louis Trust Company, St. Louis Transit Company, Mercantile Trust Company, trustee, American Loan & Trust Company, Boston, and Rolla Wells, receiver of the United Railways.

The Suburban lines and those of the St. Louis & Meramec River Company, which are involved with them in the present proceedings, are the present Hodiamont, Sarah and Union lines of the United Railways, that part of the Manchester lines west of Sarah Street, and the Maplewood-Meramec, Kirkwood-Ferguson and Florissant lines in St. Louis County.

These lines, the petition states, form 15 per cent of the United Railways system, and furnish more than 15 per cent of its revenue, while their bonded indebtedness is less than 12 per cent of that of the entire system. The Suburban and Meramec lines were absorbed Dec. 31, 1906, by the United Railways, which thus obtained a complete monopoly of railway transportation in the city and St. Louis County.

The petitioners allege that in 1917 the United Railways charged $638,279 against depreciation reserve on account of two power plants of the Suburban which were closed without rendering any account of the proceeds of their disposition. This amount, it is alleged, was less than the Suburban lines' share of the United Railways depreciation reserve for that period. The petitioners say this reserve should have been at least $850,000, and the court is asked to order Receiver Wells to pay that sum, or a sum fixed by investigation, to the new receiver.

It is charged that the United Railways has operated the Suburban property to the profit of the entire system, rather than to that of the Suburban lines, and that this has been detrimental to the interest of the Suburban bondholders. A separate valuation was asked three times, the petition states, but was opposed by the company and the receiver.

The petition says the Suburban lines are capable of being administered independently of the United Railways, and for that purpose, it asks that Receiver Wells be ordered by the court to turn over to the Suburban the rolling stock and other equipment which it will need, and to furnish the needed power at cost. This can be done, it is stated, without detriment to the United Railways system.

Sam B. Jeffries, attorney for the Suburban group, gave out this statement:

> We have a mortgage on the best producing portion of the United Railways. Our interest on the mortgage is unpaid, and we are asking for our property, so that we can make it produce for us.
>
> The old Suburban lines were the biggest of the lines that went into the United Railways, and had the greatest potentialities. For instance, the Broadway, the Olive and the Cass lines served a community whose needs were already known. But the Suburban lines served growing communities—Florissant, Ferguson, Maplewood, Webster Groves, Kirkwood and the like—all needing development of the car service.
>
> The report of James E. Allison & Company, consulting engineers, shows that while the underlying bonds and mortgage total only $6,500,000, the minimum value of the physical properties is $7,500,000. We have a mortgage on a real paying property, and we want our money, or a chance to get it.

Receiver Will Show Railway's Worth.—The Norwalk-Shelby traction line, placed in the hands of a receiver on Nov. 3, will have a chance to prove its worth, according to Receiver E. G. Martin. Freight-carrying equipment will be added to the line and arrangements have been made with the Ohio State Power Company, Tiffin, to continue to deliver electricity to the power customers of the company by way of Plymouth.

Net Up $93,802

Third Avenue Railway, New York, Reports Gain for Year Ended June 30

For the fiscal year ended June 30, 1923, the operating revenue of the Third Avenue Railway System, New York, was $14,406,784, an increase of $265,371, or 1.88 per cent, as compared with the fiscal year ended June 30, 1922. The operating expense for the year ended June 30, 1923, was $10,726,984, an increase of $171,957, or 1.63 per cent, as compared with the previous year. The net income for the year recently ended was $301,276, an increase of $93,802 over the previous year.

The property earned during the fiscal year a fraction more than 6 per cent on the 5 per cent adjustment bonds and the directors authorized two interest payments of 3 per cent each, making 6 per cent for the year. Five per cent was for the current interest and 1 per cent a payment upon the accumulated interest on these bonds. There remains as interest still unpaid upon these adjustment bonds 20¼ per cent.

Slaughter W. Huff, president of the company, explains that there has been some misunderstanding as to the amount that is available for payment of accumulated interest on these bonds, due to the fact that all the company's cash or its equivalent in securities has been carried heretofore in the current assets account without reference to the amounts that were due to depreciation and contingencies and other reserve accounts. With the report for the year recently ended there was submitted a balance sheet which shows cash or securities to the amount of the depreciation and contingencies account so set apart that current assets the company has available for general purposes may be readily distinguished. Mr. Huff says it will be seen that these assets are not more than are necessary for the safe operation of the companies and the protection of the stockholders' interest in the property. He says

> Your directors believe that sufficient cash or its equivalent should be kept available at all time for the purposes of the company, and that the surplus that has been already created should be maintained for the protection of the property. They have, however, paid out in interest on the adjustment bonds, approximately all that has been earned during the last two years, 5 per cent being paid last year and 6 per cent this year.
>
> After the reorganization of the Third Avenue Railway in 1912, 20 per cent of the gross receipts of the companies of the system was set aside for maintenance of the property, depreciation and contingencies. Under the low costs of labor and material prevailing prior to the war, this provided for the maintenance of the property and created a depreciation and contingency fund, which was invested in the securities of the company as follows: $2,022,498 Third Avenue Railway first refunding 4 per cent bonds. $254,388.97 Third Avenue Railway 5 per cent adjustment bonds.
>
> With the high cost of labor and material prevailing during the war and since, it was necessary to increase this percentage of gross receipts for maintenance, depreciation and contingencies from 20 per cent to 25 per cent, and during a portion of the time it required the entire 25 per cent to maintain the property or to take care of deferred maintenance, but there have been

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CONSOLIDATED STATEMENT OF INCOME OF THIRD AVENUE RAILWAY SYSTEM FOR YEARS ENDED JUNE 30, 1923 AND 1922

	1923	1922
Operating Revenue:		
Transportation	$14,008,416	$13,783,349
Advertising	150,000	121,755
Rent of tracks and terminals	26,005	26,868
Rent of buildings and other property	174,695	196,746
Rent of equipment	34,551	.....
Sale of power	13,117	12,694
Total operating revenue	$14,406,784	$14,141,412
Operating Expenses:		
Maintenance of way and structures	$1,425,233	$1,667,318
Maintenance of equipment	1,334,189	1,211,766
Depreciation accruals	733,347	597,177
Power supply	1,223,968	1,119,464
Operation of cars	4,574,373	4,492,966
Injuries to persons and property—expended	1,074,590	867,078
Injuries to persons and property—reserved	*203,513	63,890
General and miscellaneous expenses	564,794	535,367
Total operating expenses	$10,726,984	$10,555,026
Net operating revenue	$3,679,800	$3,586,386
Taxes	968,044	964,969
Operating income	$2,711,756	$2,621,417
Interest revenue	287,348	261,537
Gross income	$2,999,104	$2,882,954
Deductions from Gross Income:		
Interest on first mortgage bonds	$548,080	$548,080
Interest on first refunding mortgage bonds	879,620	879,620
Interest on adjustment mortgage bonds	1,126,800	1,126,800
Track and terminal privileges	14,524	14,766
Miscellaneous rent deductions	7,782	9,793
Amortization of debt discount and expense	21,315	20,782
Amortization of limited franchises	10,904	8,670
Sinking fund accruals	33,480	33,480
Miscellaneous	55,324	33,485
Total deductions	$2,697,829	$2,675,479
Net income	$301,275	$207,475

* Deficit.

periods in which a substantial part of the 25 per cent went into the depreciation and contingency account. During the past year, about $750,000 passed into that account, partly due to the fact that it was difficult to secure sufficient labor to carry on the maintenance work, and partly to the fact that it was not believed to be economical to perform under present costs maintenance work that might be deferred to a more favorable time for the purchase of material and employment of labor, and when the money could be expended more economically for maintenance work.

It is important that a depreciation and contingency fund be created and that actual cash or its equivalent be set aside to cover this account, not only because of the necessity for actually purchasing from time to time additional equipment to replace that which has worn out or become obsolete, but because it would seem particularly desirable to have a cash fund available from which to borrow, in order to cover the actual cash expenditures that have to be made under capital account.

So long as accumulated interest on the adjustment bonds remains unpaid, the company is not permitted to acquire or construct additional lines, for which additional capital might have to be issued. It is necessary, however, in order to operate lines already owned or controlled, that from time to time expenditures should be made on account of additions to capital. Under the present conditions, these expenditures must of necessity be taken care of out of the surplus of the companies, or borrowed from its depreciation and contingencies fund.

The increased actual physical property of the companies, upon which they are entitled to increase their capitalization, is an offset against the depreciation of the property that has already taken place, or is to take place, and it is perfectly legitimate to borrow from the depreciation and contingency account, in order to meet the requirements of the capitalization account. It would seem under present conditions that this would be a wise procedure and for the best interests of the security holders of the companies.

At any time that conditions might be favorable, additional securities can be issued for the capital account, and the depreciation and contingency account reimbursed for the funds borrowed from it, while for the present the properties are saved the great sacrifice that would result from an effort to market securities under present conditions.

If the issuance of additional securities can be avoided, with the increase of gross receipts that must result from the growth of the territory of the companies, the financial position of the company should be greatly strengthened, regardless of any temporary setbacks that may come due either to increases in the cost of labor and material, or to the temporary loss of receipts.

Northern Massachusetts May Suspend in December

By a decree of Judge Charles DeCourcy of the Massachusetts Supreme Court, set forth at a hearing in Boston on Nov. 9, service on the Northern Massachusetts Street Railway may cease on Dec. 31 next, either on the whole of the property or upon such portion or portions as the receiver, Daniel P. Abercrombie, shall deem wise, with the written consent of trustees under the mortgages.

The course authorized on the Connecticut Valley system, controlled by the same interests and having the same receiver, was left to be determined at a continued hearing on Nov. 16. The probability is that some of these lines will cease operation on Dec. 31 and that all of them will stop by March 31, unless sales are made enabling some of the lines to be run by other interests.

In the case of the Connecticut Valley lines, which serve Greenfield, Northampton, Deerfield, Turners Falls, Amherst and other points, sale by foreclosure has been generally agreed upon as most desirable. Provisions for immediate needs of the Northern Massachusetts are covered in the court decree, which authorizes the borrowing of $15,000 on receiver's certificates and the renewal of $25,000 in outstanding certificates.

Revaluation of Rochester Lines Sought

The city of Rochester has opened proceedings for the review of the valuation of the Rochester lines of the New York State Railways under the service-at-cost contract with the service of summons and complaint upon the railway. The city sets forth that the valuation of $19,216,000, fixed by the appraisal under the contract, is excessive and predicated upon war-time values.

This action, it is expected, will be tried before the December equity term of the Supreme Court.

President Hamilton of the New York State Railways maintains that the revaluation will show the lines to be worth in excess of the figures set by the appraisal, under which the revenues are now determined.

Purchase of Seattle & Rainier Valley Property Discussed

Possibility of ultimate purchase of the Seattle & Rainier Valley Railway system by the city of Seattle to put Rainier Valley residents on a parity with the rest of the city in fares was discussed informally recently when John C. Higgins, counsel for the company, appeared before the City Council street committee to ask that body to recommend repeal of an ordinance passed recently requiring the company to pave its right of way in Rainier Avenue between Graham and Morgan Streets. The company has pending before the franchise committee of the Council a request for relief from its franchise obligations to pay the city a percentage of its gross revenue as a franchise tax and to carry policemen, firemen and city officials free on its lines. Mr. Higgins said if the company was relieved of these burdens, it would not be able to continue the recent fare adjustment, which put the Rainier Valley patrons on a parity with the Seattle Municipal Railway patrons. While Mr. Higgins suggested that the city might eventually buy the lines as the only means of assuring the same treatment for residents of the section as for other parts of the city, he made it clear that his informal suggestion was not an attempt to open negotiations with the city for merging the line with the Municipal Railway.

Large Payment Made at Montreal on Account of Accumulations

J. F. Saint-Cyr, chairman of the Montreal Tramways Commission, has sent a check for $303,745 to the city, covering city rentals for the quarter ended Oct. 1, amounting to $125,000, the balance to serve against the arrears. This is the first check forwarded covering the present fiscal year payments, the fiscal year of the company being from July 1 to the succeeding June 30. It is with only one exception the highest amount paid on this account since the present contract came into force on Feb. 9, 1918.

Paragraph 4, of Article 92, of this contract, dealing with city rentals, reads as follows:

> The city shall receive out of the gross revenues over and above all other amounts to which it may be entitled under this contract or otherwise the sum of $500,000 per annum during the continuation of this contract, payable quarterly.

During the period from Feb. 9, 1918, to Feb. 12, 1921, the company was unable to pay anything to the city on account of city rentals from its gross revenues, and the quarterly amount of $125,000 consequently grew into a considerable amount of arrears.

On Feb. 12, 1921, the gross revenues were such as to permit the sending of a check to the city for rentals amounting to $61,090. During the succeeding month another check was mailed on the same account, amounting to $170,985.

Four payments were made during 1922, as follows, Jan. 27, to the amount

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of $182,468; April 27, $195,915; Oct. 3, $260,748; Nov. 27, $318,720.

Four payments have now been made during 1923, as follows: Feb. 12, to the amount of $382,741; May 5, $106,656; August, $81,033; October, $303,745.

Total payments to date under the present contract on account of city rentals amount to $2,064,106. The total amount owing to the city on this account from the beginning of the contract to Oct. 1, 1923, was $2,817,694. The balance still owing to the city is therefore $753,587.

These payments on account of city rentals do not include sums paid to the city by the company for taxes and snow removal. During the fiscal year ended June 30, 1923, the company paid in taxes to the city the sum of $229,629, and in snow removal the sum of $190,-800. The latter is half of the total cost of snow removal in the city on the tracks. The amount of $889,151 was paid to the city during the 1922-1923 fiscal year for city rentals, this being 10.86 per cent of the gross revenues.

A Good Year for Aberdeen's Cars and Buses

Despite greater unemployment in Aberdeen, the report of William Forbes, general manager Tramways Department, shows that for the year ended May 31, 1923, the management gave more service and earned more net than in either of the two years preceding. The changes in the railway end compared with the year before were: Gross earnings up from £184,618 to £184,868; operating expenses down from £137,979 to £133,614; net, before interest, sinking fund, depreciation, renewals and special expenditure, up from £46,639 to £51,254; surplus down because of exceptional payments from £15,089 to £8,663. The motor bus division grew from £11,650 gross to £12,557. But operating expenses fell from £8,443 to £8,224, increasing the net before fixed charges from £3,207 to £4,033. After payment of interest, sinking fund and special expenditures, there was left a balance of £1,257 (compared with £771 the year before) for renewal and reserve accounts.

One-third of the railway division's surplus of £8,663 was, by ordinance, turned over to the fund called "Common Good and City Improvements."

The double-deck street cars standard in Aberdeen ran 2,399,742 car-miles for 41,142,504 passengers, giving a density of 17.14 passengers per car-mile. In the preceding year service was less liberal, as only 2,252,889 car-miles were run for 41,087,388 passengers, a density of 18.23 passengers per car-mile. Of course, these high density figures are caused by the zone-fare system. More than 30,238,000 persons rode at 1d. although the fare scale ranges from ¾d. to 3d. As the motor buses are single-deckers and in use on poorer routes, they do not show the same densities, although far higher than American bus routes of like characteristics. The bus routes carried 1,805,279 riders with 169,353 bus-miles, a density of 10.66, which compares as follows with the preceding year 1,646,672 riders, 157,807 bus-miles and 10.43 density.

Street car earnings averaged 18.37d. per car-mile from an average fare of 1.07d. and buses averaged 17.33d. per bus-mile from an average fare of 1.51d. Car operating expenses were 13.36d., leaving 5.12d. to overhead; bus operating expenses were 11.65d. and assigned interest and sinking fund charges 3.93d. per mile.

Ottawa Company Earning 7.74 per Cent Return

Figures on the earnings of Ottawa Electric Railway for the present year have been made public in connection with the negotiations between the company and the city of Ottawa for a straight 5-cent fare and extensions to the company's system. According to the *Canadian Financial Post* the figures indicate that for the first eight months of the present year the gross passenger revenue declined $40,069, as compared with the first eight months of 1922.

The compilation of the return on the company's plant investment indicates a yield of 7.74 per cent during 1922 obtained as follows:

Capital additions	$88,730.43
Allowance for engineering, etc.	9,760.34
Total annual additions	$98,490.77
Total investment at end of period	4,076,499.47
Less one-half capital additions	49,245.38
Average investment	$4,027,204.09
Working capital	80,000.00
Average investment and working capital	$4,107,204.09
Net return available 1922	317,826.01
Per cent return 1922	7.74

Income Lower—Passengers Increase in Louisville

During the nine months ended Sept. 30, 1923, the number of passengers carried on the Louisville Railway totaled 73,102,434. This represented an increase of nearly 5,000,000 over the corresponding period in 1922. The revenue derived from these patrons, however, was not so great as last year, due to a fare rate reduction through the sale of 6-cent tokens used by about 80 per cent of the passengers carried. The total revenue from transportation was $3,182,417, a decrease of $135,834 compared with the same period of last year. The decrease in operating revenue was offset by operating economies effected, which resulted in reduction of expenses for the nine months of 1923 by $46,416. Operation of all these factors has resulted for the first nine months of this year in a reduction of the barometer fund from $350,000 to $238,571, after the payment of all expenses, fixed charges and full accrual of dividends, as provided by the ordinance. It is expected that October operations will further reduce the amount of the fund by $10,000, according to a statement by President Barnes. He further stated that if the barometer fund could, by operating economy and by increased riding, be brought to the sum of $500,000, the fare would under the terms of the ordinance be reduced to 6 cents straight.

Long-Term Bonds Offered.—A syndicate headed by E. H. Rollins & Sons is offering at 98½ and interest to yield more than 6.10 per cent, $5,000,000 of the Illinois Power & Light Corporation first and refunding mortgage gold bonds, known as series "A," 6 per cent, thirty years. The bonds are dated April 2, 1923, and are due April 1, 1953. The bonds are secured by direct mortgage or collateral lien on properties appraised at a value substantially in excess of the total debt and are a direct first mortage or lien free of prior encumbrance on properties, including some of the most important power and light properties of the system.

New Director Elected.—Irving T. Bush has been elected a director of the Brooklyn City Railroad to fill a vacancy.

Property Sold.—The property of the Northwestern Electric Service Company, which operates a trolley and lighting service between Erie and Meadville, was recently sold to the Penn Public Service Corporation of Johnstown, Pa. Last May the Penn Public Service Corporation, acquired the stock of the Erie Lighting Company and the acquisition of the Northwestern stock is part of a far-reaching plan on the part of the Penn company to extend its power and lighting properties throughout the state of Pennsylvania from the Maryland line in the south to Erie in the north. Purchase of the Northwestern Electric stock was made through the Venango Public Service Corporation.

Five-Year Gold Notes Offered.—The Salt Lake & Utah Railroad has announced the offering of a new issue of $150,000 of five-year 7 per cent secured gold notes. The issue has been purchased by the Palmer Bond & Mortgage Company and E. H. Rollins & Sons. The notes, offered at 99 and interest to yield 7¼ per cent, are secured by deposit with a trustee of $200,000 of Salt Lake & Utah Railroad's 6 per cent first mortgage bonds. A feature of the notes is that they are convertible into first mortgage bonds prior to Oct. 1, 1925, at 89; thereafter the conversion price advances 1 per cent each year until maturity of the notes, Oct. 1, 1928. The proceeds of the notes are to be used by the railroad to cover the cost of additions and improvements along its line, chief among which are tracks and sidings at the new Columbia Steel Corporation's plant near Provo, Utah.

Payment Made.—The May 1, 1923, coupons pertaining to the Dayton, Springfield & Urbana Electric Railway's first mortgage 5 per cent thirty-year gold bonds due Nov. 1, 1928, were paid Nov. 1 last at their face amount, together with six per cent interest.

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Traffic and Transportation

Ten-Cent Fare Justified

Report of Engineers Confirms President's Statement that Davenport Company Must Have Relief

That the relief plan recently proposed to the City Council of Davenport by President B. J. Denman of the Tri-City Railway of Iowa is justified, including a 10-cent fare and a drastic rerouting plan, is the finding of an audit filed with the city on Nov. 8 by Burns & McDonnell, engineers.

The report bears out the arguments submitted by Mr. Denman when he told the City Council that unless some financial relief was granted his company it would be forced to discontinue transportation service. The engineers find the company is entitled to a 10-cent fare; that track abandonment and rerouting as demanded by the company are justified; that the company cannot take care of the depreciation of its property and pay a proper return under the present rates and operating expenses, and that charges made to operating cost are more than fair, the United Light & Railways Company, the holding concern, having been of decided service to the local company.

The investigator for Burns & McDonnell was R. L. Baldwin. Present valuation of the company's property in Davenport is $3,257,519, this figure being as of Aug. 31 last. The auditor's report substantiated figures used by Mr. Denman in his relief demands, he having used approximately the same valuation figure; in fact, basing his figure not on the company's own valuation estimate but on an extension of a previous valuation figure arrived at by Burns & McDonnell when employed by the city of Davenport in 1920.

The total revenue for the twelve months ended Aug. 31 was $754,106 and for 1922 $752,415. Operating expenses for the twelve months ended Aug. 31, 1923, are $600,603 and for 1922 $602,581.

The report allows the company 3¼ per cent for depreciation and 7 per cent for return on investment. This year the company has made only 4.72 per cent, according to the report. Last year it made 4.70 per cent. In 1917 a 7.70 per cent return is indicated. Since then the company has been unable to make both ends meet.

One-Man Cars Under Fire

Agitation has been renewed against the use of the one-man car in Massachusetts. Employees are circulating petitions which have for their purpose the doing away with these cars. If present indications are any criterion the prospect is that the question of the continued use of these vehicles will be a matter for legislation at the coming session. The legislation asked in the petitions now being circulated provides that one-man cars shall be forbidden, and that communities where they are operated may vote whether to apply the law to themselves. Platform men everywhere are making a talking point of the fact that the Public Utilities Commission overruled the efforts of the City Councils of Worcester, Cambridge and some other towns and cities to eliminate one-man cars.

Asked for an expression of opinion on the matter Clark V. Wood, president of the Springfield Street Railway, is reported to have said:

> The public may have to choose between one-man cars and no service, and the trolleymen may find they have killed the goose that lays their golden egg. If the companies cannot carry the costs of two-man cars, and are forbidden by law to operate one-man cars, there may not be any trolley jobs at all for the men.
>
> You cannot legislate against economic laws. On many lines the introduction of one-man cars enabled service to be maintained, when the costs of operation had endangered the continuance of service.

Posts Abolished in District of Columbia

Fixed posts to guard street car safety zones in the District of Columbia have been abolished by order of the Public Utilities Commission on the ground that they constitute a menace to vehicular traffic.

Four sets of these posts were installed in the business district of Washington as an experiment, two being on lines of the Washington Railway & Electric Company and two on lines of the Capital Traction Company. The system consisted of iron posts imbedded 2 ft. in concrete and standing 4 ft. above the street level, set 25 ft. apart to mark a street car loading station and protect passengers. The posts were painted white, with black stripes, for visibility and were marked by oil lanterns with red globes at night. They were removable so that the streets might be cleared for parades and similar uses.

A series of accidents resulting from motorists driving into the posts, mostly at night, caused public attention to be centered upon the experiment, which was tried for an experimental period at the direction of the Public Utilities Commission.

The order of the Utilities Commission directing removal of the posts, for which painted lines have been substituted, brought a protest from the Capital Traction Company on the ground that no hearing on the subject had been granted. The letter called attention to the fact that while removal of the posts might benefit motorists it left passengers exposed to the hazards of street traffic while attempting to board or leave cars.

2,700,000,000 Passengers a Year

456 Rides per Person per Year Is the Record in New York—Surface Lines Carry 40 per Cent

Nearly 2,700,000,000 revenue passengers were carried last year upon the surface, subway and elevated lines of New York City. This traffic was divided almost exactly, 60 per cent to the rapid transit groups—elevated and subway lines—and 40 per cent to the surface lines. The total traffic, 2,681,206,755, represents an increase of 90,893,027 passengers over 1922, each fare that was paid being computed as a passenger carried.

The rate of growth in the fiscal year 1923, however, was slightly less than last year, when nearly 8,000,000 more passengers were carried. The percentage of growth in 1923 was 3.51 per cent, as against 3.95 per cent in 1922. Whereas last year more than three-quarters of the increase was upon the surface lines, in the fiscal year 1923 the condition was almost exactly reversed, the rapid transit line increase being 72,122,104, as against 23,919,193 upon the surface lines.

The figures just quoted were compiled by the New York Transit Commission. They cover the fiscal year ended June 30 last. While the returns have not yet been fully checked, awaiting the final compilation of the figures from the annual reports of the companies, the ultimate figures will not show a variation of more than a few thousand passengers, at most, from the present calculations. The traffic upon steam railroad and omnibus lines is not included.

While the general traffic increase for the year was 3.51 per cent, the traffic has increased more than 30 per cent since the fiscal year 1919, in which year the 2,000,000,000 mark was passed for the first time. A part of the increase in traffic was due to the increase in the habit of riding by New Yorkers. To-day the average New Yorker takes ten times as many rides in a year as he did in 1860. In the latter year, the first of which there is any competent record, the average number of rides was 43. In 1923, based upon an estimated population of 5,875,996, each New Yorker rode 456 times. He rode 448 times in 1922 and 437 times in 1921.

Both the increase in the riding habit and the gross increase in the traffic are indicative of the need for new facilities as fast as they can be provided. Twenty years ago, a year before the first subway was opened, the billion mark in street railroad traffic was passed for the first time. Three years later traffic had grown 25 per cent, to a billion and a quarter. In the seventeen years since, the traffic has more than doubled. While rapid transit facilities have increased in capacity in that period by the building of new subways and the extending and third-tracking of the elevated railroads, the surface car track mileage

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STREET RAILWAY TRAFFIC IN NEW YORK CITY, 1921-1923

Number of Revenue Passengers (Cash Fares)

	Fiscal Year Ending June 30			Increase* of
	1921	1922	1923	1923 over 1922
Subway and Elevated Lines:				
Interborough—				
Subway	639,385,780	644,975,474	676,650,431	31,674,957
Elevated	374,293,051	348,517,216	348,524,700	7,484
B.R.T. elevated and subway	404,970,640	444,747,228	480,900,869	36,153,641
Hudson and Manhattan tubes	95,607,645	99,104,889	103,390,911	4,286,022
Total rapid transit	1,514,257,116	1,537,344,807	1,609,466,911	72,122,104
Street Surface Lines:				
By Boroughs—				
Manhattan	384,128,024	388,357,767	383,209,497	D5,148,270
Brooklyn	418,106,693	472,538,068	490,128,692	17,590,624
The Bronx	107,675,507	114,679,520	119,140,781	4,461,261
Queens (a)	51,944,034	58,826,451	59,852,694	1,826,243
Richmond	15,797,894	18,567,115	19,408,180	841,065
Total surface lines	977,652,062	1,052,968,921	1,071,739,844	23,919,193
Grand total	2,491,909,178	2,590,313,720	2,601,206,755	90,693,027
Population (b)	5,705,364	5,780,870	5,875,996	.....
Fares per capita	437	448	456	.....

(a) Exclusive of B.M.T. (b) Estimated on basis of one-tenth of decennial increase.
* Prefix D indicates decrease.

has tended to decrease steadily. As the commission has repeatedly pointed out, more rapid transit lines are urgently needed if adequate provision is to be made for the growth in traffic. With the growth in traffic has grown the length of ride, the latter being to a certain extent responsible for the former. Where people used to walk they now ride, because in most instances it is no longer possible to walk the distance between work and home. As the commission sees it surface cars and bus lines, while playing a highly important part in short-haul transportation and in feeder traffic, are becoming less and less a factor in the solution of the long-haul transportation problem.

The traffic upon the Hudson & Manhattan tubes, while largely a traffic into and out of New York rather than a traffic within the city, is nevertheless included in the gross figures. The following table shows the traffic of all the lines,—subway, elevated and surface,—operated in certain years, with the increases in each year, including figures of the Hudson tubes for the years in which those lines have been operated:

Year Ended June 30	Number of Revenue Passengers	Annual Increase
1903	1,000,767,483	61,777,519
1906	1,251,841,173	120,838,479
1910	1,531,262,914	128,845,272
1913	1,709,876,508	88,962,573
1916	1,898,735,615	91,102,889
1918	1,975,482,316	56,670,087
1919	2,079,944,297	104,461,981
1920	2,365,587,369	285,643,072
1921	2,491,909,178	126,321,809
1922	2,590,313,728	98,404,550
1923	2,681,206,755	90,893,027

One of the outstanding features in the traffic statistics of the year was the fact that the tremendous traffic loss was halted which began on the Manhattan elevated lines of the Interborough Company in 1921, and these lines showed a very slight gain, amounting to 7,484 passengers over last year. The total Interborough elevated figure, however, is still far below the 1921 figure, 1922 having shown a falling off of more than 25,750,000 elevated passengers from the previous year. In 1921 the Manhattan elevated carried about 374,500,000 passengers, while last year and this year the figure was about 348,500,000, the exact figure for this year being 348,524,700. The change in regard to the Interborough elevated traffic is generally presumed to be due to the campaign which that company made to build up this traffic, resulting in increased service and in the repainting of cars and stations a taxicab orange. The statistics show that just about the time this campaign started the loss in traffic which had been continuing into the current fiscal year, was halted, and there was a prompt gain.

Still another feature of the traffic year was the increase in riding upon the Interborough subway. During the fiscal year 1922 the gain upon the Interborough's underground system was only a little more than 5,500,000 passengers, losses being noted upon practically all parts of the system except upon the two main trunk lines through Manhattan. This year, however, the Interborough subway traffic was 676,650,431, a gain of 31,674,957. The Interborough traffic, therefore, was more than the whole traffic upon all lines in the city of New York thirty years ago.

Another outstanding feature of the report for the year was a falling off in trolley traffic in Manhattan of 5,148,270, as against a gain last year of 4,229,743. The exact cause of this change is not determinable, but it is probable that the elevated railroad traffic campaign drew a large number of riders from the surface cars, as with the growth of vehicular traffic in the street, the difficulty of maintaining trolley schedules is constantly increasing. The loss, however, in trolley traffic in Manhattan is a small figure when compared with the aggregate of this traffic, and does not mean any material falling off, being in fact larger than in any other recent years outside of 1921 and 1922, and higher than in any other period in the history of such railroad operation in Manhattan, with the exception of the four years 1913 to 1916, inclusive, which were the banner years of trolley operation in Manhattan, the figure of total traffic being for each of the four years well over 400,000,000.

The Brooklyn trolley gain for the year was 17,590,624 in a total traffic of 490,128,692. The figure of gain for the year previous, however, nearly 54,500,000, was abnormal, due to the splitting up of lines and the collection of added fares thereby, together with an abnormally low traffic, due to street car strikes in a part of the previous fiscal year. The Bronx, with a gain of 4,461,261 in a total trolley traffic of 119,140,781, shows a somewhat reduced rate of gain from the previous year. For the Borough of Queens, in a total trolley traffic of 59,852,694, there was shown a gain of 1,026,243, which was also less than last year, but appreciable. Trolley traffic in Richmond Borough, which showed a rather abnormal growth last year, in 1923 went back to its practically normal rate, with an increase of 841,065 in a total traffic of 19,408,180. The total traffic upon the rapid transit lines was 1,609,466,911, and on the surface railroad lines 1,071,759,844.

Estimated upon the basis of 340 average traffic days in the year,—account being taken of lighter traffic on holidays and Sundays,—the total increase in 1923 would mean that 267,000 more persons each day rode upon the subways, elevated and surface car lines of the city than rode upon a similar date in the year previous. As a matter of fact, however, the rate of increase is known to be far higher at the end of the year than at the beginning, and it has been estimated that about 2,500 more persons ride upon these lines on a particular day than rode upon the day previous. Using the same divisor of 340, the daily total traffic averaged last year 7,885,900 passengers; but again taking into consideration the fact that traffic is higher at the end of the year than at the beginning, the figure was probably well over 8,000,000 at the end of the fiscal year.

Despite the slight net gain for the whole Interborough elevated system, there was a net loss of traffic upon two of its principal lines, the Third Avenue and Sixth Avenue. However, where last year the loss upon the Third Avenue line was nearly 8,000,000, the drop this year was less than 150,000. On the Sixth Avenue line last year, which suffered a loss of 10,750,000 in traffic, the loss this year was about 1,100,000. The Second Avenue and Ninth Avenue lines which, together, last year lost 7,000,000 passengers, this year both showed a gain amounting to more than 1,250,000 passengers. On the Interborough's underground system, passengers carried on the Lexington Avenue trunk line were 202,600,000 in number, or 8,400,000 more than last year, while on the West Side trunk line, with 199,600,000 passengers, there was a gain of 12,200,000. With the exception of the West Farms branch, which lost about 400,000 passengers, and the stations in downtown Brooklyn, which dropped back about 275,000, practically all branches of the Interborough subway system showed gains. There was a gain of 5,000,000 passengers on the Jerome Avenue branch; of 2,500,000 on the Eastern Parkway branch, and of 1,600,000 on the Queensboro subway.

The Broadway subway of the B.-M. T.

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system continued to be one of the great traffic gainers. Last year it had a traffic of a little less than 109,000,000, and this year of 119,000,000, a gain of nearly 10,200,000. Other lines in the Brooklyn system which showed big gains were the Brighton and Fourth Avenue subway lines and the Lexington Avenue elevated, which each gained about 3,000,000 passengers; the Fulton Avenue elevated, which gained some 2,500,000 passengers; the West End line, with 2,000,000 passengers; the Culver, Sea Beach and Myrtle Avenue lines, with 1,000,000 passengers each, and the Canarsie and Fifth Avenue elevated lines, with 500,000 each.

The accompanying table shows the street railway traffic in New York for the three years 1921 to 1923, inclusive.

Ordinances Introduced to Prohibit Jitneys in Gadsden

An ordinance has been introduced before the City Council of Gadsden, Ala., designed to put the jitneys out of business. The ordinance prohibits the operation of the jitneys on streets over which electric railway cars are operated. If the jitneys cannot be operated over streets where car lines run the jitneys will be forced out of business. This ordinance will come up before the City Council for final passage on Dec. 1. Officials of the Alabama Power Company, which operates in Gadsden say the buses and the jitneys are getting so much of their business that the operation of the cars is unprofitable.

Alabama City and Attalla, two good-sized towns, are located within a few miles of Gadsden. These two towns are connected with Gadsden by street cars, buses and jitneys. Officials of both Attalla and Alabama City are discussing the probability of passing ordinances similar to the one now before the City Council of Gadsden. Should these ordinances be adopted it would prevent the operation of buses and jitneys on the paved highways entering these three cities.

Different Rates Sought in Pensacola

Jack G. Holtzclaw, receiver for the Pensacola Electric Company, has filed a petition with the Florida Railroad Commission asking for a readjustment of passenger and freight rates. The petition leaves the rate entirely to the commission to decide. In the petition Mr. Holtzclaw says that the railway loses on an average of $55 a year in fares on every privately owned automobile in its territory.

Vote Against One-Man Cars.—At a recent election in Dayton the people voted in favor of an ordinance requiring two men on every car. The Oakwood Street Railway, the Peoples Railway and the Dayton Street Railway have been running one-man cars.

Why the Trackless Trolley?

The trackless trolley is said to have made a hit. But why not the bus without the trolley poles and overhead wires?—Philadelphia "Evening Bulletin."

The trackless trolley is primarily the forerunner of extended trolley service and, by utilizing the electrical distribution system, can be operated by means of street car motors at a cost sufficiently lower than that of the gasoline motorbus of similar size closely to approximate the difference between the trackless trolley fare of 7 cents—four tickets for 25 cents—and the 10-cent fare which is necessary to support operation of the gasoline motorbus when supplying similar service.

—*Philadelphia Rapid Transit Co.*

Will Supplement Service with Buses.—Service given by the Jacksonville Traction Company will be supplemented by buses, according to a recent announcement of J. P. Ingle, general manager of the company. It is planned to replace the line on Oakland Street with buses as a start, and if this service proves successful similar service will be established in other sections not now served by the railway. For sometime the city has been seeking the extension of the railway line to the electric light plant and municipal docks, but the necessary cost would be prohibitive, according to Mr. Ingle. The regular 7-cent fare now in effect on the railway line will prevail on the buses and transfer privileges will remain as at present.

Winter Rates in Effect.—Winter rates on the Oregon Electric Railway, operating between Portland, Ore., and Willamette Valley points, became effective Nov. 12. Under the new tariff, which affects week-end and fifteen-day round trip tickets, the fare from Salem to Portland will be increased from $2 to $2.30, the fifteen-day ticket from $2 to $2.50, the week-end fare, Eugene to Portland, $5.30 instead of $4.90, and the fifteen-day rate $6 instead of $5.80.

No Jitneys in El Paso.—Following the opinion of Judge Stewart Berkshire of the Corporation Court declaring the jitney ordinance invalid because it did not specify both a maximum and minimum penalty for violation, the City Council under the emergency clause passed a new ordinance at the same time repealing the older one. After this ruling jitneys ceased to run. One jitney driver did operate but was arrested and fined. His case is now on appeal in the higher court. With this exception no jitneys have been run in El Paso since April 30 of this year. This brings up to date the status of the jitney situation, which was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 20, 1923, page 723.

Improved Service Provided.—J. M. Barry, division manager of the Alabama Power Company, recently submitted to Mayor Gunter of Montgomery a proposal for the rerouting of the Montgomery Street Railway system. The proposal includes transfer privileges between depot cars and other cars so that passengers could travel on the cars between the Union Station and all other parts of the city.

Will Consider Results of Referendum.—A post card referendum is to be started in Milwaukee. Post cards on the desirability of continuing motor bus service in the Eighteenth Ward will be sent to all owners of property on the streets where the buses of the Milwaukee Electric Railway & Light Company are operated. The results of the referendum will be placed before the Common Council for consideration.

Anti-Jitney Ordinance Before Court.—The case of E. C. Waid against the city of Fort Worth, Tex., on appeal before the Court of Civil Appeals, involving the validity of the anti-jitney ordinance enacted by the city of Fort Worth has been set for hearing before the court. This particular ordinance as passed makes it unlawful for jitneys and other vehicles carrying passengers for hire in opposition to the traction company to operate on certain specified streets, the specified streets being the downtown business district. Enforcement of the ordinance would put the jitneys in Fort Worth out of business.

Fare Reduction Sought.—A reduction in fares at Savannah, Ga., to 5 cents is being sought by the city. A resolution asking for the reduction has been adopted by the City Council, and the Mayor of Savannah will present it to officials of the Savannah Electric & Power Company. The present rate is 7 cents. If the company refuses voluntarily to grant the request, the resolution authorizes the Mayor of Savannah to appeal the matter to the Georgia Public Service Commission.

Hears Five-Cent Fare Claim.—The city of London, Ont., has questioned the right of the London Street Railway to charge the 5-cent fare that is now in effect. R. G. Ivey, vice-president of the company, recently appeared before the Provincial Cabinet to present the claim of his company. Adam Back and City Solicitor Meredith appeared before the Cabinet on behalf of the city.

More One-Man Cars in Use in New Jersey.—As a measure of economy the Public Service Railway, Newark, N. J., is extending the use of its one-man cars. In the Central division of the system one-man cars have been placed in operation on the Middlesex and South Amboy lines. Other lines which tried out the one-man type of cars recently were the West Hoboken line operating in Hoboken and West Hoboken; Pavonia line, in Jersey City, and the Clifton line, in Newark. The Bergen line in Newark has been using the one-man cars for several months.

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Personal Items

G. E. Departments Combine

Publication and Advertising Departments to Merge on Dec. 1 with M. P. Rice as Manager

The publication and advertising departments of the General Electric Company will be combined on Dec. 1, with Martin P. Rice, as manager of the publicity department, in charge.

Frank H. Gale, advertising manager, will on Dec. 1 become assistant to D. R. Bullen and manager of conventions and exhibits. Mr. Bullen was recently appointed assistant vice-president, and Mr. Gale will do important association work.

C. H. Lang, who has been assistant to Mr. Rice as manager of the publication department, will continue as assistant manager of the newly created publicity department, and T. J. McManis, who has been manager of the department of publicity for the Edison Lamp Works of the General Electric Company at Harrison, N. J., will also become an assistant manager of the new department.

In addition to the above announcement made by President Gerard Swope, an advertising council has been created, with the following members and with Director B. G. Tremaine, Vice-presidents J. R. Lovejoy, George F. Morrison and F. S. Terry and A. D. Page as ex officio members of this council: Chairman of the council, J. G. Barry; manager of publicity department, M. P. Rice; assistant manager of the publicity department, T. J. McManis; P. B. Zimmerman, George C. Osborne, L. P. Sawyer and G. P. Baldwin; advertising counsel, Bruce Barton, and secretary of the council, C. H. Lang.

Mr. Rice, the new publicity manager, has been in the employ of the General Electric Company for twenty-eight years. He was graduated from the University of Pennsylvania in the class of 1893 with the degree of bachelor of science, and then took a post-graduate course, receiving the degree of mechanical engineer.

Mr. Rice entered the service of the General Electric Company in 1895 in the drafting room. After nine months he was transferred to the engineering department, and when the X-ray was discovered was assigned to that new work. The publication bureau was organized in December, 1897, and he was made manager, a position he has since held. In this position he had supervision of all company printing, photographs, technical data and all general publicity for the company. In June, 1903, he established the *General Electric Review.*

In February, 1921, when the General Electric Company became interested in radio broadcasting, Mr. Rice was made director of radio broadcasting and in this position outlines the company's policy in this new field. He readily recognized that broadcasting should be more than a mere entertainment to be successful and that its programs should be educational and helpful to the public in the distribution of interesting news events of the day. The company is now building a second large radio station at Oakland, Cal., and has definitely announced plans for a third station to be built at Denver, Col., both of which will come under Mr. Rice's supervision.

Mr. Gale has been in charge of the space advertising of the company for the last seventeen years. As a member of the staff of Dana R. Bullen, assistant vice-president, he will assist Mr. Bullen in the manifold activities of his new work, and in particular will have charge of conventions and exhibits. He will have the title of manager of conventions and exhibits, and his field will be one with which his work has made him very familiar.

M. P. Rice

Mr. Gale entered the service of the Thomson-Houston Electric Company at Lynn, Mass., in 1890 as a draftsman. Later he served in the catalog department. With the formation of the General Electric Company in 1892, into which the Thomson-Houston Company was merged, his work took him to Schenectady, to the Schuyler plant at Middletown, Conn., to the Edison Lamp Works at Harrison, N. J., and to the Brush Works at Cleveland, Ohio, where he was also associated with the Short Electric Railway and the Sperry Electric Railway.

He returned to Schenectady in the spring of 1895, and in 1899 was transferred to the commercial department. In 1901 he had charge of the company's interests at the Pan-American Exposition at Buffalo, and since then has had supervision of such work at all exhibits and conventions, notably at the St. Louis and San Francisco world's fairs. He was awarded a gold medal at the San Francisco Exposition for the excellence of the design of the company's exhibit. Following the St. Louis Exposition he was placed in charge of the company's advertising in periodicals and later given the title of advertising manager.

A. V. Kipp, traffic manager of the Salt Lake & Utah Railroad, has been appointed assistant general freight agent of the Oregon Short Line. Mr. Kipp has been traffic manager of the Salt Lake & Utah Railroad since March 1, 1921. For six months prior he served as general freight and passenger agent for the road. He has been constantly connected with railroads of the West since he entered the service of the Union Pacific at Omaha in 1902 as telegraph operator. He consecutively became chief operator at the Omaha office, traffic agent for shipments in Wyoming, traveling freight agent with headquarters in Denver and contracting freight agent for Denver. During the war he had charge of the traffic department of the United States food administration for Colorado. Mr. Kipp's successor as traffic manager has not yet been named.

Don. C. Farra, for twelve years connected with the freight department of the Boston & Maine Railroad, has been appointed freight agent of the Springfield Terminal Railway Corporation, Springfield, Vt., owing to heavy freight movements over the Springfield-Charlestown, N. H., electric line.

Edward M. Raver has been appointed claim agent of the Chicago and West Towns Railway at Oak Park, Ill. For the past seven years he has served as supervisor of claims for the northern district of California, with the Union Automobile Insurance Company at San Francisco. He has been connected with the Fort Wayne & Northern Indiana Traction Company and as superintendent of transportation with the Michigan United Railways at Jackson and Battle Creek. For three years beginning in 1913 he was superintendent of transportation and claim agent with the Lincoln Traction Company of Lincoln, Neb.

Obituary

Edwin W. Olds, once prominent in the electric railway field, died recently in Long Beach, Cal., at the age of seventy-six. Early in 1911 Mr. Olds resigned as superintendent of rolling stock of the Milwaukee Electric Railway & Light Company and with that resignation severed his connection with the electric railway industry. He entered the service of the Milwaukee company in 1896. He was one of the organizers of the American Elecric Railway Engineering Association and had always been prominent in the councils of that body. He served as president of the association in 1903-04.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Fewer Electric Railway Repair Shops Employ More Men

The reduction in the number of electric railway car repair shops in the United States is an outstanding feature of a report recently published by the Department of Commerce. Whereas there were in 1919 some 624 such repair shops, there were only 560 two years later. In spite of the reduction in the number of shops, however, the number of workmen employed increased from 33,120 to 35,638. Their wages increased from about $39,000,000 in 1919 to more than $47,000,000 in 1921. The number of salaried employees, as shown in the table below, increased more than did the number of wage earners. In 1921 such employees numbered 2,359, as compared with only 1,847 in 1919.

This report shows also the distribution of the shops by states. Pennsylvania leads in the number of electric railway car repair shops with 70, Ohio is second with 65 and New York is third with 45. Illinois, with 42, is not far behind. In number of employees, however, New York is first with 5,799, Pennsylvania is second with 4,458 and Illinois third with 4,021. Ohio, which ranks second in number of establishments, ranks below California in number of employees. Wages have followed the same general trend as the number of employees, although Illinois, with fewer employees than Pennsylvania, nevertheless pays a considerably larger sum in wages.

American Couplers Going Abroad

During recent months the Ohio Brass Company has received a number of orders for Tomlinson standard automatic couplers for use in foreign countries. Cia. Metropolitano Alfonzo XIII, Madrid, Spain (the subway of Madrid), has purchased eighty-four coupler equipments. Companies in Australia have purchased coupler equipments for 150 cars. Both of these orders call for couplers comprising automatic electrical coupling as well. The railway in Haarlem, Holland, recently bought couplers for seventy-five cars, and 200 coupler equipments were ordered from Rio de Janeiro. Japanese companies have ordered 120 couplers.

State	No. of Establishments	Total Persons Employed	No. Salaried Employees	Wage Earners, Average Number	Salaries	Wages	Paid for Contract Work	Cost of Materials	Value of Products
United States:									
1921	560	35,638	2,359	33,279	$4,461,800	$47,775,235	$105,862	$33,560,133	$87,312,426
1919	624	33,120	1,847	31,272	2,979,367	39,073,154	118,335	32,025,484	75,210,701
1914	649	28,215	1,827	26,384	1,914,538	18,644,845	24,596	17,609,574	38,576,565
Alabama	7	205	10	195	23,963	279,793	.....	256,705	560,461
California	22	2,602	118	2,484	218,434	3,977,151	8,124	2,217,467	6,426,872
Colorado	5	272	17	255	20,498	395,147	3,675	226,258	645,579
Connecticut	17	722	93	629	199,520	578,154	.....	722,156	1,502,227
Georgia	8	343	19	324	36,313	258,770	.....	231,573	526,657
Illinois	42	4,021	253	3,768	536,154	5,694,974	2,082	3,737,988	9,975,845
Indiana	29	1,180	113	1,067	148,418	1,318,309	.....	889,252	2,393,856
Iowa	14	232	17	215	36,422	294,900	28,141	294,771	654,236
Kansas	10	162	17	145	29,852	204,914	.....	176,737	411,505
Kentucky	6	223	10	213	20,272	281,272	.....	134,793	450,183
Louisiana	7	438	36	402	81,500	703,715	11,398	541,980	1,340,049
Maine	10	184	14	170	24,925	218,104	637	217,788	462,740
Maryland	5	926	44	882	38,976	891,573	.....	453,204	1,383,753
Massachusetts	30	1,704	87	1,617	123,226	2,378,630	.....	1,493,302	4,072,298
Michigan	17	1,532	115	1,417	450,398	1,848,732	.....	1,896,934	4,252,511
Minnesota	7	621	43	578	111,579	937,433	.....	567,621	1,617,645
Missisippi	5	31	8	23	14,351	26,710	.....	60,436	101,497
Missouri	8	1,216	62	1,154	114,390	1,828,173	.....	1,574,774	3,517,337
Montana	4	36	3	33	7,764	52,952	.....	30,722	91,438
N. Hampshire	5	78	4	74	7,569	126,201	1,000	49,877	184,985
New Jersey	14	1,455	37	1,418	91,634	2,270,570	.....	1,966,685	4,328,891
New York	45	5,799	394	5,405	687,451	9,532,574	11,644	4,978,183	15,344,539
North Carolina	7	76	15	61	16,550	75,858	.....	61,346	154,355
Ohio	55	2,340	108	2,232	202,978	2,158,521	23,343	1,731,569	5,170,617
Oklahoma	9	184	22	162	41,989	220,475	.....	152,302	414,766
Pennsylvania	70	4,458	277	4,181	518,053	5,292,840	10,427	4,469,201	10,294,786
Tennessee	6	300	6	294	15,600	428,253	.....	274,985	721,027
Texas	16	726	52	674	104,952	853,409	108	497,679	1,456,895
Utah	3	171	12	159	10,851	230,860	.....	152,248	396,021
Vermont	4	27	2	25	2,626	30,809	.....	21,066	54,501
Virginia	9	400	28	372	36,359	371,713	.....	394,812	802,939
Washington	11	1,077	174	903	194,555	1,464,395	796	793,442	2,453,188
West Virginia	10	189	14	175	22,172	231,661	.....	196,892	450,740
Wisconsin	14	604	71	533	141,723	769,115	2,737	785,914	1,700,753
All others*	29	1,104	64	1,040	129,783	1,548,575	1,750	1,309,471	2,996,734

* Arizona, 2 establishments; Arkansas, 2; Delaware, 1; District of Columbia, 2; Florida, 5; Idaho, 2; Nebraska, 2; Nevada, 1; North Dakota, 2; Oregon, 3; Rhode Island, 4; South Carolina, 1; South Dakota, 1; Wyoming, 1.

Brill Buys Service Motors

The J. G. Brill Company, Philadelphia, has purchased the railroad motor coach division of the Service Motors, Inc., Wabash, Ind., with exclusive rights for the production and sale of the type of gasoline driven rail cars heretofore known as the Service Model 55 railroad motor coach. While the Brill Company has heretofore furnished only the bodies for these cars, it will now furnish the complete unit without change in design. With its extensive facilities the company will be better able to meet the increased demand for this type of equipment. In the future this type car will be known as the Brill Model 55 gasoline car.

Cars of this type have been operated for more than 1,500,000 miles in the United States. Twelve similar cars are now being built for the Australian Government Railroad. They are about 44 ft. long and weigh in the neighborhood of 28,000 lb. The renewal part business for the cars now in service and the guarantees given by Service Motors, Inc., have been taken over by Brill.

The purchase gives the Brill Company a complete line of automotive cars for steam railroads ranging from the thirty-passenger, six-wheel type to the Model 55 with a maximum capacity of fifty-five passengers. This part of the business is handled by the automotive car division, with C. O. Guernsey, designer of the Model 55 and formerly vice-president of Service Motors, as chief engineer. C. J. McPherson, A. H. Hudson and A. F. McCormick, all formerly of Service Motors, have joined the Brill organization to assist in this work.

Dayton Air Brush Company to Be Sold

The assets of the Dayton Air Brush Company will be offered for sale at the Montgomery County Court House, Montgomery County, Ohio, on Nov. 24. They will be sold at such prices as may be approved by the court. The assets consist of patents, good will, accounts receivable, and a small amount of equipment and parts. The order for the sale was given by Judge Robert C. Patterson of the Common Pleas Court of Montgomery County, Ohio.

Metal, Coal and Material Prices

Metals—New York	Nov. 13, 1923
Copper, electrolytic, cents per lb	13.375
Copper wire base, cents per lb	16.00
Lead, cents per lb	6.875
Zinc, cents per lb	6.425
Tin, Straits, cents per lb	44.50
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.30
Somerset mine run, Boston, net tons	2.375
Pittsburgh mine run, Pittsburgh, net tons	1.925
Franklin, Ill., screenings, Chicago, net tons	1.45
Central, Ill., screenings, Chicago, net tons	1.05
Kansas screenings, Kansas City, net tons	2.25
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.50
Weatherproof wire base, N. Y., cents per lb	16.50
Cement, Chicago, net prices, without bags	2.50
Linseed oil (5-bbl. lots), N. Y., per gal	0.93
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	11.25
Turpentine, (bbl. lots), N. Y., per gal	0.97

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Directors Declare Dividend

The board of directors of the Pressed Steel Car Company, Pittsburgh, met on Nov. 8 and declared the regular dividend of $1.75 per share on the preferred capital stock and a dividend of $1 per share on the common capital stock. No announcement was made, however, concerning the volume of business done nor the earnings. It is expected that this information will be contained, however, in the annual report which will be issued about the end of February, 1924.

Rolling Stock

The Illinois Traction, Inc., is preparing to purchase seventeen new, one-man, light-weight, double-truck interurban safety cars for its Ottawa division, which was formerly known as the Chicago, Ottawa & Peoria Railway.

Houston Electric Company will, if it follows the recommendation of John A. Beeler to the city, purchase fifteen new one-man cars at a cost of $180,000.

Department of Street Railways, Detroit, Mich., has been authorized by the City Council to purchase fifty new double-truck Peter Witt type cars and one three-car train. The three-car train will be used for experimental purposes to determine its practicability on lines such as that on Woodward Avenue. A train of the kind proposed would be 122 ft. long and would require a motorman and three conductors to operate. The equipment would cost $29,230 and the cars making up the train would have a seating capacity of 134 passengers. Delivery on the three-car train is expected about Jan. 1 and on the first of the Peter Witt cars about Feb. 1. The sale of fourteen of the city's one-man cars has been authorized by the Council. These cars will be replaced by larger ones.

Cleveland Southwestern & Columbus Railway, Cleveland, Ohio, has purchased twelve new interurban cars to be built by the Cincinnati Car Company.

New Orleans Public Service, Inc., has purchased twelve new double-truck cars of the Perley A. Thomas Car Company, High Point, N. C.

Toronto Transportation Commission is planning either to purchase seventy new cars or rebuild a number of its old cars.

Havana Central Railroad, Havana, Cuba, has placed an order with the Wasson Car Company for six new cars.

Track and Line

Community Traction Company, Toledo, Ohio, will double track Sylvania Avenue from Martha Avenue to Jackman Road with extension of service on Tremainsville Road on the tracks of the Toledo & Western line. Extension will be made at a cost of $100,000. Double tracking in Sylvania Avenue is part of a program to repave and widen the thoroughfare.

New Orleans, La.—Two franchises affecting the reorganization and rerouting of the New Orleans Public Service, Inc., on the lines laid down in the Beeler report have been offered the Commission Council by Commissioner Paul H. Maloney of the Department of Public Utilities. One, covering the Elysian Fields Avenue franchise, provides, as a compromise to the Beeler suggestion, that the New Orleans Public Service, Inc., shall construct a single-track line on the upper side of Elysian Fields Avenue from North Claiborne Avenue to Hope Street, with a shuttle service from North Claiborne Avenue. The other franchise provides for the extension of the Broadway lines with double-track service from South Claiborne Avenue to Broad Place; thence on Broad Place to Almonaster Street, where it will resolve into a single-track line, continuing out Almonaster Street through such streets as residents in that section of the city, who are opposed to the Beeler recommendations, have approved.

Grand River Valley Railway, Grand Junction, Col., will be extended 3½ miles into the High Line district, one of the best farm land sections of the state, at an estimated cost of $65,000. The work will be started at once.

Citizens Traction Company, Oil City, Pa., is planning to lay a single track at the end of the double track on Main Street at Relief Street to the shops and offices of the National Transit Pump & Machine Company. This will provide service for the men employed in the Third Ward shops as soon after the closing of the suspension bridge as possible. Permission will have to be obtained from a number of sources, such as the city and the Erie Railroad.

Power Houses, Shops and Buildings

Wisconsin Public Service Corporation, Green Bay, Wis., completed work in replacing its 25-cycle generators at its High Falls hydro-electric plant with new 60-cycle generators. This is in line with its policy to change all plant equipment to 60-cycle generators and also to change all motors and meters on lines using current to 60 cycles, thus eliminating the need of frequency changers.

Paducah Electric Company, Paducah, Ky., is constructing a new power station which represents an investment of $370,000. It is expected that the new unit will be in operation early in 1924. The structure when complete will house a new 2,500-kw. turbine and boiler equipment of the most modern type. The unit is being erected adjacent to the old power plant and in time the two will be linked together. The combined generating capacity will be 6,000 kw.

Trade Notes

Transit Equipment Company, New York, N. Y., is establishing a new method to bring the bus to the electric railways by taking the latter's obsolete material in part payment for any buses they purchase.

Standard Underground Cable Company, Pittsburgh, Pa., announces the following changes in its Perth Amboy, N. J., organization: H. W. Fisher has been advanced in title to technical director of electrical engineering, while continuing also as manager of the lead cable and rubber departments. R. W. Atkinson has been appointed chief electrical engineer. G. J. Shurts has been made production manager of the lead cable department.

New Advertising Literature

Beckwith-Chandler Company, Newark, N. J., paint and varnish manufacturer, has ready for distribution a comprehensive sample booklet of its line of motor coach colors. This pamphlet will be of particular interest to companies operating and maintaining motor buses.

Reliance Electric & Engineering Company, Cleveland, has issued a thirty-two page booklet on electric motors. It describes how electric motors are to be chosen and used. It also gives methods of installing motors, rules for determining the size of motors required for different applications and an analysis of some troubles which may be encountered. Copies of the booklet will be sent to interested persons without charge.

Edison Lamp Works, Harrison, N. J., has issued a thirty-two-page pamphlet entitled "Lighting for Traffic Control." The booklet contains illustrations of many types of traffic signals and how they are operated.

Miller Trolley Shoe Company, Boston, has issued a new circular entitled "About Wire Wear." It features and describes tests of trolley wire wear over a period of six years on the Portland-Lewiston Interurban Railway division of the Androscoggin Electric Company. This road has been using Miller trolley shoes exclusively for many years, and the pamphlet gives interesting statistics of micrometer measurements made by the railway company's engineers on its trolley lines.

American Manganese Steel Company, Chicago Heights, Ill., has issued a six-page pamphlet, accompanied by illustrations, entitled "A Better Manganese Crossing."

Elliott Service Company, New York, N. Y., through its public safety division, has issued a pamphlet called "Reaching the Public with the Safety Idea." The pamphlet states that accidents can be prevented and it attempts to give the solution of the problem

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New York, Saturday, November 24, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 21

Chamber of Commerce Committees Make Constructive Reports

IT IS gratifying that a strong indorsement of the principle of co-ordination of service between bus and trolley is given in the report just issued by the special committee of the United States Chamber of Commerce appointed to study this question. Although representatives of the motor transport interests made up a considerable proportion of the committee, the report declares that the bus and the electric railway cannot permanently exist in a community and pay their way in competition with each other. It also says that there should be in each community a single reliable transportation agency, rather than individual transportation units, and that the electric railway is the best medium for the mass transportation of passengers and should be the foundation of the suggested co-ordinated transit system.

Nor is there any doubt as to where the committee stands in regard to regulation. Briefly, the committee says that any one engaged in the business of common carrier by motor vehicle should be subject to regulation as to its rates and service, just as any other common carrier. Regulation by state bodies having jurisdiction over intrastate traffic has been generally accepted in this country and should be applied to motor vehicle common carriers as well as to other public utilities. If a certificate of public convenience and necessity is granted to the operator of a motor vehicle, he should be compelled to furnish ample evidence of financial responsibility, or else carry insurance adequate to cover all injury to persons or damage to property resulting from negligent operation.

Of course, the need of any public carrier to assume full responsibility for damage caused by his negligence is not a new idea. The business of public carrier is one of the oldest in the world and reliability and responsibility are at the basis of the duties which the experience of centuries has shown should be placed on persons so engaged. Our present regulatory laws simply elaborate these rules to adapt them to modern conditions, particularly the replacement to a great extent of the individual carriers of the earlier days by large transportation systems. Primarily the purpose of all these laws is to protect the public by securing (1) regular and adequate service, (2) reasonable rates, and (3) responsibility of the carrier for damages which he may cause during transportation. There can be no permanent gain to any community which ignores these fundamental principles. Jitney service failed in respect to them, particularly regularity of service and responsibility, and this automatically keeps jitneys out of the class of legitimate common carriers.

The committee on taxation of motor transportation agencies of the national chamber, on which motor transport interests were also largely represented, has made an equally valuable report. It points out that present electric railway taxes are unsystematic, to say the least, yet amount, with imposts, to nearly $100,000,000 a year, while the maintenance of track amounts annually to even more than this sum. The committee comes out strongly for a tax based on both gross and net returns, rather than an ad valorem tax, for greater tax simplification and for placing the entire expense of maintaining improved highways upon the users of those highways. This latter recommendation should tend to make each form of transportation bear its fair share of the public expenditure, while the whole program of this committee if carried out should help to place the transportation agencies of this country on a logical basis and enable them to stabilize their financial status and to be of even greater help to the nation.

Proper Basis for Valuation Is of Vital Importance

VALUATION of electric railway properties continues to be a major topic for discussion. This is evidenced by the recent report of the committee on valuation of the American Electric Railway Association, printed in full in the issue of this paper for Nov. 3, and by the discussion by L. R. Nash which appears in this issue.

There have been so many differing views on the subject that the committee had much work to do to bring together the opinions and decisions rendered on the subject by the various regulatory bodies. Out of twenty-six commissions replying to a questionnaire sent out by the committee, fourteen, or more than half, belong to the class that refuses to recognize either original cost or reproduction cost of the present date as controlling, and have no definite method of relative weighting for these two evidences of value. Four others consider reproduction cost in varying degree. These eighteen, or 69 per cent of those replying, give some weight to reproduction cost, but it is difficult to determine just how far they consider it. The remaining eight commissions either ignore reproduction cost entirely or have some special theories of their own.

In view of the various decisions of the Supreme Court of the United States it is rather surprising that reproduction cost should figure so little in the decisions of the commissions. The only apparent reason why they should take this stand is that the Supreme Court itself has never made definite the weight that should be given to reproduction cost, merely stating that it must be considered. The railway valuation committee finds that the commissions in the largest group mentioned state that they consider all evidences of value which are presented and all other matters or circumstances which they feel have a bearing on the case, and

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then announce what they believe to be the fair value under all of the circumstances. This is subject to such a broad interpretation that it may mean much or little, though shrouding the method in mystery often leaves an opening for the feeling that politics should have been included in the list of elements considered in the final determination.

The decisions of the courts, both state and federal, show less variation, according to the committee. These have held quite generally that the basis of rate making is the present value of the property, and that the present value is not necessarily either "prudent investment," "original cost" or reproduction cost at abnormal prices. Of course this again is disappointingly indefinite, for it states what present value is not, but fails to show what it is.

Comparison of investment value and reproduction cost is brought out in a definite way in Mr. Nash's discussion. Taking a hypothetical case, he shows how the investment value may be greater or less than the cost to reproduce at prices current. Where prices are rising, the cost of reproduction is the higher; but where prices rise and then fall as they have done during and since the war, and continue to fall as he states they are likely to do in the future, the actual investment soon becomes greater than the cost to reproduce. Thus there is a real danger to the utility in attempting to secure valuation on the basis alone of cost of reproduction at current prices, in that if it were followed to its logical conclusion during an era of falling prices the rate base allowed would not be sufficient to support the securities issued.

This shows rather clearly the weakness of the position taken by former valuation committees in declaring for reproduction cost at current prices, and this, undepreciated. The 1923 committee's report is more practical, and it is believed that the position it recommends would put a company in a better light before a regulatory body. Its work is a contribution in the direction of clarification and stabilization of valuation procedure. This is exceedingly important, since higher interest rates are demanded and capital is harder to secure in proportion to the doubt that exists as to the outcome of the question of the rate base on which the utility is entitled to earn.

Secretary Mellon's Recommendations and Railway Taxation in General

WITH the opening of Congress now only a few days off, special interest attaches to the marked indorsement which Secretary Mellon's tax reduction recommendations are receiving from business interests generally. These reductions are possible, of course, only if the incoming Congress does not pass a soldier's bonus or other bill which would add seriously to the outgo of the treasury. Hence a tax reduction act at this coming session is by no means sure. Nevertheless, as the Secretary's outline will probably form the basis for any tax reduction bill introduced by the majority party, its effect on electric railway companies may be considered.

As the Secretary's recommendations contain no suggestion of a reduction in the present corporation tax of 12½ per cent on net income, the effect on railways will come primarily from the larger market which they, like other corporations, will have for their securities, due to the reduction of surtaxes. This was one of the purposes of the recommendations—the hope that some of the capital now going into tax exempt securities because of the high surtaxes would return to the field of productive business. Tables accompanying Mr. Mellon's letter to the House ways and means committee show in a striking way the virtual disappearance from the tax rolls of persons with large incomes. In the $300,000 a year class, the reduction was from 1,296 in 1916 to 246 in 1921. Under the present surtax rates taxpayers with this income practically cannot afford to invest in securities other than those which are tax exempt.

Just how far the Secretary intended his incidental suggestion about abolishing for the purpose of the income tax capital losses and capital gains is hard to say. If these were given up, it is probable that investors would seek bonds carrying a low interest rate but sold at a large discount. Thus they would have to account only for the return received as interest. Even under the present law this is rather a profitable plan for the bond buyer, because it postpones till a later year, when the income tax rate will probably be lower, the portion of the return represented by the discount at which the bond was purchased; or he can group his capital gains in one year so as to take advantage of the 12½ per cent provision.

It is to be hoped that the discussion on taxation which is bound to take place in Congress this coming session will stimulate a study of the same subject in state capitols and by municipal governments. According to figures recently issued by the National Industrial Conference Board, while federal expenditures decreased from $6,112,243,000 in 1920 to $4,849,708,000 in 1921, expenditures of state and local governments increased during the same years from $3,808,523,000 to $4,523,887,000. The opportunity to sell bonds at low rates of interest has been a contributing reason for the plethora of expenditure in which local governments have lately indulged. Here is where a conference on taxation, if undertaken by a national body of influence, like the United States Chamber of Commerce, would help. Senator McCormick of Illinois recently made the suggestion that President Coolidge call a national conference of state and local taxing authorities to consider checking the steady increase of tax burdens.

From any reform which would put on a more scientific basis our present tax laws, the electric railway industry would be almost certain to receive benefit. This is shown by the situation in New York State. Here in 1922 a committee, of which Senator Davenport was chairman, canvassed the whole tax situation, and found that the taxes of the electric railway companies in New York were proportionately to both their gross and net incomes far greater than those of any other class of utility, and still greater on net than general business corporations, the net of these corporations being the only figures available as these are the ones on which their state tax is based. The figures from New York State are probably not greatly different from those which would be found in other states. While no general relief has come as yet in New York as the result of this committee's work, it is likely that when readjustment does come something will be done in removing the obvious inequality of tax assessment from which the railways are suffering. Similarly, studies in other states would pave the way for a fairer taxing of the electric railways.

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Keeping Cars on Time

The Duties of Supervisors and the Importance of Adherence to Time-Tables Discussed by J. R. Ong in His Los Angeles Report—Other Suggestions for Improvement of Service

AN ACCOUNT of the traffic situation in Los Angeles, based on a report recently made to the management of the Los Angeles Railway Corporation by Joe R. Ong of Piqua, Ohio, was published in the issue of this paper for Nov. 3. That article also gave a number of ways by which, through the co-operation of the city, the situation could be helped. Mr. Ong's report included also observations as to electric railway operation in Los Angeles, with a discussion of supervisors and time-tables. An abstract follows of those observations of most general interest, with some additional information on the form of supervisor's book mentioned.

Adequate supervision is an essential feature of satisfactory service. Supervisors are the company's official representatives in directing the operation of cars on the streets. They should be able to grasp a situation and act quickly, at the same time displaying good judgment in their decisions.

Quite naturally, supervisors are recruited from the list of motormen and conductors because such a background of experience is necessary. In order that a supervisor's position may appeal to the trainmen best suited for it, it should be attractive not only because of its increased responsibility and authority, but also because of its financial advancement. In Los Angeles supervisors' salaries should be materially increased above the present scale so that it will be possible to attract the best men in the train service. The hours should be arranged to alternate the day and night work for all supervisors, the changes being made at intervals of two weeks or four weeks, because straight night work as a supervisor for several years makes little appeal to a platform man holding a good day run.

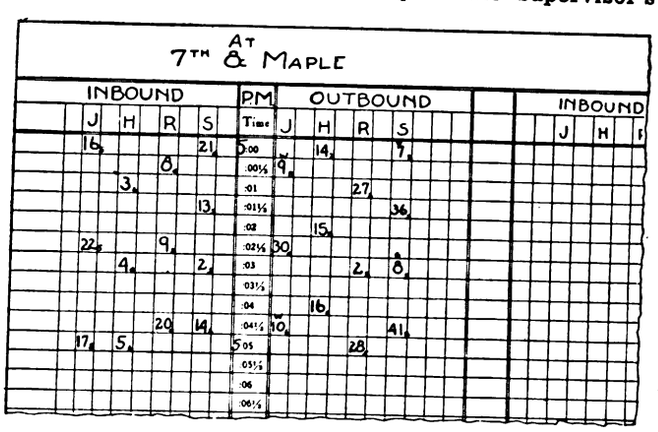
Duties of Supervisors

A supervisor's chief duties are to keep cars on time under normal conditions of operation and to see that patrons of the line get the best possible service under any unusual conditions that may arise. Normally, therefore, the supervisor should be watching his cars and checking their actual time against their scheduled time and ascertaining the cause for any deviations. Chronic cases of irregular operation should be checked in particular and fully reported so that appropriate measures for correction may be taken.

Obviously a supervisor cannot check his cars from memory unless he has very few cars on a regular but infrequent headway. It, therefore, has been the practice to supply the supervisors with schedule data showing the time cars are due to leave the terminals, arranged in the order in which they are due to leave. Many supervisors carried only the terminal times in their books and had no time shown at the point where they were stationed for a period of several hours daily. The result was that an individual mental calculation of time had to be made in order to check each inbound car by adding to the terminal time the running time to the point of observation, and to ascertain if that total corresponded to the observed time.

Upon Mr. Ong's recommendation there was adopted an improved type of supervisor's book which greatly facilitates his work. Time by half-minute intervals is printed in a column in the center of the page. The left half of the page is used for inbound cars and the right half of the page is used for outbound cars, one column being reserved for each route passing the checking point for which the book is made up.

The new book is made up to show the time that each car on the schedule is due to pass the supervisor's station by having its train number in the proper route column on the proper horizontal time line. This enables the supervisor to tell quickly whether the car is on time, late or ahead of time. The clearly detailed yet compact arrangement of the schedule data enables him to tell quickly the relative position of the cars from different routes on common track, and if at a junction he can readily direct which car should have the preference when two arrive at the same time.



Page from Supervisor's Time-Point Book, as Used in Los Angeles

A part of a page of this book is reproduced. The letters J, H, R and S indicate routes. J and S are split lines, i.e., the cars run to two terminals. The large figures show train numbers. The small figures show minutes layover at the next terminal.

The figures are inserted in this book before the supervisor goes out on the street and he makes no notes in the book on the street. It is his reference book on schedules in concise form so that he can quickly determine when the cars should pass him.

All figures in the book except the headings are put in with pencil so that in the event of a schedule change on one line the train numbers on the old schedule are erased and the new train numbers put in without the necessity of making a whole new book. The supervisor may indicate by key letters or characters the destination of cars on split lines or cars scheduled to short terminals, and other information such as night cars which he may

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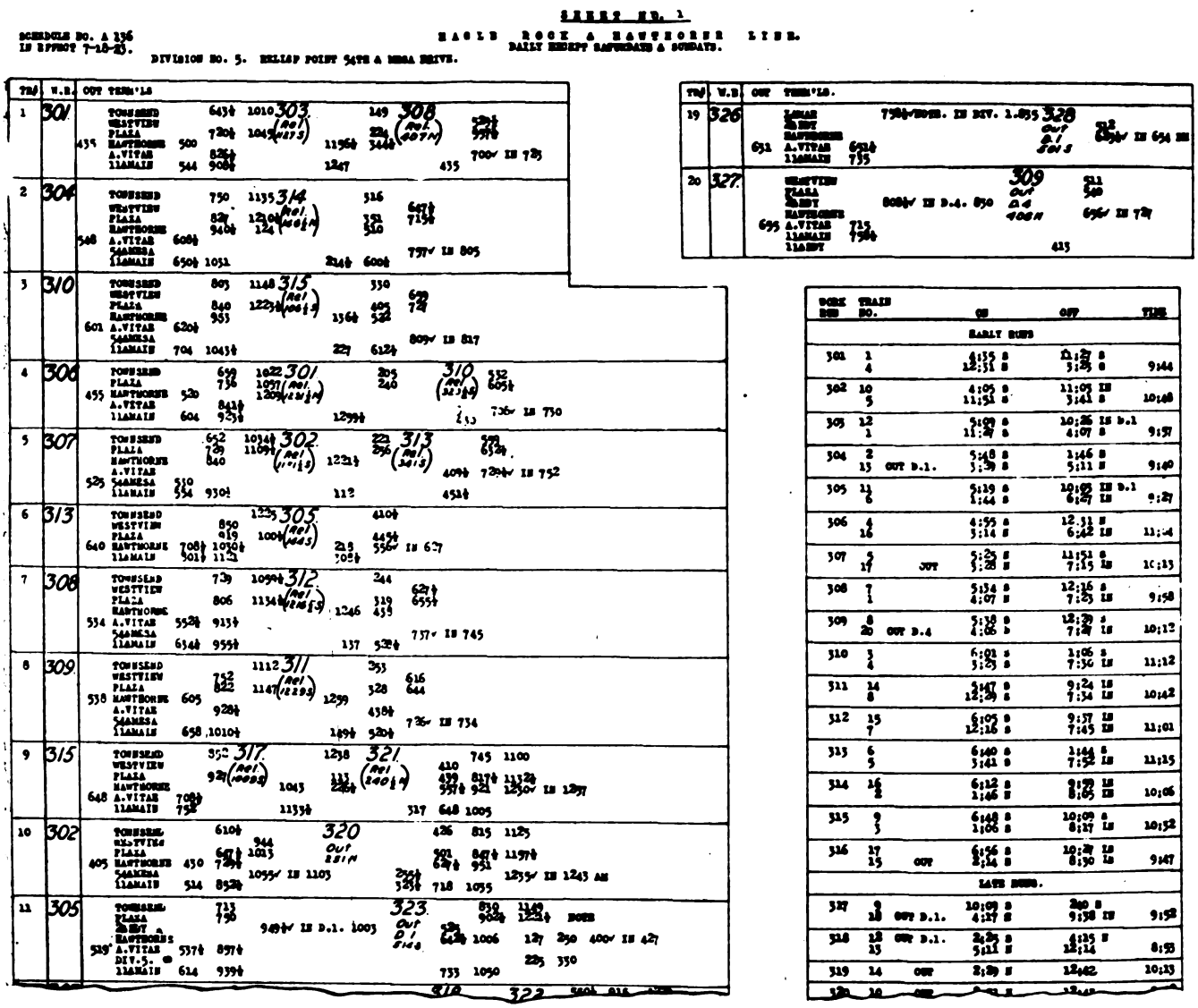
desire to watch with particular care after the headways begin to spread.

To protect the book from the weather, sheets of transparent celluloid may be cut to page size and held on by rubber bands. For very wet weather a celluloid case large enough to take the book when open may be used. Such a case is very similar to the identification card case one carries in the pocket except for size, closed on three sides and open at the bottom.

As explained, the book shows by a small number the layover at the next terminal for each train, so that the supervisor has right before him the number of minutes



EAGLE ROCK & HAWTHORNE LINE

Running times between time points for Schedule No. A-136, in effect July 18, 1923

LV. TOWNSEND

From 7:35 P.M. to 5:54 A.M. use No. 1
5:55 A.M. to 6:27 A.M. use No. 2
6:28 A.M. to 8:19 A.M. use No. 3
8:20 A.M. to 11:21 A.M. use No. 4
11:22 A.M. to 1:41 P.M. use No. 5
1:42 P.M. to 4:14 P.M. use No. 6
4:15 P.M. to 5:09 P.M. use No. 7
5:10 P.M. to 5:34 P.M. use No. 8
5:35 P.M. to 7:34 P.M. use No. 9

LV. HAWTHORNE

From 7:15 P.M. to 5:33 A.M. use No. 10
5:34 A.M. to 6:04 A.M. use No. 11
6:05 A.M. to 8:14 A.M. use No. 12
8:15 A.M. to 10:59 A.M. use No. 13
11:00 A.M. to 3:49 P.M. use No. 14
3:50 P.M. to 4:49 P.M. use No. 15
4:50 P.M. to 5:24 P.M. use No. 16
5:25 P.M. to 7:14 P.M. use No. 17

TOWNSEND TO	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9
Westview	5½	7	7	6	6	6	6	5½	5½
So. Vdgo	7½	9	9	8½	8½	8½	8½	7½	7½
28 & Day	8	8½	8½	8	8	8	8	8	8
Bdge. Jct	5½	5½	5½	5½	5½	5½	5½	5½	5½
Plaza	6	7	7	7	7	7	7	7	7
1st. & Spg	3	3	3	3	3	3	3	3	3
7th & Bdy	6½	6½	8	8	9½	9½	11½	8	8
11 & Main	3½	3½	3½	3½	3½	3½	4	3½	3½
Wash	3½	3½	3½	3½	3½	3½	4½	3½	3½
Jeff	4	4½	4½	4½	4½	4½	5	4½	4½
Hoover	5	5½	5½	5½	5½	5½	6½	6½	5½
Dalton	3½	4	4	4	4	4½	5	5	4
54th	9	10	10	10	10	11	11½	11½	10
67th	3½	4	4	4	4	4	4½	4½	4
Regent	5½	6	6	6	6	6½	6½	6½	6
A. Vitae	3	4	4	4	4	4	4	4	4
Hawthorne	7½	8	8	8	8	9	9	9	8

HAWTH. TO	No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17
A. Vitae	7½	8½	9½	8½	8½	8½	8½	8½
Regent	3½	4	4	4	4	4	4	4
67th	5½	6	6½	6	6	6	6	6
54th	3½	4	4	4	4	4	4	4
Dalton	7½	10	10	9	9	9	9	9
Hoover	4	4½	4½	4½	4½	4½	4½	4½
Jeff	5	6	6	6	6	6	6	6
Wash	4	4	4½	4½	4½	4½	4½	4½
11th	3½	3½	4	4	4	4	4	4
7th & Bdy	3½	3½	3½	3½	3½	4½	3½	3½
1st. & Spg	6½	6½	8	8	9½	11	8	8
Plaza	3	3	3	3	3	3	3	3
Bdge. Jct	6	6	7	7	7	7	7	7
Ave. 28	5½	5½	5½	5½	5½	5½	5½	5½
So. Vdgo	8	8	8	9	9	9	9	8
Westview	9	9	9	10	10	10	10	9
Townsend	6½	6½	6½	8	8	8	8	6½

The Upper Table Is a Reproduction of Part of a Schedule Sheet, with Run Guide and Working Times for Crews. The Lower Table Shows in Type the Running Time Between Time Points in the Schedule Sheet Reproduced Above

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leeway he has on the outbound car before it will be necessary to consider turning it short of destination. For example, if an outbound car has seven and one-half minutes layover and passes the supervisor six minutes late it should leave the terminal on time. If the car was twenty minutes late outbound with only seven and one-half minutes layover it lacked twelve and one-half minutes of having time to make the terminal to leave on time. The supervisor then may put this car on time by turning it back at a crossover from which the running time to the terminal and return is not less than twelve and one-half or thirteen minutes.

The advisability of turning cars short of scheduled destination is a matter that must be considered in the light of circumstances and conditions at the time. It would depend upon how many passengers the car had on board, upon whether the prevailing direction of travel was outbound or inbound, upon whether other cars were immediately ahead of or behind the car to be turned short, and perhaps on some other conditions.

The elimination of, or a reduction in the number of, turnbacks may be a general indication of improved operating conditions, but the fact must not be overlooked that there are times and conditions when the service would be benefited if there were more turnbacks. There are usually more people desiring transportation at other points along the line than at the terminals and they are to be considered. Day cars which are late in the morning rush and night cars which are late in the afternoon rush often can be advantageously put on time by turnbacks, and the service to the terminal supplied by a tripper which is due to pull in.

Street Supervision Eighteen Hours a Day

On a system the size of the Los Angeles Railway there should be direct supervision on the street for approximately eighteen hours per day, according to the following plan. Supervisors should be located at strategic points for control of the various lines. On through routes there should be a supervisor located on each half of a line at a point beyond the congested area, each supervisor looking after one or more lines passing his station.

One supervisor should be held primarily responsible for each line to avoid confusion over orders, but the supervisor stationed on the other half of the line should assist in carrying out the plan of control determined upon by the supervisor in charge. In fact, each supervisor should have in his book the times of cars on all lines past his station—not that he will have to work all of them but that he should be in a position to step in and take action in an emergency.

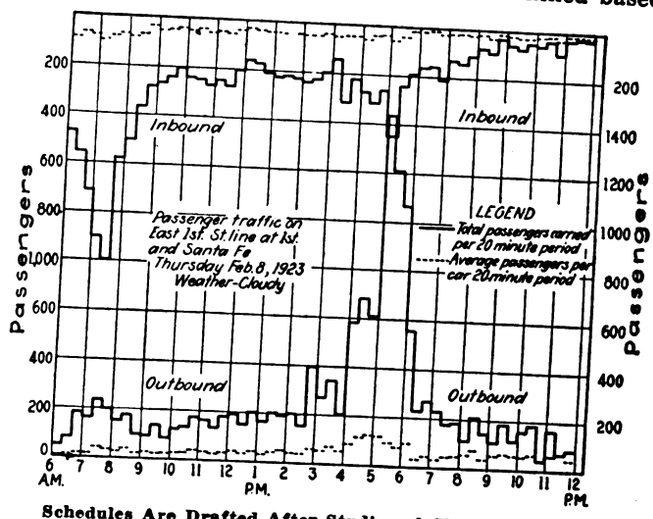
It is not contemplated that a point supervisor can never be taken off the point. He should leave his station to go to an accident, derailment or blockade if he can do more good there, but except in emergencies he should stay at his point, which, if properly selected, is the strategic point for the control of the lines under his direction.

The objection is sometimes raised to point supervision on the ground that the crews always know where the supervisors are located and may be leaving terminals late, running by passengers or running ahead of time because they think it will not be discovered. If the point supervisors are giving careful attention to the cars passing their stations they will usually be able to detect any serious irregularities. A limited number of traveling supervisors should be assigned to travel on several lines to correct such matters as mentioned in this paragraph and to follow up cases of recurring irregular operation reported by the point supervisor.

On many street railways the division superintendents have the responsibility for the operation of cars on the street, but on the Los Angeles Railway this function is delegated to "district chiefs" under the director of traffic. The district chiefs should be assigned to a certain territory and have general direction of all lines and all supervisors within that territory. Territorial division for the district chiefs is to be preferred over a group of through lines, because it enables them to cover the lines with less lost motion or duplication of supervision on trunk lines. It gives a better distribution of their services.

Preparation of Schedules

In the preparation of schedules Mr. Ong's recommendations for using traffic graphs have been adopted and are now in effect. Twenty-minute charts (similar to that shown below) for several different days are taken and analyzed, with one day compared with another and corrected for distortions. A representative one is then selected. From it the headways are determined based



Schedules Are Drafted After Studies of Charts Like This

on the number of passengers carried. For example, the chart published shows approximately 250 passengers as the average sustained maximum per twenty-minute period during the middle of the day in the controlling direction of travel, which is inbound. If it is desired to schedule service on the basis of fifty passengers per car, then five cars will be required in each twenty-minute period, resulting in a four-minute headway. It may be noted that after 11:40 a.m. the inbound travel falls off so that a four-minute headway throughout the middle of the day would show an average of less than fifty passengers per car.

In a similar manner the headways required for other periods are calculated except that in the rush hours the average number of passengers per car must be increased to perhaps eighty or eighty-eight. To carry 1,300 passengers per 20-minute period on the basis of eighty per car would require a one and one-quarter-minute headway. And in this manner the required headways past the point of maximum load are selected. In translating the twenty-minute chart into headways a convenient table

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has been devised which shows the passenger carrying capacity on different headways at different densities of loading per car.

In addition to the traffic charts from which the headways are determined, the schedule maker must also have riding checks to show the time required between time points all along the line at the different periods of the day. Preferably he should make several trips himself over the line to refresh his knowledge of conditions.

Where all cars do not go through to the end of the line, short line cars should follow longer headways than through cars in order to balance the loads on the long and short line cars. Thus, an average main-line headway of five minutes might be split as a six-minute interval before the short-line car and a four-minute interval before the long-line car, or the differential cut to one minute by using five and one-half and four and one-half-minute spacing.

A change has been made in the form of the schedule and crew assignment sheets. Formerly the schedule sheet showed the leaving times of each train number from one terminal on the left half of the sheet and from the other terminal on the right half of the sheet, all on one horizontal line. To follow a train number through its operation from the time it left the carhouse until it pulled into the carhouse it was necessary to look back and forth from one side of the sheet to the other. This schedule sheet was never posted for the trainmen but was used for office reference. Copies were secured by the ditto-graph.

For the trainmen's use there was a large sheet that showed the day's work for a crew arranged in a horizontal section of the sheet, giving the various times at which they were due to leave the terminals and the times when reliefs were made. On this sheet the various pieces of work by each crew were grouped together, but in order to follow one car or train on its schedule throughout the day it was necessary to look all over the sheet for the particular train number. For the division clerks, the timekeepers and the auditor's office a condensed work run sheet was supplied showing "time on" and "time off" for each piece of work for each crew and the total time of the run. Thus, on the old plan, the information was grouped three ways on three forms.

New Schedule Replaces Three Sheets

On the new form of sheet (see page 888) the information that was formerly in three places has been combined on one form and additional information shown. The run guide as arranged in the form previously sent to the timekeeper is retained in the new schedule sheet. The times that cars are due to leave terminals and one intermediate point on each half trip are shown in the body of the schedule. The intermediate time shown is usually for the time point just at the edge of the congested area inbound.

The details of runs are read horizontally, and each section of the details of runs represents the movements of an individual car or train during the day. The movements of each individual crew are indicated by run numbers written in bold figures, so that the various pieces of work of each individual crew may readily be picked from the schedule. By using this method, the schedule permits one to follow all movements of cars as well as crews, a feature which is not easily possible when each horizontal section of the details of runs refers to the day's movements of an individual crew rather than of an individual car.

The new schedule sheets are prepared on the typewriter and are arranged for blueprinting so that as many copies as desired may be had at any time. All working copies should be blueprints. The master copy should be kept corrected to date so that any copies taken at any time may be correct. An office copy, a carbon copy of the original, should be kept to show the successive changes and alterations without obliterating the original figures, so that ready reference may be had at any time to the exact times on the schedule on any particular date.

Work Assignments for Trainmen

It is also a part of the work of the schedule department to make up the work runs for motormen and conductors after the schedules have been prepared. Inasmuch as schedules are based on the demands of traffic they should be laid out to meet that demand as nearly as is reasonably possible and not with the idea of providing work runs for any individual trainman or group of trainmen. Conditions controlling the number of cars operated are something which the company cannot change and therefore it is not to be expected that work runs for the motormen and conductors can be laid out exactly the same from one schedule to another. The cars cannot leave and return to the carhouse at the same times on all schedules.

Those not familiar with the street railway business sometimes find it difficult to understand why the working conditions for motormen and conductors cannot be made the same as working conditions for employees in other lines of business. For example, the question is raised why is it necessary for street railway men to have such a long spread of time in which to complete a day's work. It might help some in the understanding of this question if reference were made to the lower chart on page 772 of the Nov. 3 issue showing the cars scheduled for operation on April 2, 1923, by one-hour periods throughout the day. Cars must be on the street in time to take other employees to their places of business in the morning, and cars must be on the street to take other employees home and return to the carhouses in the evening, so that street car men are required to extend their day's labor over a long period of time.

Many references have been made to the morning and afternoon rush periods when great masses of people demand transportation within limited periods of time. This uneven demand for service is one of the fundamental characteristics of the business which every street railway would gladly change if it could, because it affects not only the working conditions for the trainmen, but also involves a heavy expense on the part of the company for cars, carhouses, power, substations and equipment in use for only a limited period.

One of the fundamental difficulties in connection with the operation of cars on the Los Angeles Railway was that too many of the cars were operated as trippers by extra crews and not enough of the cars were made a part of regular runs. This means an unusually large extra list and it means that men have to "fight the extra board" for perhaps several years. This is not a satisfactory condition of affairs and could be improved by allowing a slightly greater spread in the runs so that the day crews coming out of the carhouse not too early in the morning could be used again in the afternoon rush.

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It is apparent from the chart on page 772 of the Nov. 3 issue that a great many crews must be used both morning and afternoon if the total number of cars operated are to be handled efficiently. The spread in the runs on the lines of the Los Angeles Railway is not excessive and in fact is much lower than the spread in runs on most other large city properties. It is considered a distinct detriment to the service, without being an advantage to any particular number of men, to maintain the old system of making up runs. It was recommended that more of the trippers be worked into parts of regular runs and that the allowable spread in the time to complete the day's work be sufficiently extended to permit this.

Other Service Improvements

A number of other service improvements were also introduced as a result of the survey. Thus, the layover time was reduced by introducing more time points, particularly during the outbound trip and by an adjustment of running time to meet the varying conditions of operation. This kept some motormen from speeding and resulted in better spacing of cars along the line and less bunching of cars at the terminals. Further reduction in layover time is expected to follow the adoption of a further differential in running times. It had been the practice for some time on the Los Angeles Railway lines to have only two running times, i.e., "short" time and "long" time. Short time was from 6:15 p.m. to 7 a.m. and long time from 7 a.m. to 6:15 p.m. It will be noted that the new schedule on page 888 calls for several running time changes in twenty-four hours.

Larger train number plates were put on so that the supervisor could distinguish train numbers more quickly and easily. Formerly the train number was on a 2½-in. disk and was carried inside the window on the front end of the car only. The new train number plates are of sheet metal 5½ in. x 6 in., with aluminum leaf letters on a black background. Two are used for each train, one placed on the front end and the other on the rear above the window to the right of the center line of the car. The train numbers stay in place from the time the car leaves the carhouse until it returns to the carhouse, while it is on the same train run.

A clear and more definite system of route and destination sign is under consideration. The report favors roller signs adjustable from within the car, rather than metal roof and dash signs, because the former can be changed only if some one climbs to the roof, and both require more trouble to change the car from one route to another.

Cars and Special Work

A low-floor car designed to facilitate the rapid handling of passengers was recommended. One-man cars have been found too slow for operation in the congested area and to cause additional delays. The report recommended two-car units for mass transportation, particularly for operation on heavy lines. For the lighter lines which run through the congested area a one-man-two-man car was recommended to supersede the safety car for conditions existing. These cars would operate with one man except during rush hours.

The report also urges the addition of more special trackwork, so that the opportunities for turnbacks and for maintenance of service by diversions during emergencies may be increased. On some lines the skip stop or alternate stop plan is now in force, and it is recommended that the same plan be extended to all lines.

Statistics on Twelve Large Properties

STATISTICS showing a comparison between six of the largest surface lines and an equal number of rapid transit properties are presented herewith. They afford an interesting comparison of these figures with the figures which show the results of the electric railway industry as a whole, as published in ELECTRIC RAILWAY JOURNAL, on page 578, of the March 31, 1923, issue.

While the 121 companies covered in the analysis on March 31 produced gross earnings of over $393,000,000, the twelve city properties under consideration showed a total of over $316,000,000, although they operate only one-ninth of the track mileage in the United States. Of these twelve properties, six are classed as rapid transit, although only three operate elevated or subway lines exclusively, the other three being in combination with surface lines. Each of the twelve companies collected over $8,000,000 in its last fiscal year and its average receipts exceeded $26,000,000. The prevailing rate of fare varies, three charging 5 cents, two 5 cents with a 2-cent transfer charge, one 5 cents with a 1-cent transfer charge, four 7 cents and two 10 cents, while in some cases the company sells tokens at a lower rate.

Gross earnings of the six surface properties show a decrease of 3.5 per cent below the previous year, while operating expenses, including taxes, decreased only 1.6 per cent. For the rapid transit companies the increase in receipts was 1.7 per cent and the decrease in cost 6 per cent. The operating ratio for the surface group averaged 83.34 per cent, as against 85.08 per cent in the previous year, and ranged from 68.93 to 93.35 per cent. The average for the rapid transit group was 71.63 per cent, ranging from 59.08 to 83.03 per cent, compared with an average of 77.92 per cent in the preceding twelve months. Considering only the three roads which operate subways or elevated lines exclusively, the operating ratios average 69.17 per cent, as against 75.9 per cent in the previous year.

The total passengers per mile of single track operated showed an increase of 0.89 per cent for surface companies and 4.7 per cent for rapid transit lines. The number of passengers per mile of track in the former group ranged from 929,650 to 1,940,456, and in the latter group from 1,263,286 to 1,463,592. Several companies, however, do not keep account of transfers and free passengers and for that reason the figures shown are low. On the surface lines, less service was rendered by each car in the past year than in the preceding year, the annual miles operated per car averaging 34,877, as against 35,862. On rapid transit lines

STATISTICS PER CAR-MILE AND PER CAR-HOUR ON TWELVE LARGE ROADS

	Six Surface Roads				Six Rapid Transit Roads			
	1919	1920	1921	1922	1919	1920	1921	1922
Transportation revenue per car-mile	38.9 cents	44.7 cents	47.8 cents	47.8 cents	33.1 cents	38.0 cents	40.7 cents	40.8 cents
Expenses and taxes per car-mile	32.5 cents	37.6 cents	43.2 cents	43.2 cents	25.9 cents	30.6 cents	33.4 cents	31.1 cents
Transportation revenue per car-hour	$3.26	$4.00	$4.03	$3.14	$4.21	$4.63	$5.21	$5.14
Expenses and taxes per car-hour	$2.75	$3.37	$3.62	$3.64	$3.25	$3.70	$4.13	$3.81
Operating ratio, per cent	83.06	87.45	85.08	83.34	74.00	77.26	77.92	71.63

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there was an increase, the figures being 39,271 for the last year against 38,557 in the preceding year.

Revenue passengers on surface lines increased 1.1 per cent and the car mileage was less by 0.55 per cent. On rapid transit lines the number of passengers increased 3.3 per cent and there was an increase of 1.7 per cent in service. The average car-miles per car-hour on surface lines increased 1.1 per cent over the previous year, while the rapid transit lines remained the same. The figures just given used to be considered as an index of speed performance, but in recent years car-hours have been so augmented by contract requirements that it is no longer regarded as of much value. The figures given above as well as those contained in the table are for the twelve largest companies, five of which have a fiscal year ending June 30, while the others have a fiscal year more nearly corresponding to the calendar year.

Rapid Transit Parkway Proposed for New York

For Outlying Sections, with Track on Surface, Commission Engineer Declares Cost About Same as Elevated and One-Third that of Subway

AN ACCOUNT was published on page 572 of the issue of this paper for Oct. 6 of a rapid transit parkway line, recommended as part of the New York Transit System by Daniel L. Turner. The report of Mr. Turner goes into considerable length as to the advantages of this system over an elevated or subway line for undeveloped portions of a city. Briefly, the plan consists of a reservation strip approximately 500 ft. wide with two or four tracks in the center and vehicular, overhead or under crossings about every third or half mile. The right of way would be divided as shown in the accompanying section.

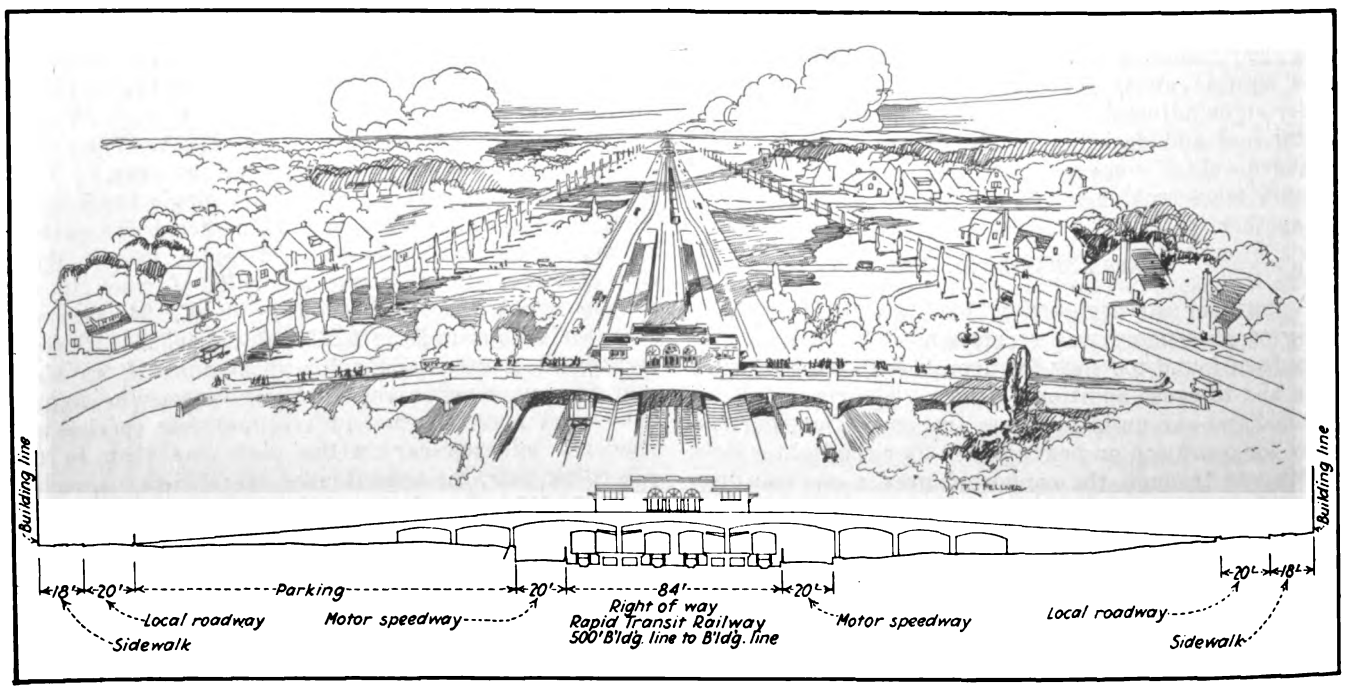
Mr. Turner points out that such a line would have all the advantages of an elevated line, in that it is in the open air, and also the advantages of a subway in that it does not disfigure the streets or cut off light and air from abutting property.

As regards cost, Mr. Turner estimates that such a line, including real estate in suburban territory, would be slightly more expensive to build than an elevated line, but considerably less costly than a subway, based on the figures of $2,300,000 per route-mile for a two-track subway line and $700,000 per route-mile for a two-track elevated line. For everything except real estate for a two-track parkway line, built either in open cut or on embankment or as an elevated railroad, as best suited to the topographical conditions, Mr. Turner allows $500,000 per route-mile and believes that the real estate for a 400-ft. wide strip could be secured for $400,000 a mile and if 100-ft. wide for $100,000 a mile. The approximate unit cost figures, including real estate for a two-track structure, would be as follows:

	Per Route-Mile
For a two-track subway line	$2,300,000
For a two-track elevated line	700,000
For a parkway line through a 400-ft. wide strip costing $400,000	900,000
For a parkway line through a 100-ft. wide strip costing $100,000	600,000

In his remarks on cost Mr. Turner says: "The conclusion seems inevitable that through undeveloped country, instead of building elevated lines as we have done in the past, the parkway line should be built, a wide parkway line if possible, but in any event a narrow parkway line, and that the land necessary for such parkway should be obtained in advance and held until the building of the rapid transit line becomes necessary."

In discussing the matter of assessment of cost, Mr. Turner says that while the New York State law provides for local assessment for rapid transit lines, based on the enhancement in land values, no rapid transit line has yet been built under the assessment plan. Nevertheless, an assessment for a parkway is a common procedure and should meet with no obstacles of any kind, particularly if the parkways are to be of the width and importance that a strip approximately 400 ft. wide would permit to be developed, thereby bringing the parkway within a half mile of everybody living within the area developed in such a manner.



Section of Suggested Parkway Line for Rapid Transit Development in Outlying Sections of New York

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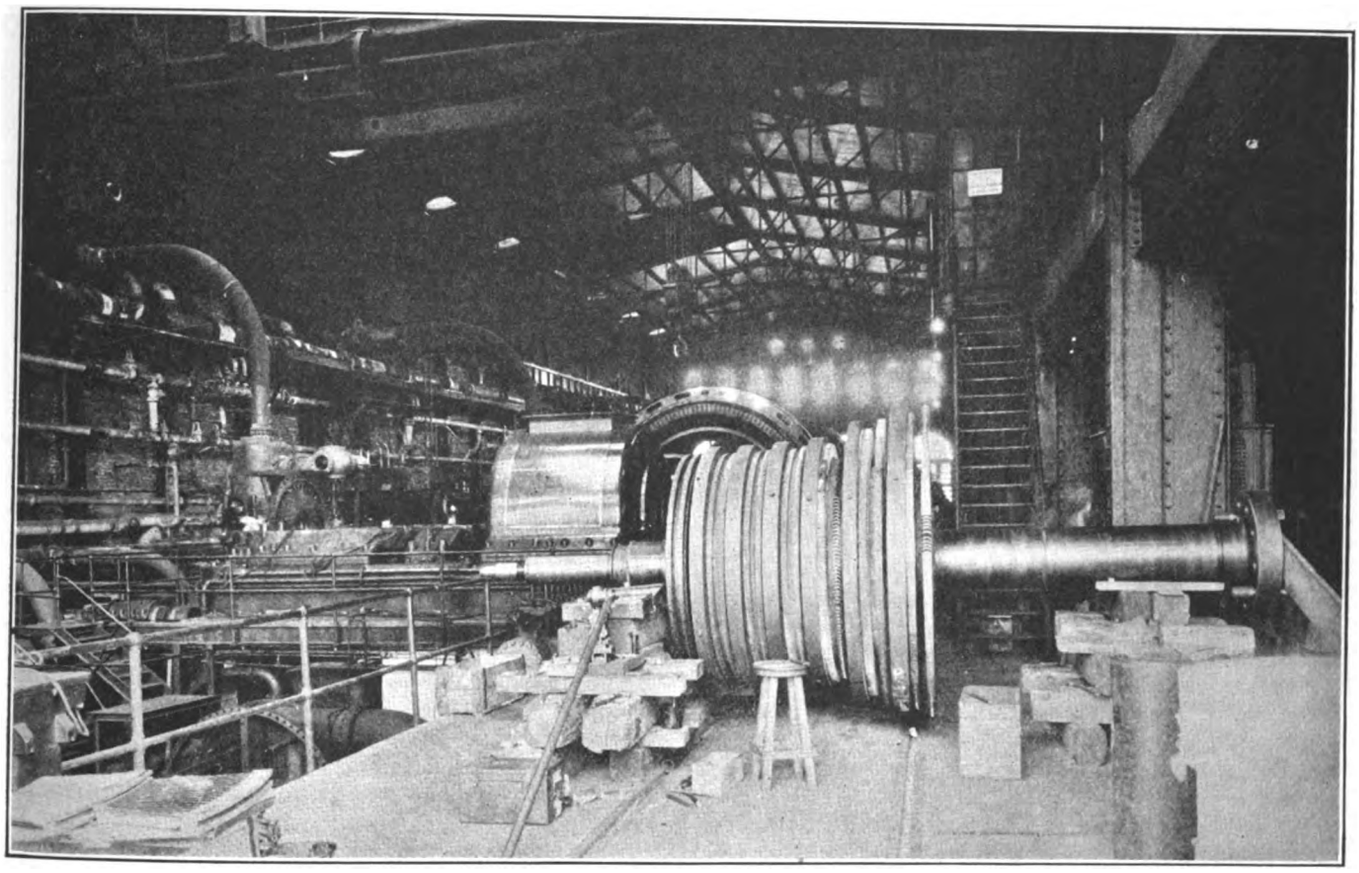
Remodeling a Power Plant to Improve Performance

Batavia Station of C., A. & E. R.R., Twenty-two Years Old, with Changes Costing $11 per Kilowatt, Has 12 per Cent Lower Water Rate and 30 per Cent Less Maintenance—Capacity Also Is Increased About 10 per Cent



This View of the Engine Room Shows the High-Pressure 7,500-Kw. Turbine Under Repairs

EXTENSIVE changes have been going on in the Batavia power plant of the Chicago, Aurora & Elgin Railroad for the past year, the idea being to improve the efficiency of the station. While the work is not yet fully completed, the results to date indicate that evaporation will be bettered approximately 9 per cent, and the turbine and engine water rates will be decreased approximately 12 per cent. The maintenance budget for the last half of 1923 is almost 30 per cent less than maintenance expenditures for the last half of 1921, before the new work was started. On this reconstruction H. W. Brooks acted as consulting and construction engineer.

Though not an original objective of the work, the output of the rehabilitated equipment has been increased about 2,000 kw. Line drops and distributing losses have been decreased materially, while the railway schedule has been speeded up and the service made more frequent. The possibility of service interruption has been reduced to a minimum. The plant as remodeled, if kept in a reasonable state of repair, should render effective service for at least ten to fifteen years at economies comparing favorably with the average obtained in modern plants of equal size. Based on the station capacity the entire cost of the work will not exceed $11 per kilowatt. Including the new line and substation work the total unit cost will not exceed $15.

The original station, installed in 1901, consisted of three 1,500-kw. and one 1,800-kw. engine generators driven by 32x64x60-in. cross-compound Corliss condensing engines at 75 r.p.m. This equipment was augmented in 1912 by a 7,500-kw., 1,500-r.p.m. condensing turbo-generator and a 3,000-kw., 1,500-r.p.m. low-pressure condensing turbo-generator. All this generating equipment is rated liberally, however, in comparison with present standards, tests having proved the continuous 40-deg. capacity of the station to be about 18,000 kw., with 22,000 kw. obtainable on the swings. Three-phase, 25-cycle current is generated at 2,300 volts. Each generator is connected through a separate bank of transformers to the station 26,300-volt, three-phase bus, and all switching is done on the high-tension side.

In the boiler room there are eighteen 5,000-sq.ft. water-tube boilers equipped with chain-grate stokers. Steam is now generated at 200-lb. pressure and 150 to 200 deg. superheat.

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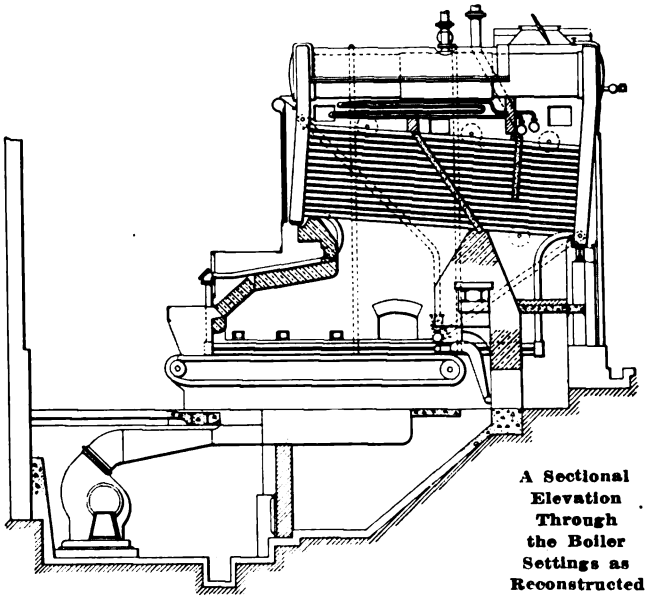
Four boiler settings were excavated beneath so as to lower them, their stokers, hoppers and accessory equipment by 4 ft., thus increasing the height of the combustion chamber from 8 to 12 ft. This permitted increased combustion efficiency, particularly with the long-flaming, high-volatile southern Illinois and Indiana screenings burned. The method of excavation was found more economical than the more usual plan of raising the boilers.

The natural draft stokers on these four boilers were



A Sectional Elevation Through the Boiler Settings as Reconstructed

replaced with forced-draft chain-grate stokers equipped with side-wall tubes and pressure water bags. With the forced-draft stokers the fluctuations of the load, which are especially heavy in railway service, are accommodated readily through the greater inherent flexibility of this type, while the steady base load is carried by the natural-draft boilers at their most efficient rating.

While the furnaces were being rebuilt it was considered advisable to reconstruct the old baffles, which were of the standard type, nearly vertical, replacing them with inclined baffles, thus tapering the gas passages to follow as closely as possible the reduced volume of the gases with their shrinkage at lessening temperatures. The lower entrance velocity aids the draft and relieves clogging of the gas passages by slag present in large quantities in the Illinois and Indiana screenings. Two different types of baffles were installed for competitive purposes, the interlocking tile type with plastic joints on two boilers, and monolithic baffles shot with a cement gun on the other two. The aggregate found most satisfactory for the monolithic baffles consisted of two and one-half parts of ganister screened through ⅛-in. mesh with one part of portland cement and one part of ordinary fire clay.

Experiments were made to determine the correct amount of excess air to be introduced and the correct location for orifices. Dampers or grates will be placed over these orifices later and calibrated in such a manner that the firemen always will know what setting to employ with a given fire condition and steam flow.

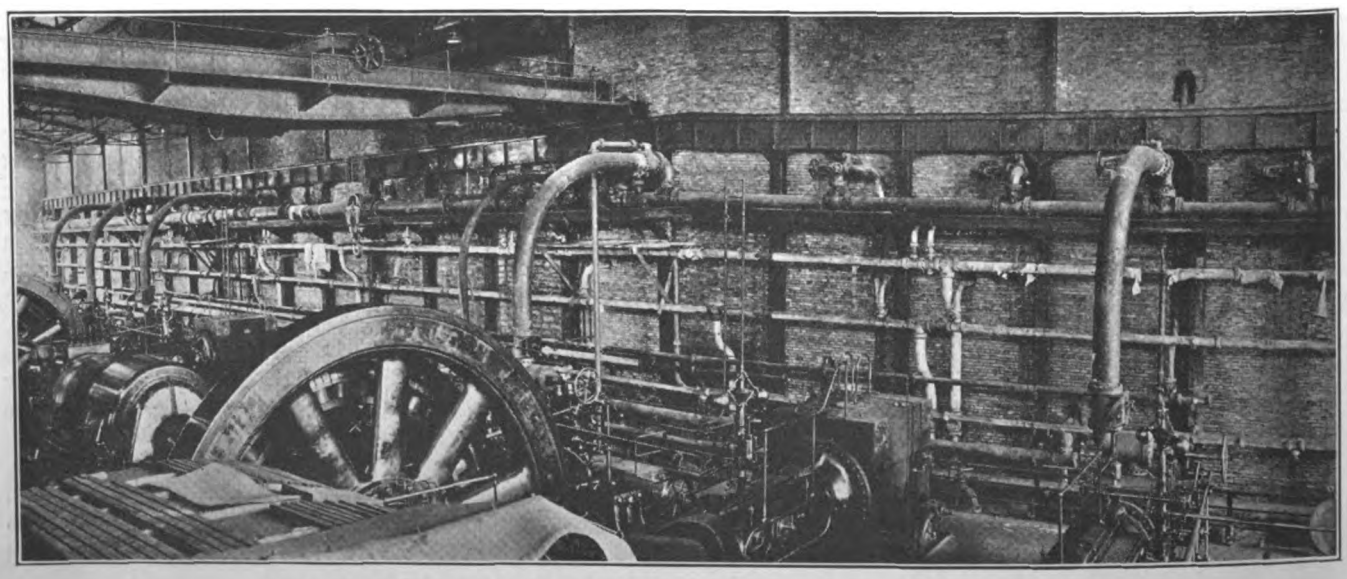
A number of other changes have been made in the boiler room, such as the installation of d.c. motors to drive the forced-draft stokers, fans and damper machines; the design and installation of coal spreaders in some of the stoker hoppers to cut down the labor cost of firemen and to produce uniform fuel beds; installation of recording meters and draft gages, including a trial installation of the Lea recording coal meter to give a continuous boiler check on pounds of steam per pound of coal.

Eight superheaters were installed to obtain decreased engine and turbine water rates possible with superheated steam at approximately 550 to 600 deg.

A large portion of the pneumatic ash conveyor system was replaced with a new steam-jet system for the purpose of reducing operating and maintenance costs. White iron ash conveyor pipe 1 in. thick was used, with a joint somewhat resembling Vanstone construction. Five boiler water deconcentrators and a feed water filter in the make-up line were installed to minimize boiler cleaning and upkeep expense. All cast-iron fittings, valves and screwed flanges in the boiler and engine leads were removed and replaced with steel fittings and valves and Vanstone flanges to withstand superheated steam.

Heat insulating materials were used to cover all steam and hot water lines, boiler drums and heads, etc., to cut down the heat losses in transmission.

The 7,500-kw. turbine was completely rebladed and repaired to place it in efficient operating condition, and the cast-iron head was replaced with a new steel head



Cast-Iron Valves and Fittings Were Replaced by Steel Parts in the Engine Room

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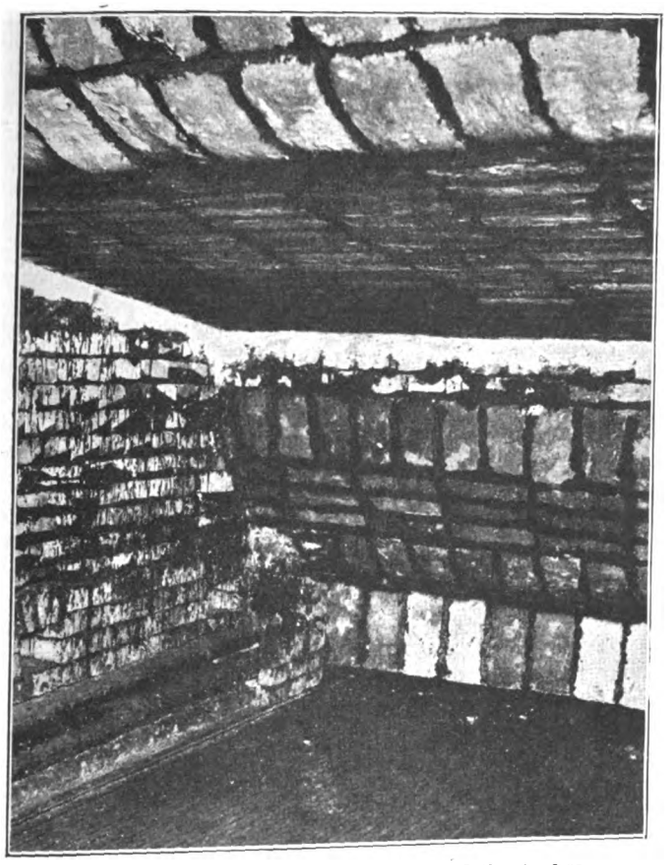

Interior View of Furnace Looking Toward the Arches

to permit the use of the increased temperature. A desuperheater and attemporator were designed and constructed for the purpose of automatically maintaining the temperature in the main steam header opposite the reciprocating engines at a point not in excess of 500 deg. F. at all conditions of flow.

The turbine-driven hydro-flow air pump on the main turbine condenser was replaced with a twin two-stage steam-jet air removal pump with inter and after condenser and the consequent halving of steam consumption necessary for air removal. A small automatic dual drive exciter set was installed for the purpose of constantly and automatically maintaining a station heat balance. A 750-gal. per minute boiler feed pump driven by a variable-speed motor was installed with automatic constant pressure differential speed regulating control. Under the load conditions prevailing computations proved a power saving of 17 per cent by the use of speed regulating control of the motor as compared with throttling control of the pump.

The station bus was redesigned and reinforced, as were the cables and wiring, the present output having outgrown the capacity for which they were designed.

A 1,000-kw. frequency changer was added to permit handling additional 60-cycle commercial load until an increase makes necessary additional 60-cycle generating capacities. Two 1,000-kw. full automatic rotary converter substations were also installed, with all necessary equipment, making possible faster and more frequent railway schedules at a minimum expenditure for labor.

In addition to the major items there were scores of minor changes, repairs and additions effected. All boilers were turbined and washed and a fixed cleaning schedule established. Masonry in furnaces and settings was placed in first-class condition, all steam or water leaks were sought out and eliminated, valves were repacked and ground, auxiliary turbines, engines and motors repaired and placed in first-class operating condition, main engines gone over in detail and completely rehabilitated wherever necessary. A complete new system of power house logs and accounting was introduced, which makes possible a much more accurate prediction of the annual maintenance budget or subsequent new construction budgets.

As not all the items of new equipment are yet in service, nor has the operating personnel yet had time to become so intimately acquainted with all details as to be able to say what maximum results are to be obtained, definite figures just at this time are not available. The general conclusions stated at the beginning of this article have, however, been definitely established.

What It Costs to Operate an Auto

CONSIDERABLE interest has recently been manifested by electric railway men in automobile operating cost figures for use in telling the owners how much they save by leaving their automobiles at home and riding the electric cars. L. S. Cowles, writing in the *Stone & Webster Journal*, gives figures throwing some light on the subject. The following is abstracted from his article:

Any driver knows that with "gas" at 20 cents per gallon and his car making 10 miles per gallon the fuel cost is 2 cents a mile. Beyond this, few care or take the trouble to go. When you see a Pierce-Arrow roll by with a chauffeur at the wheel, you may know at once that such an outfit is costing the owner from 50 to 60 cents per mile traveled. For small annual mileage, say 4,000 miles, the cost per mile may easily exceed $1. Few would believe this without analyzing the situation carefully. A few exact figures bearing on the actual cost of operating one particular car will enable one to get some idea of operating and maintenance expense.

ANNUAL STATEMENT OF MOTOR CAR OPERATION
June 11, 1922, to June 11, 1923

Make	Buick
Model	22-44
Type	Roadster
Total miles traveled	6,114

Operating and repair cost (not including replacements):

Interest	$35.61	Two bottles body polish	1.45
Depreciation	355.02	Cheesecloth	.15
Registration	10.00	One can leather dressing	.75
Driving license	2.00	One can nickel polish	.90
Fire and theft insurance	12.50	Distilled water	.10
Liability insurance	46.69	One flashlight bulb	.20
Personal property tax	22.56	Three 21-cp. lamp bulbs	1.50
16.75 gal. engine oil	15.91	Three 2-cp. lamp bulbs	.90
405 gal. gasoline	113.95	12 lb. grease	2.60
Two carbon burnings	9.00	1.75 gal. alcohol	1.50
Repair labor	74.18	One roll friction tape	.35
Tire repairs	6.65	Two flashlight batteries	1.00
1.75 gal. transmission oil	1.82	Battery charge	1.20
Tire powder	.20	Cotton waste	.90
One can "tar remover"	1.00		
		Total	$720.59

Cost per mile operated:

	Cents
Fixed charges	6.380
Operating fees	0.196
Insurance	0.970
Taxes	0.396
Fuel	1.865
Lubrication	0.333
Repair labor	1.470
Miscellaneous supplies and expenditures	0.260
Total cost per mile	11.870

From the above it is seen that fuel cost is a relatively small part of the whole. While no one wants to waste gasoline, the question of high mileage per gallon of gas is not as important as one might at first believe. In the case cited no allowance was included for garage rental and car washing, as these vary with the requirements of the owner.

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Some Useful Elements of the Street Railway Philosophy

By W. E. Wood
Manager Houston Electric Company, Houston, Tex.

The Real Interests of the Three Groups in the Public Utility Triangle, Public, Employee and Owner, Are the Same — What the Railway Management Should Do to Bring About Real Co-operation

PHILOSOPHY, as such, is generally conceded to be a dry subject, especially for the practical business man. But in our desire to analyze our business so that we may popularize it and administer it more successfully, we have naturally gravitated into a study of its philosophy. Having got into this study, we have been agreeably surprised to find how beautifully the facts we have always known develop themselves in the most logical fashion.

As a basis of our study we have accepted as true two important facts. A proof of their truth will not be attempted here because of the space that would be required, but surely we could not so earnestly continue to pursue our business if we did not believe them to be true. The assumptions are these:

1. In the heart of every human there is a spark of reason and justice that is capable of being fanned into a flame under proper condition.

Within this assumption lies our hope of obtaining the popular co-operation so essential to a successful operation of our business, for while it is true that we may temporarily lull our public into a quiet state of mind or even make them enthusiastic for us by catch phrases, attractive publicity and the like, if our basic arguments are not founded on "justice and reason," eventually these efforts will surely fail. Then the enthusiasm aroused in our favor will react with most unwholesome results. But if this enthusiasm is based on justice, reason and sincere efforts it is on the firmest foundation on which our industry can stand.

2. Up to the present time private ownership and operation have been capable of rendering street railway service more efficiently and economically than has municipal ownership.

Three Distinct Groups Interested in Every Public Utility

Having accepted these two assumptions as true we should next make a careful analysis of the public utility triangle.

There are three and only three distinct groups interested in each public utility. The public, the employees and the owners.

It should be beneficial to determine in what each of these groups is interested and what each may properly expect to receive from the business and from each other.

The Public: By virtue of the fact that the public through its constituted authorities has granted to the utility the right to use certain portions of its property in the transaction of its business, it has a right and does desire and expect to receive from the utility the best practicable service at the lowest possible cost.

The Employee: It is an accepted theory in this country that all employees are entitled, for proper performance of their duties, to receive, and it is their natural instinct to be interested in, fair wages and proper working conditions.

The Owner: Capital is essential to the construction and establishment of public utilities. There could be no reason why any one should become interested in acquiring or investing in public utilities unless he can reasonably expect the capital he so invests to earn a fair return.

So we find three separate and distinct interests, each apparently having a right to expect to derive some distinct benefit from the operation of the utility. Their interests may appear divergent, but a study makes it certain that for each to receive the greatest possible permanent individual benefits their interests must be unselfishly mutual.

The history of our industry clearly indicates that the public and employees will persecute the owners of a utility when they discover that the owners are receiving more than a fair return. Therefore it is to the owners' best self-interest, when the returns exceed a fair amount, with wages and working conditions all that they should be, to return the excess to the public in better service or cheaper rates.

If the public insists on getting its service cheaper than will yield the owner his fair return and the employee his fair wage and working conditions, the utility must fail and ultimately cause the public to receive an inferior service which necessarily becomes more and more expensive to operate. During the period of rising prices of wages and material, caused by the recent war, it was very hard for the public to realize that the above was a fact; however, its truth is becoming more and more apparent to the public every day.

Should the employees of a public utility demand and obtain more than a fair wage and working conditions, either the rate of fare of the service of the public must furnish this excess or it must be taken out of the owner's fair return. In either event the result would ultimately defeat its own purpose.

Mutuality of Interest Between Groups

We have recited a few instances which tend to demonstrate the mutuality of interest of the three groups interested in the public utility. Like the axioms in geometry, this fact is so clear and apparent that it is difficult to prove.

The public's manner of expressing its approbation or dislike for the owner or employee is through public attitude.

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The employee's method of showing his interest for the owner or public is through loyalty.

And the owners express themselves through their policies.

Believing, as we do, that there is a distinct and invariable mutuality of interest between the groups, then why is there so often controversy between the groups? Employees and owners are frequently at odds. Employees and the public sometimes entertain a healthy disrespect and dislike for each other, and in the immediate past instances of antagonism between the owners and the public were continually arising. Our reasoning shows that such conditions are contrary to the best interests of all concerned. To eliminate them we must first determine their causes.

Improper Policies and Lack of Understanding Causes for Disagreement

There seem to be two major reasons why the public's attitude toward the owners is hostile or the employees are disloyal to the owners:

First—The formulation and maintenance of improper policies by the owners toward the public or the employee.

Second—Lack of understanding.

These causes seem to cover every case both in connection with the public's attitude and loyalty of employees. As a rule, where the public attitude is the most favorable, the employees are the most loyal. In this case the owners' policies necessarily approach right, and there is little lack of understanding.

In some cases the employees are loyal yet there is an unfavorable public attitude. This indicates that the owners' policies point right but that the public lacks the understanding of the situation which it has been possible to convey to the employees. In every case it must be remembered that the employees' loyalty is weakened by improper policies toward the public and the public's attitude is adversely affected by the improper policies of the owners toward their own employees.

Continuing the analysis, we find that the owner should weigh his policies to the public in respect to service, publicity, citizenship and expansion.

The owners' policies toward the employee include wages, working conditions and welfare work.

All of the phases are susceptible of a most interesting further analysis.

Now, if the owners' policies toward both the public and employees are right, fair and just, then certainly, if our first original assumption is true, and in some manner we can convince the public of the fairness and justice of our policies, the antagonism will begin to disappear.

Lack of understanding can only be wiped out by the education of both the public and employees concerning utilities in general and the specific utility concerned in particular.

Components of Service

We are studying the street railway business, the most important feature of which to the public is service, therefore special care should be taken in analyzing our service.

Service is composed of: (1) Safety, (2) quantity, (3) personal service (commonly called courtesy), and (4) cleanliness and comfort.

Safety is the first and most important component of street railway service. When we do not make it so, our widespread catch phrase "safety first" is insincere and therefore a cause of public disrespect. There are so many phases to the study of safety that although most interesting and important, it cannot be considered here.

By quantity of service we mean the amount, frequency, regularity and speed. It should be unnecessary to point out to any street railway man the importance of having an entirely sufficient service with as excellent a standard as possible. It is equally our duty to the public to be sure that this service is rendered as economically as possible in order that it may be given "at the lowest possible cost."

Personal Service Rendered Is Different from that in Other Utilities

The third component mentioned of railway service is personal service. Although we have barely pointed to the importance of safety and quantity of service, we must not in the slightest degree minimize their importance. Service is like a three-legged stool standing on safety, quantity and personal service. If deprived of any of the three legs, it cannot stand. It is difficult to say which leg is the most important, but for fear that the usefulness and spirit of "personal service" may not be fully appreciated we will inquire into this phase more minutely.

To understand to the fullest the place of personal service in street railway service, it is necessary to digress sufficiently to study street railway psychology as compared with that of other utilities. For the greatest contrast we will compare electric lighting with street car service. One enters a dark room and wishes light. A switch is located in the room convenient to the entrance. With a minimum of effort the button is pressed and instantly the room is lighted, and the person unconsciously feels a sense of satisfaction. Psychologically there is nothing in the operation that would prepare his mind to harbor any ill feeling or mistrust for the lighting company. He knows of no substitute at any cost that is comparable in convenience or satisfaction.

But picture a modern man, our friend Bill Jones, a regular patron of the street car service on an ordinary morning's ride to his office. Mr. Jones may or may not be the possessor of an automobile, but surely he is fully acquainted with the comfort and speed they offer and besides can easily forget their small disadvantages. Possibly his family has started him a little late to work. He has to walk two and a half blocks to the car line. Although there is no particular objection to this, he doesn't relish it every morning. He has to wait four minutes for a car, not an unreasonable wait but seemingly much longer, and distasteful. The street car maintains a good average schedule speed to town, but automobiles pass it and, darting in and out of traffic, weave their way to the city in less time. Somehow, the occupants of the automobile look more comfortable to him than he feels. At times a broken truck may delay the street car. Bill Jones is not an unreasonable man, but under these conditions the street car ride furnishes him no real sense of satisfaction and very probably his mind is prepared to entertain some ill feeling or mistrust for the street car company.

So we find that very few people will get pleasure out of street car riding even when the safety and quan-

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tity are above reproach. But all is not lost. We have a most effective way of preventing this ill feeling and mistrust from capturing Bill.

By the use of what we have called personal service, even under the conditions mentioned, we can gain his respect and very frequently his active co-operation. The lighting has practically no human contact with Bill, but the street car company has, every time he uses its service. We have commonly called this phase of our business "courtesy." But sincerely based on the golden rule our organization, if it is permeated with the spirit of personal service, can effectively win over Bill Jones. The definition of personal service is:

Those acts of kindness, courtesy, accommodation, attention, favor, respect and consideration which we may render to our fellow man in connection with our business.

Personal service tends to gain a favorable public attitude for the company. For the employee it makes individual friends, creates self-respect, gives the satisfaction of a duty well performed and makes his work more pleasant.

Besides this, if the company's policies are right (and if they are not, the spirit of personal service will be difficult to obtain), this spirit is the surest way of obtaining real co-operation in the utility triangle. Therefore, if there is a mutuality of interest the employees will ultimately be rewarded by better wages and working conditions. We might add, however, by way of warning, that if the personal service is rendered primarily in the hope of a material reward without a sincere desire to live up to the golden rule, it is not likely to be effective enough to gain the material reward.

Cleanliness and Comfort the Fourth Component of Service

The fourth component of service mentioned was cleanliness and comfort. Although these may not be as important factors of service as the three others, we feel that their necessity is apparent enough without further argument.

For fear of exhausting the patience of the reader no attempt will be made here to analyze the other factors of the owners' policies to the public, namely, publicity, expansion and citizenship, or to the employee, which can be summed up under the headings of wages, working conditions and welfare. It is necessary clearly to understand the public's and employees' rights and the company's obligations in these respects to "formulate and maintain the proper policies."

Real Co-operation Necessary

What we have tried to accomplish is to show the relationship between the three groups interested in the public utility; to prove an absolute and unchangeable mutuality of interest between these groups, which in turn means that for their own interests there must be a real co-operation between the groups. And, lastly, we have tried to analyze the things the owner, through its management, can and ought to accomplish to bring about this mutual understanding and co-operation.

If we can render a better service more cheerfully by understanding this philosophy, is it not necessary for us to teach and preach it throughout our organization until every one of our employees can better perform his daily duty because he understands how to and believes in the necessity of winning the public?

Concrete Paving of Track in Chattanooga

Tennessee Power Company Is Installing Concrete in Track Area with Excellent Results—Ballast Is Tamped Under Traffic

With a view to securing permanently satisfactory results with concrete paving in and between tracks, the Tennessee Power Company, which operates the city railway lines in Chattanooga, Tenn., has lately used the track construction shown in the cross-section, Fig. 1.

The trench for the single track is 9 ft. wide and the bottom is inclined toward a 12-in. x 12-in. drainage ditch in which a 6-in. farm tile is laid. If the soil is soft, 2 or 3 in. of ballast is rolled into the bottom. The trench is about 22 in. deep at the middle and 2 in. less

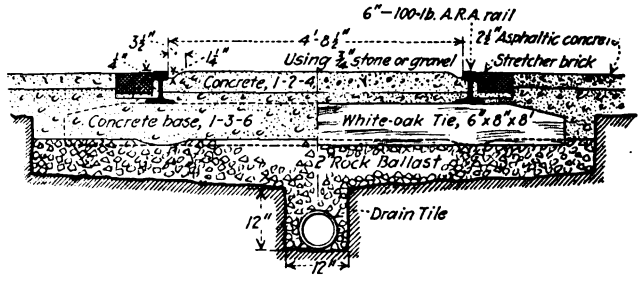

Fig. 1—Typical Cross-Section of Track for Paved Streets with Concrete Paving Used in Chattanooga

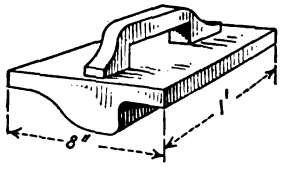

Fig. 2—Grooving Tool for Use in Forming Flangeway in Concrete Paving

Concrete Track Paving in Chattanooga Like that Shown at the Left Is Turning Out Well

at the outside. Broken stone ballast is laid in the bottom to a depth of 8 in. at the middle, on which white oak ties creosoted by dipping one hour in hot oil and one hour in cold oil are laid. Standard 6-in. 100-lb. A.R.A. rail is spiked to the ties.

A concrete paving base with a 1-3-6 aggregate mixed one and one-half minutes is poured between and over the ties, covering them to a depth of 2 in. The concrete base is deepened slightly under the rails by scraping out the ballast before the base is poured.

The paving base is made about 9 in. deep outside of the rails, where, as in the case illustrated, an asphaltic concrete paving is to be laid by the city. Outside the rails the concrete is depressed to accommodate two or more rows of stretcher brick, which are laid on a sand cushion.

The concrete between the rails is 4 in. deep, of 1-2-4 concrete mix, surfaced as indicated in the cross-section.

Contour strips of wood are laid in the rail flangeways while the concrete is soft, and the surface is smoothed by means of a level board. The surface is not crowned. After the concrete has hardened suffi-

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ciently to "stand up," the flangeway is smoothed by means of a special grooving tool shaped in the form shown in Fig. 2.

Expansion joints are placed 15 ft. apart, a space ¾ in. wide at the top battered to ½ in. at the bottom being left for this purpose. A board with the proper taper is used in forming this joint, and the concrete is mixed with as little water as possible to enable it to stand up when the expansion joint board is removed.

After the removal of the board, a grooving tool, such as is used by sidewalk layers in marking lines in concrete surfaces, is drawn through the groove, slightly rounding the edges. Pitch is poured into the joint after twenty-one days.

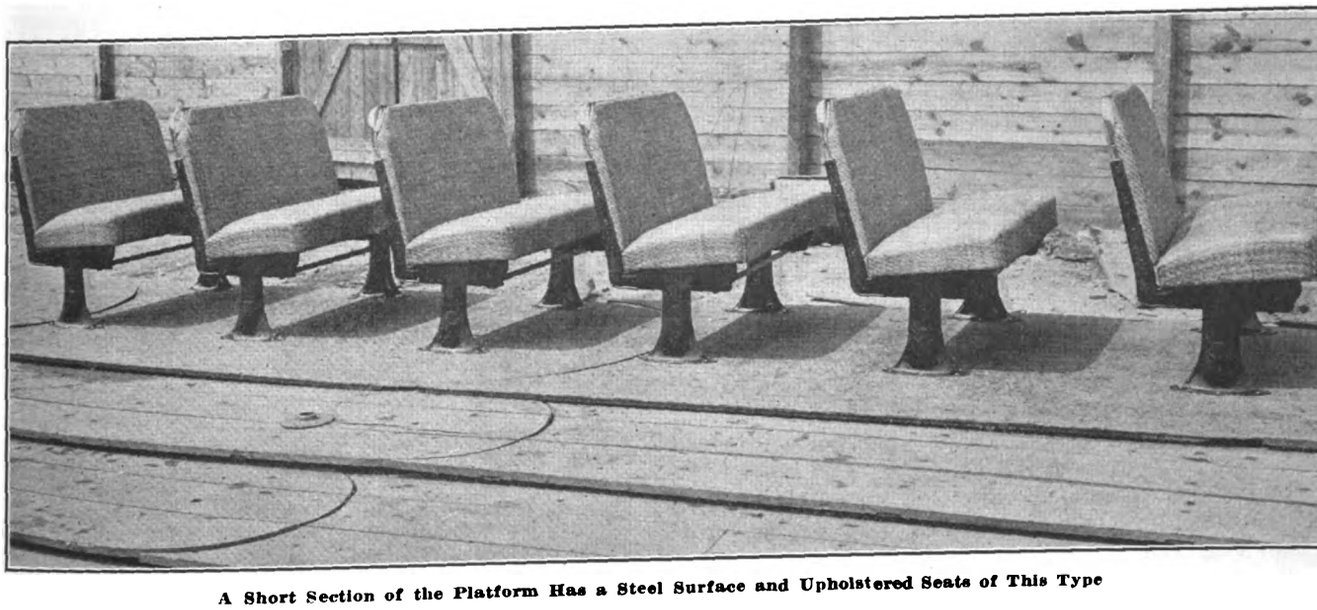
The concrete paving and the ballast tamping are done under traffic. Sometimes ten tampings of the ballast are needed when the ground is soft. The tamping is done with ordinary hand picks. Care is taken to see that no flat-wheel cars go over the line while the concrete is setting, and all cars are run during this period at reduced speed.

For the first seven days the concrete is continually wet down to permit uniform setting.

The cost of this work was from $1.25 to $1.50 per yard on two recent jobs on Walnut Street and Harrison Avenue. This work was carried out under the direction of R. C. Morrison, engineer maintenance of way Tennessee Power Company.

Moving Platform Tests Show Low Power Requirement

A Demonstration Plant of the Type of Platform Recommended for Forty-second Street, New York, Has Been Built for Tests and Demonstration Purposes



A Short Section of the Platform Has a Steel Surface and Upholstered Seats of This Type

A SERIES of dynamometer tests has recently been concluded on a demonstration plant of the type of moving platform considered by engineers of the New York Transit Commission for use under Forty-second Street in place of the present shuttle train service. This demonstration plant has been built in Jersey City by the Continuous Transit Company, of which H. St. Clair Putnam is president.

The demonstration plant is constructed in the form of a loop approximately 200 ft. long and 100 ft. wide, with a 50-ft. radius at each end. It consists of three parallel continuous platforms designed for operation at 3, 6 and 9 m.p.h. respectively. The high-speed platform is 57 in. wide, is provided with seats spaced 32 in., holding two passengers each. At 9 m.p.h. this gives a total seating capacity of 35,640 per hour. Each of the lower-speed platforms is 27 in. wide, and there is a stationary walkway path alongside the slowest platform. The total width of the three platforms assembled is 9 ft. 3 in., and the height above the rail is less than 12 in. Each loop is made up of a series of small trucks 8 ft. long with circular ends exactly fitting into each other. The trucks are supported at the rear end by two independent wheels with ball bearings. The forward end is connected to the preceding truck by a universal coupling. The track for the high-speed platform has a gage of 37 in., and for each of the other platforms it is 17½ in.

The general design of the installation is along the lines of a paper read by L. B. Stillwell before the American Society of Civil Engineers on Nov. 17, 1920, and reported in the ELECTRIC RAILWAY JOURNAL for Nov. 27, 1920, page 1102, and Jan. 15, 1921, page 124. The most important change in the present demonstration plant from that description is that only the high-speed platform is propelled by induction motor

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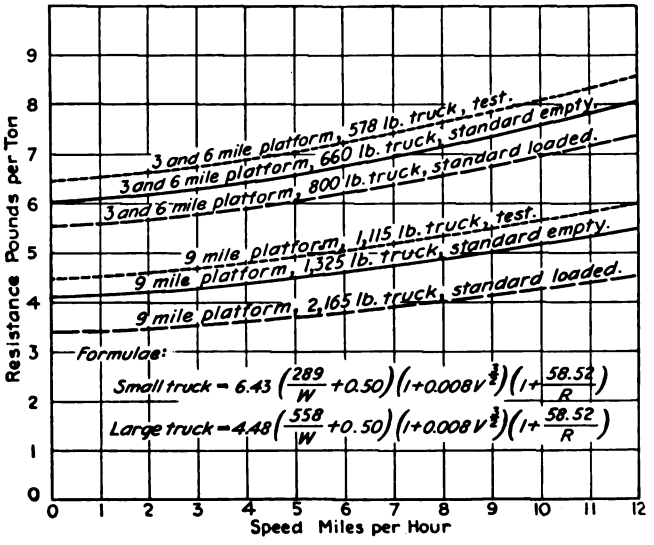
elements, the other two being driven by racks and pinions. With the induction motor type of drive a stationary element is placed between the rails. This consists of a development of the ordinary primary or stationary part of an induction motor, as shown in the illustration. These sections are approximately 5 ft. long and are placed between the rails in groups about 140 ft. apart. The secondary element is similar to the developed rotor of the squirrel-cage type mounted on the bottom of the truck. It consists of a laminated iron core with punched copper windings. Except for the necessary breaks between the trucks this is continuous for the entire length of the platform. The primary is supplied with three-phase alternating current at 37½ cycles per second for a speed of 9 m.p.h. In the demonstration plant the alternating-current generator supplying the propulsion power is capable of



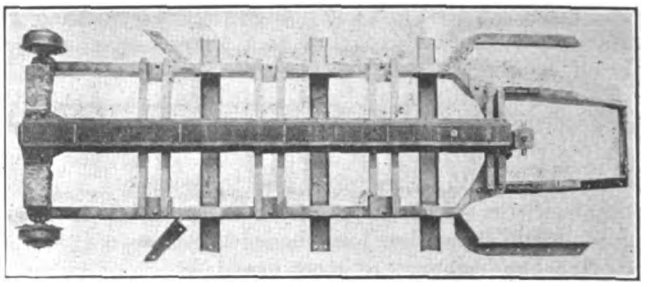
Train Resistance of Moving Platforms on Tangent Track

drive at variable speeds in order to change the speed of the platforms.

The two lower speed platforms are similar in type. The racks are continuous, and are mounted on the underside of the platform in the same manner as the secondary element in the induction drive.

In the demonstrations witnessed by representatives of the ELECTRIC RAILWAY JOURNAL, the three platforms have been run at various speeds to determine what will be practicable in service. With the high-speed platform running at 4.5 m.p.h. and the others at 3 m.p.h. and 1.5 m.p.h. respectively no difficulty at all was experienced in getting on or off, or stepping from one platform to the next. This also held true when the platforms were speeded up to 2, 4 and 6 m.p.h. At speeds of 3, 6 and 9 m.p.h., for which the installation was designed, it was necessary to practice getting on or off before facility could be had in it, or in stepping from one platform to the next. It was difficult, however, to trip oneself so that a fall was imminent. It has been suggested that the platforms can be operated at reduced speeds during the non-rush hours, and speeded up for the maximum loads.

The power requirements for this type of platform have been determined from dynamometer tests made by the Electrical Testing Laboratories of New York. Since the platform is continuous and approximately 73 per cent of the track length is curved, this was the only method available to determine the power required



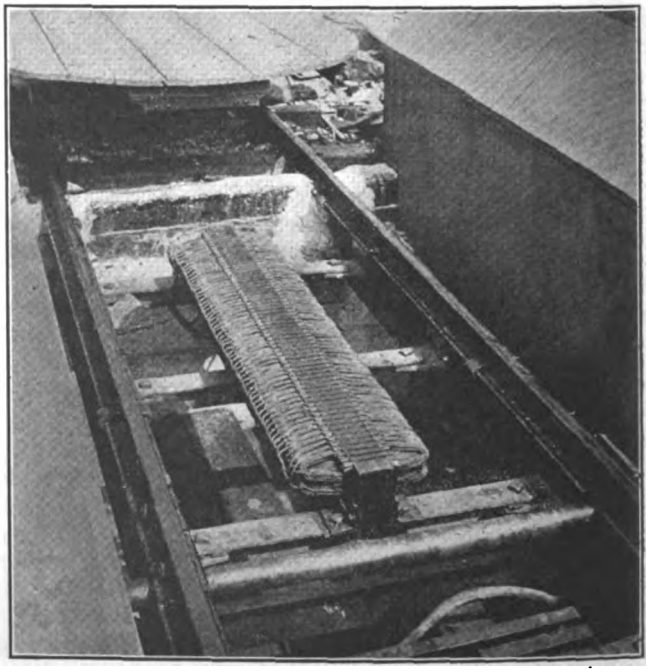
Under Side of Truck for High-Speed Platform, Showing Induction Motor Secondary Element

for longer platforms of the same type. Tests were made at various speeds in order to determine the train resistance, both on tangents and on the curves. From these tests the train resistance has been worked out, as shown in the accompanying curve sheet.

Average figures show that the train resistance on tangents of the high-speed platform at 9 m.p.h. is approximately 5 lb. per ton empty, and 4.1 lb. per ton fully loaded. The other platforms have a resistance of approximately 6.3 lb. per ton at 3 m.p.h. and 6.7 lb. per ton at 6 m.p.h. when empty and 5.8 lb. per ton at 3 m.p.h. and 6.2 lb. per ton at 6 m.p.h. when fully loaded. It is not expected, however, that large numbers of persons will desire to ride on the slower platforms. The resistance on curves is from two to two and one-half times the tangent resistance.

It is stated that this low train resistance is due largely to the use of ball bearings and independent wheels and to lubrication of the rails. It has been found that this reduces the frictional resistance to a material degree. Rail lubrication is of course possible in the case of an installation of this kind, since the rails are not used for traction.

The average resistance of three loops of moving platforms 2 miles each way in length, which would be required for the Forty-second Street installation, is 6 lb. per ton including curve resistance. The average resistance under maximum load conditions is 5.13 lb. per ton, including curves.



Three-Phase Induction Motor Primary Windings Are Placed Between the Rails

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Since there is no power needed for acceleration except at such times as the platforms have to be started, the only power requirement is that for overcoming the train resistance. Running at constant speed the power per mile for the three platforms unloaded is 91 hp., and 114 hp. per mile for maximum load conditions is needed. On this basis the complete double-track loop, required for Forty-second Street, would take 364 hp. unloaded and 456 hp. loaded.

West Penn Center-Door Cars Successful

Interurban Service in Difficult Pennsylvania Section Much Improved Through Use of This Type of Car—Details of Construction and Equipment

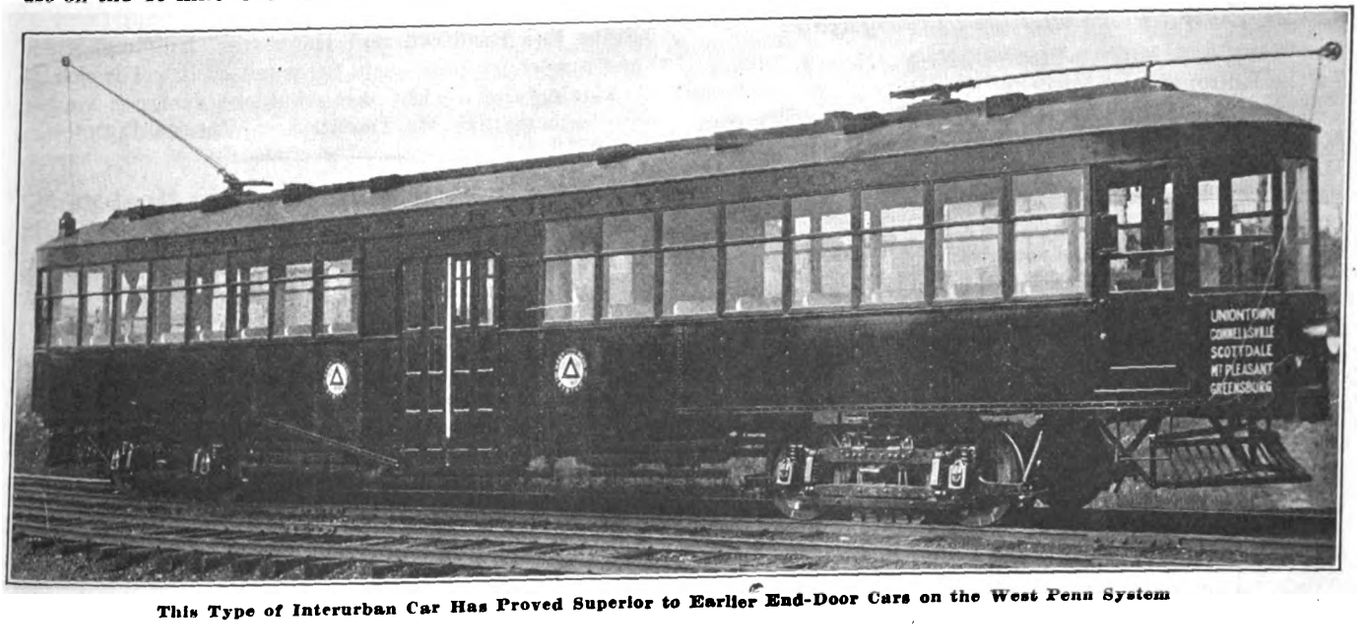
A MATERIAL saving in the time required for loading and unloading passengers is the chief advantage found by the West Penn Railways in center-door cars for interurban service. Cars of this type are in use on the 40-mile line between Uniontown and Greensburg, as well as on 95 miles of shorter routes on the Coke Region division, and have proved to be much more satisfactory than the end-door cars formerly operated.

Physical difficulties of railway operation are great in this territory, due to the fact that it lies among the foothills of the Allegheny Mountains. Grades in some cases are as steep as 12 per cent. Careful operation and strict observance of the rules on the part of employees is necessary for the safety of the passengers and the maintenance of scheduled speed. Stops are well spaced, and attention has been given to the matter of increasing the speed of passenger interchange. During recent years the number of cars on time has averaged from 96 to 98 per cent of the total cars operated.

The West Penn Railways was one of the first companies to use center-door cars in interurban service. In 1910 an experimental car designed by W. E. Moore, general manager, and Daniel Durie, superintendent of equipment, was placed in service. While the original car was crude in a good many details, nevertheless from it has been developed the present standard interurban car of the company, which is thought to be ideal for the particular conditions prevailing in that territory. All the subsequent cars of this type have been built in the West Penn Railways shops at Connellsville.

The first cars of this type were built with a large two-part two-leaf folding door controlled by a hand-operated mechanism from the center compartment. In the later equipment the door is the same except that it is set flush with the sides of the car and is electrically operated by a Westinghouse 1/12-hp. 250-volt motor. All grab handles close inside of the car, and the doors on either side may be operated from any position within the car. Each door has an independent motor with a cord connection to the operating switch. A three-way snap switch to change the cord control from one door to the other has been installed. Besides these, each door has an independent lever by which it can be manually operated.

The length of the car is 58 ft. over bumpers, and the seating capacity is seventy, the general compartment containing thirty-six seats, the smoking compartment thirty seats, and a small compartment at the center having four more. Standard practice has been followed in the construction of the underframe, which is of wood reinforced with steel plates. Side sheathing is made of open-hearth rolled steel. The exterior of the car is painted deep orange, with black trimming. On each side of the center door has been painted the monogram of the company.



This Type of Interurban Car Has Proved Superior to Earlier End-Door Cars on the West Penn System

The entire interior of the car is finished in cherry except the ceilings, which are enameled in light buff. Artificial lighting is accomplished by thirty 23-watt Mazda lamps, located in two rows, one on each side of the car directly over the seats. The buff color ceiling has been found to be an excellent reflecting surface for these lights.

An outside marker or taillight is a combination of daylight and night stationary fixture with a turning arm inside of the car. Each marker is equipped with green and red glass and a 6-volt 2-cp. lamp on an Edison three-cell 18¾-amp. storage battery. The battery is kept charged by a connection through the headlight resistance. In addition to that a lamp of similar size is placed in the center compartment ceiling to show when the trolley wheel leaves the wire. This also makes it pos-

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sible for the conductor to keep close track of the marker lights, as they are in parallel with this lamp.

A feature that has been found especially pleasing to the motormen is the front center "clear vision" window. Originally a double glass was used to prevent steaming and frosting during the winter weather, but more recently these have been replaced by a ½-in. French plate glass, which is far superior to the old arrangement. It does not steam nor frost, gives a clear vision, and is much easier on the operator's eyes.

The cars are equipped with Westinghouse magnetic brakes, which have proved to be very efficient. Truck maintenance costs are said to be considerably reduced and flat wheels are practically unknown. With this type of brake wheels have a very high mileage of service, records of more than 350,000 miles being quite common on the West Penn system.

The Readers' Forum

Zone Passes on Flat-Fare Systems

MOUNT VERNON, N. Y., Nov. 9, 1923.

To the Editors:

Any one who gives the principle of the weekly pass serious thought will find a number of advantages therefrom, not obvious at first sight. Among these is the one which Lawrence H. Doolittle has set forth in his communication "The Weekly Pass as a Simple Zoning Expedient," published in your issue of Nov. 3.

If I understand Mr. Doolittle aright, he suggests passes good within certain sections or zones on what to the cash and ticket rider is still a flat-fare system. In other words, if the standard fare were 7 cents we might perhaps have a universal pass at $1 and shorter-distance passes at say 50 cents for one zone and 75 cents for two zones. A passholder who rode beyond the bounds, as Mr. Doolittle explains, would not gain thereby. "What goes up must come down" is still true. The passholder would not be likely to go much beyond his boundary, because on the return trip he would either start or end in the wrong zone and thus have to pay the unit cash or ticket fare. This would give a slight reduction in rate only for the occasional long rides.

This plan would not be feasible, of course, on the many systems where there is a combination like pay-leave outbound and pay-enter inbound. The passholder would buy a one-zone pass good in his suburban area. This he would show on leaving outbound or entering inbound, thereby getting the best of it every time.

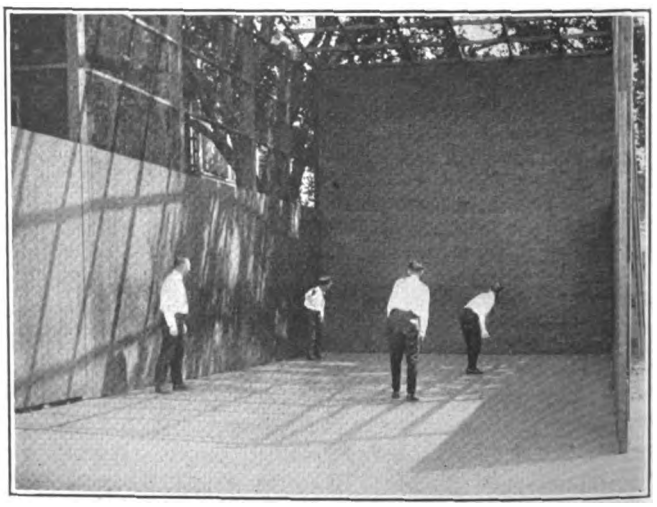
While Mr. Doolittle has arrived at his suggestions independently, the same plan was set forth two years ago in a confidential report by the writer to a rapid transit company. In this instance, it was also proposed to retain the flat fare for cash and ticket riders but to sell both an inner and outer area pass as well as a universal pass. When one of the operating staff pointed out that the holder of the single-zone pass could over-ride without detection on this all pay-enter system, the general manager cleverly retorted that every station over-ridden meant just as many stations to overwalk on the return trip. The company adopted the pass plan, but refrained from installing the single-zone short haul pass for reasons of policy.

As a student of pass installations, Mr. Doolittle may be interested to know that the distance principle is in effect on at least eight installations in this country. In all these cases, the price of the pass has been shaded downward as the average length of haul increased and the probability of repeating full-length rides decreased. On several of these installations the character of fare collection is such that a passholder could readily over-ride if he wanted to do so, but the fare collection plan automatically minimizes this for the reasons noted hereinbefore. Even in those instances where the cash and ticket fares are zoned, abuse is minimized by the fact that the difference in price between passes is too small to encourage the practice of over-riding one way and paying the cash fare between boarding place and the boundary of the section within which the pass may properly be presented. For instance: With one pass costing $1, the other $1.25 and the cash fare 10 cents, it would not pay to do this more than twice a week.

There is no question that short-haul passes would bring more short-haul fares. They do so on the Beaver Valley Traction Company's system, where some of the passes cover sections having no exact relation to the cash fares. They also bring more short-haul fares on systems like Bradford and Doncaster, England, where there are short-haul cash fares as well. The job of introducing the weekly pass would be easier if we had more converts like Mr. Doolittle. WALTER JACKSON.

Men Take to Hand Ball in Boston

THE Boston Elevated Railway has constructed a hand ball court in the rear of several of its division headquarters. It is found that the men take a great deal of interest in this game and by its exercise acquire agility and other physical qualities very useful in their daily work. An advantage of the game is that it can be played for a short or long time, as may be desired. Another advantage is that it can be played in winter as well as at other times of the year, if only a little trouble is given to removal of snow in the court.



The Hand Ball Court, a Popular Place for Exercise Between Runs in Boston

The hand ball courts in Boston are laid with a concrete floor and cost from $1,000 to $1,500 each to install, depending upon conditions. Four or five have been built, and it is the policy of the company to erect them whenever a carhouse is rebuilt, if there is sufficient ground for their installation.

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Association News & Discussions

Relations Between Motor Bus and Trolley Car Outlined

National Chamber of Commerce Committees Issue Long-Awaited Reports on Economies of Transportation by the Various Agencies

EARLY this year, it will be remembered, President Julius H. Barnes of the United States Chamber of Commerce appointed five special committees of the chamber to report on various topics in connection with transportation. It is the intention to call a transportation conference at which these reports are to be considered. The topics selected for these committees were: (1) Governmental relations to transportation; (2) railroad consolidation; (3) readjustment of relative freight rate schedules; (4) highways and motor transport; (5) co-ordination of rail and water service.

As will be noted, the report of Committee 4 is the report of closest relation to electric railway companies. The report of this committee has just been made public, as has also a report of a special joint sub-committee, appointed by the chamber to consider the subject of the taxation of transportation agencies. Abstracts follow of the portions of these reports of particular concern to electric railway companies.

Relation of Highways in Motor Transport to Other Transportation Agencies

The committee appointed to consider this subject represented all branches of transportation service and was made up as follows: Alfred H. Swayne, chairman, vice-president General Motors Corporation, New York; W. J. L. Banham, general traffic manager Otis Elevator Company, New York; L. W. Childress, president Columbia Terminals Company, St. Louis; D. C. Fenner, engineer and manager Public Works Department, Macks Trucks, Inc., New York; Gerrit Fort, vice-president Boston & Maine Railroad, Boston; Philip H. Gadsden, vice-president United Gas Improvement Company, Philadelphia; W. H. Lyford, vice-president and general counsel Chicago & Eastern Illinois Railway, Chicago; Ralph H. Matthiessen, president Motor Haulage Company, New York; John D. Miller, president National Milk Producers' Federation, New York; H. H. Raymond, president Clyde Steamship Company, New York; Arthur T. Waterfall, vice-president Dodge Brothers, Detroit; Henry J. Waters, editor *Weekly Kansas City Star*, Kansas City; R. C. Wright, general traffic manager, Pennsylvania Railroad, Philadelphia.

In the introduction to its report, the committee, after referring to the rapid development of the passenger motor car and the motor truck, says that inevitably this rapid growth of a new transportation facility has had its effect on the old facilities. Inevitably there has been, and still is, misunderstanding and conflict in the fields of the old and the new facilities, and the old ones are only at the beginning of a readjustment of their activities to meet the new conditions. Meanwhile, the new facility, with inadequate organization and often with little knowledge of its own operating costs, has, in some cases, attempted to handle traffic for which it is not fitted, thus producing an incorrect popular impression as to its proper rôle in our national transportation system. There is already evidence of a tendency to a better understanding of this rôle and toward increasing co-operation of the motor with all other carriers. The present report points out ways further to effect this co-operation. ways in which this co-operation can be effected.

Rôle of the Motor Truck Within the Terminal Area

There are three principal directions in which the motor truck can serve to relieve the present terminal situation. These are:

1. By organized cartage instead of the present go-as-you-please method of receipt and delivery at the rail terminal; further than this, by store-door delivery, which is the real completed transportation.

2. By a substitution of motor service for a part of the rail service. This would cover trap car l.c.l. freight service to industries and in a large measure similar movement in interchange as between local stations.

3. By complete elimination of certain rail service. This would cover intra-terminal movements, such as movements between industries or different plants of the same industry within the terminal area, which would then be handled by motor truck.

Rôle of the Motor Truck Outside of the Terminal Area

The committee believes that where a good highway exists the motor truck has the advantage over the steam and electric railway for distances up to 10 miles in some instances and 25 miles in others, and that beyond 50 miles under certain conditions and 150 miles in others railroads would generally have the field. This leaves a competitive zone with a lower limit of 10 to 25 miles and an upper limit of 50 to 150 miles, with which each form of transportation has certain advantages, and the shipper should be free to make his choice with due regard to cost, time of transit, reliability of service and other considerations. Primarily, the question is one between steam railroad and motor vehicle, but in certain districts, notably in the Middle West and in California, freight movement by electric railways has been highly developed, so that electric railways are interested in this situation, as well as in the question of competition of motor buses in passenger service.

Altogether the estimated ton mileage of the electric railroads in 1922 is approximately 1,000,000,000, as compared with 340,000,000,000 for the steam railroads. Probably the ton mileage by motor trucks considerably exceeds that by electric railways. Because of the greater flexibility of the electric cars compared with the steam train and the lower overhead due to the smaller investment in terminals, the electric railway can in many instances handle package freight profitably for distances below the economic limit for steam railroads, thus widening the competitive zone as between the electric railway and the motor truck. The possibilities in the use of electric railways in the handling of freight have not as yet been fully appreciated, even by electric railway companies themselves, and a large development of this field may be expected in the future.

Competition in Passenger Transportation

Competition of the motor vehicle with the steam and electric railways for passenger traffic divides primarily into two classes—that carried by buses and that carried by the private automobile. Whatever inroads the private automobile has made upon the carriers are inevitable and the carriers must adapt themselves to the new conditions. Bus service may be classified as (1) tourists' service; (2) de luxe service in urban districts; (3) non-competitive service; (4) feeder service to rail carriers and (5) parallel competitive service.

There can be little question as to the desirability of free play in the development of motor service for any of the four classes first mentioned. The fifth class, however, offers a more serious problem. The questions to be answered here are: Is the service of the rail car-

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rier adequate and satisfactory to the public? If not, can the rail carrier make it so?

In some fifteen states the Public Service Commission already has authority to grant or refuse to grant certificates of public convenience and necessity to such prospective motor operators. It is wise for the commissions to have this authority as it will afford the existing railroads adequate protection.

The standards by which the merits of any medium of passenger transportation must be judged are:

1. Ability to render safe, adequate and satisfactory service in an efficient manner under all prevailing conditions.
2. Cost of the service.

Competition Undesirable

There is now quite general agreement on the part of public officials and transportation experts in the automotive and electric railroad fields who have studied the problem that the two forms of passenger transit—motor vehicle and electric railway—cannot permanently exist in a community and pay their way in competition with each other. Furthermore, there exists today an almost unanimous opinion among those who are qualified to judge that the motor vehicle may be used to supplement the electric railway service in such a manner that the transportation needs of the community will be most efficiently met by the provision of a complete system of transportation, under the supervision of a single reliable agency, rather than by individual transportation units.

The problem must be analyzed from the standpoint of the requirements of the entire community. There may be instances where buses, operating in competition with steam and electric railways, have so flourished as to give rise to the feeling that the new medium was the more economical unit. That condition arises primarily because the bus most frequently operates over what may be termed "preferred routes," where the traffic density is greatest and the length of haul shortest, but without regard to the needs of the community as a whole.

On the other hand, nearly every large urban electric railway company has lines which are at present unprofitable to operate. They may reflect bad judgment on the part of an earlier management, or shifting population that has taken away traffic they once had, or they may have been built under public compulsion. In any event, the companies have heretofore been compelled to continue to operate these lines, with a resultant drain upon the revenues from their more remunerative lines and a lessening of their ability to render adequate service to the entire community.

It seems reasonable that in such a case the railroad company should be permitted to substitute bus for rail operation, or that if an independent bus company be granted a certificate of convenience and necessity to operate a parallel service substantially similar in quality, the railroad company should be permitted to abandon the unprofitable rail line.

The Federal Electric Railways Commission, appointed in 1919 to make a nation-wide investigation of the electric railway situation, declares: "It is clearly in the public interest that all common carriers engaged in local transportation service should be required to render adequate and safe service, and that local transportation facilities should be developed in the most economical and effective way from the point of view of the community. Unnecessary and destructive competition ought not to be permitted, and the community at large should conserve the established facility that still is and promises to continue for an indefinite period the principal means of local transportation."

It is believed that the electric railway is the best medium for the mass transportation of passengers, and should be the foundation of the co-ordinated transit system of the whole community.

It is, however, recommended that a thorough study be made of the problems involved in the handling of the transportation of passengers within the terminal areas, with special reference to public and private passenger carrying vehicles.

Relation of Motor Transport to Highway Development

The motor truck did not find its place in national transportation until the war, and as it was during that period and the one immediately following that highway engineers were forced to cut down maintenance, it naturally followed that a question arose as to the ability of the engineer economically to maintain the road under the new traffic. Studies of the cost of highway maintenance have been made by the Bureau of Public Roads, in conjunction with the State Highway Departments in California and New York, and have brought to light certain facts in regard to the effect of traffic on road wear. They have shown, for example, that a "light" truck with an abnormal relation between sprung and unsprung weight, a heavy overload, or too narrow or worn tires, may cause much more damage to the highway than a so-called "heavy" truck. Other factors affecting maintenance are comparative density of traffic, speed of travel, width of axle rather than gross load, and the comparative type of the highway and its condition. While a heavier sub-base is being used now in highways, it is impossible to say for how much of this heavier design the motor truck is responsible and how much of it is attributable to the increase in motor traffic of all kinds.

Regulation of Motor Carriers

The committee believes there has been a growing recognition during the past few years of the principle that one engaged in the business of common carrier by motor vehicles should be subject to regulation as to its rates or service just as any other common carrier.

Unregulated competition of motor-bus lines with electric railways, or of several bus lines with each other, may temporarily give increased service or lower rates, but inevitably it will result in decreased earnings and a lowering of the standards of service, until one or all of the competitors are faced with ruin. Under proper regulation, intelligently and fairly applied, such as has been adopted in a number of states, the extent to which competition is desirable in the public interest rests with the regulatory body. Destructive rate cutting is prevented, and duly authorized motor vehicle common carriers are accorded the same protection given to other public utilities, this at the same time providing the greatest measure of useful service to the public. Through judicious regulation, and only in this way, will it be possible to obtain efficient, economical and adequate co-ordination of motor transport and electric or steam railroads.

Federal regulation of interstate common-carrier motor transportation has not as yet been adopted, but it is believed that it is necessary.

Municipal regulation of common-carrier motor service frequently interferes with the effectiveness of this form of transportation, particularly where such municipal regulation conflicts with regulation by the state.

The principle of regulation by state regulatory bodies of intrastate traffic has been quite generally accepted in this country, and is believed to be sound as applied to motor vehicle common carriers as well as to other public utilities.

The scope of the regulatory powers of the utility commissions varies widely in the several states. The following outline covers broadly the powers which have been vested in these commissions for the purpose of public supervision of common carrriers:

(a) Power to grant, refuse to grant, supplement and amend the right to operate.

(b) Determination of the amount upon which, in fairness and justice to both the investor and the public, the enterprise should be allowed to earn a return.

(c) Establishment of rates or systems of rates which will yield sufficient revenue to meet all operating and overhead charges, including a reasonable rate of return to the investor.

(d) Power of regulation in respect to all matters affecting conditions and character of service, including extensions and improvements.

The right to operate common-carrier motor vehicles, similar to that to operate an electric railway or other public utility, should be contingent upon the granting of a certificate of public convenience and necessity. In considering an application for such a certificate, the state commission should take into account, as the commissions now do in the states where the motor vehicle is under their jurisdiction, the extent and quality of service rendered by the existing agencies, the desirability of intro-

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ducing new competition or forcing existing agencies to curtail or discontinue their operations—in short, the public interest in the premises.

If a certificate is granted, the operator should be compelled to furnish ample evidence of financial responsibility or else carry insurance adequate to cover all injuries to persons or damage to property resulting from negligent operation.

Where motor transport, particularly by passenger buses, appears to answer the public need most fully, it is believed that other forms of common carriers should be permitted to install such service as an adjunct to their lines. They are now prevented by the laws of some states, and it is believed that such laws should be repealed.

Size, Weight and Speed Restrictions

The enormous development of the motor vehicle, during the past ten years, not only in numbers but also in size and weight, has introduced a number of very perplexing problems with respect to the construction and maintenance of highways and the supervision of traffic on the highways. The increased wear on highways due to the increasing use of heavier and faster vehicles has resulted in the adoption by most of the states of size, weight and speed restrictions.

At the present time there is no uniformity in these restrictions, and this results in serious inconvenience and hardship on individuals and companies operating in more than one state. The weight restrictions in some states are rather indefinite, some specifying gross weight of vehicle and load, enumerating maximum permissible weight on four wheels and six wheels and stating distance between axles, while other states in addition to the above restrict the maximum load per inch of tire. It is believed that there should be uniform size, weight and speed restrictions in all states and municipalities, provided that, where conditions demand, seasonal restrictions, lower than those normally enforced, should be prescribed and administered, under proper safeguards, by the state authority.

Conclusions

The committee makes extended recommendations, among them the following:

"The best interests of the public and the rail, water and motor carriers lie in co-operation between the various agencies of transportation rather than in wasteful competition.

"To insure to the public continuity and reliability of service, sound financial organization of motor transport is necessary, as well as public regulation of common-carrier motor service.

"Passenger bus transport should be so regulated as to secure the best service to the public, certificates of public convenience and necessity as already required in many states being a useful means of insuring reliable and continuous service. Rail lines can often advantageously extend or supplement their service by bus lines, and in states where this is now prohibited such restrictions should be abolished."

Report on Taxation

The sub-committee appointed to consider this topic was made up of the following: George A. Post, chairman Geo. A. Post Company, Inc., New York; A. J. Brosseau, president Mack Trucks, Inc., New York; Roy D. Chapin, chairman of board Hudson Motor Car Company, Detroit; W. R. Cole, president Nashville, Chattanooga & St. Louis Railway, Nashville; Gerrit Fort, vice-president Boston & Maine Railroad, Boston; Philip H. Gadsden, vice-president United Gas Improvement Company, Philadelphia; W. H. Maltbie, attorney-at-law, chairman committee on special taxes, American Electric Railway Association, Baltimore. An abstract follows:

Taxes Paid by Transport Agencies

Statistics show that in 1913 the Class I steam railroads of the country paid $118,386,859 in taxes, as compared with $322,300,406 paid out in dividends. In 1921 these railroads paid $275,875,990 in taxes and $298,511,328 in dividends. The taxes exceeded the dividends in 1920 and 1922. The steam and electric railways and motor transport in 1921 paid more than 8 per cent of the nation's total taxes of approximately $9,000,000,000.

In 1921, in addition to these taxes, Class I steam railroads expended $756,413,690 for maintenance of way and structures, charging the sum to operating account. In the same year the electric railways paid in taxes and imposts $92,033,000. In addition they paid approximately $101,000,000 for maintenance of way and structures, charging the same to operating account. Motor vehicle owners paid in 1921 on the vehicles $75,000,000 in personal property taxes, $115,500,000 in special federal excise taxes, $147,000,000 in special taxes applied directly to the construction and maintenance of public highways, and in addition large sums to various municipal taxes, corporation and business income taxes and other property taxes, for which no figures are available.

Different Methods of Taxation

Consideration of the different methods of taxation in ordinary use leads to the conclusion that it is impossible to recommend any one of them as ideal or equitable for the taxation of common carriers.

A frequent method of taxation of common carriers is ad valorem taxation; that is, a taxation rate applied to an investment or valuation basis. This is largely an attempt to apply the old general property tax, in use in the early days of this country for the taxation of lands and of simple personal property, to complex and widely distributed economic units, manifestly in form unfitted for such methods of taxation.

It is now admitted by most taxation experts that the most equitable method of taxation for public utilities is that based upon earnings or income.

A graduated tax on gross earnings depending on the relation of net to gross was recommended by the New York State committee on taxation and retrenchment, in its report submitted March 1, 1922. This system has been designated the "gross-net" tax, and the committee recommends it as sound in principle, and one which should be applied to steam and electric railways and as far as practicable to motor vehicle common carriers. The details of such a tax scale would have to be worked out with much care in order that each form of transportation shall bear its just share of the requirements for public expenditures.

Such a tax has the elements of a sound tax, in that it has certainty, reasonableness and simplicity, while at the same time the state in each case will be assured of at least some revenue from each corporation.

This tax as applied to steam railroads and electric railways should replace the multiplicity of taxes at present levied upon them, including federal taxes on capital stock and income, and the various state and local taxes, such as franchise taxes (of different forms in each state), ad valorem taxes, taxes on gross earnings and on capital stock, annual licenses, special franchises, local real estate and personal property taxes. The gross-net tax should replace all of these taxes.

There are undoubtedly difficulties to be overcome in the application of the gross-net tax system. One of these is the allocation to the various political units of the gross and net earnings of interstate carriers on which the tax must be computed. The committee believes, however, that an equitable method of allocation can be devised.

Under the diverse bookkeeping methods employed by the small companies and by individuals who comprise the bulk of the highway transport common-carrier operators of today, practical administration of a gross-net tax is impossible. Pending common-carrier regulatory control which will place the earnings of these carriers upon a comparable basis for taxation, the committee believes that such increases should be made in the taxes now levied against the common-carrier motor vehicle as will bring its charges to an amount equitably proportionate to those that may be assessed against the other carriers.

It is recognized that this recommendation segregates common-carrier motor vehicles not only from private cars which have no gross or net earnings, but also from motor trucks used as private carriers and not subject to public control.

Construction and Maintenance of Highways

The report then gives the sources of money for the highway program for 1921, according to the United States Bureau of Public Roads, as follows:

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AMOUNT AND SOURCES OF HIGHWAY BUDGET, 1921

Source	Amount	Per Cent
Bonds	$417,817,208	39.0
General state and local taxation	381,091,542	43.9
Miscellaneous	88,919,158	
Gasoline tax and registration fees	109,154,226	10.2
Federal and forest road aid	74,679,897	6.9
Total	$1,071,662,031	100.0

Of the $853,844,823, representing all of the money above except that raised by bonds, the sum of $183,000,000 came from special taxes assessed against the motor vehicle and the balance from general and miscellaneous taxation.

Continuing, the committee says that it frankly accepts the motor vehicle as an essential addition to the transportation agencies required in our modern economic life. It follows that improved roads to carry the motor vehicle are equally necessary. These highways are free to the general public, and are built out of general public funds just as are schools, parks and many other improvements essential to the public health and welfare.

In the case of steam and electric railways the investment in roadway is a capital account, and returns on this investment are paid out of income, but on the other hand the steam and electric railways have certain franchise rights in the use of their roadway. Since the motor vehicle derives a special benefit from the improved highway, the committee believes that it should bear the entire expense of maintaining these roads in as good condition as when they were built, even where this involves resurfacing or reconstruction of the same type of road. In addition to a maintenance tax, highway transport common carriers should pay a tax in exchange for franchise rights comparable to those owned by the other carriers.

By paying the cost of maintenance of the highways which it uses, the motor vehicle puts itself on an equality as to maintenance with the steam and electric railways, which pay for the maintenance of their own way and structures through direct charges to operation instead of by taxation.

The committee does not believe, however, that the motor vehicle should be burdened with a special tax for the maintenance of roads not suitable for motor use.

RECOMMENDATIONS

In conclusion the committee makes the following recommendations:

"1. Each form of transportation should bear its fair share of the burden of public expenditure.

"2. Taxation of common-carrier transportation agencies should be simplified as far as possible.

"3. Taxes on regulated common carriers operated for hire should bear a definite relation to gross and net earnings rather than to invested capital.

"4. This requirement can best be met in the case of steam and electric rail common carriers by the imposition of a gross-net tax in lieu of the present levies. Pending full regulation of the motor common carrier, such increases should be made in taxes now levied against it as will bring them an amount equitably proportionate to that which may be assessed against the other carriers.

"5. The entire cost of maintaining the improved highways of the country should be borne from special taxes levied against the road user. Such taxes should be used for no other purpose.

"6. Co-ordination of highway construction and maintenance under centralized administrative agencies is urged to eliminate waste and secure efficiency."

Car Weight, Stability and Tires

AT THE fifteenth annual congress of the Tramways & Light Railways Association, held at Swansea, Wales, on June 21 and 22, W. E. Ireland, rolling stock engineer London County Council Tramways, presented a paper on "Electric Tramway Rolling Stock," dealing with the subject from an engineering point of view. He considered first the desire to produce rolling stock of lighter weight and the factors involved. In regard to double-deck cars, a prime essential was to determine what was to be top-deck load, bearing in mind stability of the car and its ability to resist overturning by wind pressure or by centrifugal force on curves. There had also to be considered strength of pillars, rails, etc., to resist vertical load due to weight of passengers, side stresses and members, the thrusts due to acceleration and retardation. It had to be appreciated that top-deck passenger loads will reach 6,440 lb. or more, added to the weight of the roof cover, say 3,700 lb., making a total of 10,140 lb. Tables were given showing the centrifugal force in pounds in case of a fully loaded car weighing 20 tons at speeds from 1 to 15 miles per hour and on curves of from 45 ft. to 100 ft. radius and total pressure resulting from a wind with a velocity of 60 miles an hour on side of car.

The application of these forces on a car fully loaded on the top deck only was shown, and from this came the deduction that to render the car stable sufficient weight must be introduced into the lower parts to balance forces acting above the center of gravity. The method of locating the center of gravity and determining the weight to be put into the lower parts of the car was illustrated by diagrams. In reference to the forces acting on the ends of the car, Mr. Ireland said that in order to provide a sound foundation and also additional support to vertical members the steel underframe had proved most successful, as it provided the necessary support in both vertical and horizontal directions and rendered the use of a truss rod unnecessary. The parts to resist stresses in their nature determined their own weight. Regarding the top-deck cover, loads were small and stresses limited, so that the structure could be designed in the lightest possible way. With respect to adding sufficient weight to the lower parts of the car to bring the center of gravity to a predetermined position, in some cases it had been found necessary to increase the cross-section of truck sides considerably beyond that required for strength.

Coming to the question of single-deck cars, Mr. Ireland referred to efforts made in America to reduce weight and quoted weights of some single-deck cars in the United States and of double-deck cars in Britain in order to show that the weight per seat was much less in the latter case than in the former. Taking the bogie cars in use in London, Manchester and Birmingham (narrow gage) weights per seat were respectively 423 lb., 393 lb. and 569 lb. A single-deck car, in which the question of stability introduced less complication than in the case of double-deck cars, could be designed in much lighter material than a double-deck car of equal carrying capacity. Mr. Ireland showed a form of body which while giving ample resistance to stresses lent itself to lightness of construction, and also a design for single-deck coupled cars in which the weight of all members would be reduced to a minimum. The body would be supported directly on axle boxes through long laminated springs, with spiral springs between the links and underframe, thus dispensing with the usual form of truck. The motors would be suspended from the underframe and the drive to the axles would be by a silent chain. The axles would be forged hollow, so as to reduce the unsprung weight. The estimated total weight of such a car was 9,520 lb., or 244 lb. per seat. Provision would be made for automatic application of the brake gear in event of cars parting. Two independent systems of mechanically operated brakes were intended to be provided in cases where magnetic brakes were not used.

Mr. Ireland in the last part of his paper dealt with the subject of wear of tires, on which for the last three years he has carried out research work. His conclusions were published in the ELECTRIC RAILWAY JOURNAL Aug. 18, 1923.

Chamber of Commerce Begins Accident Campaign

THE Insurance Department of the Chamber of Commerce of the United States has just begun issuing a series of bulletins designed to assist local chambers of commerce and other civic organizations in conducting accident prevention campaigns. This series has been started on account of the serious public accident situation, which has become worse since the general introduction and use of motor vehicles. According to a statement by James L. Madden, manager of the insurance department, nearly one-fifth of all accidental deaths are now attributed to automobiles alone. The Ford Motor Company reports that of every sixteen fatal accidents experienced by its em-

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ployees, only one occurs during the performance of duty. The other fifteen are the result of public accidents which the industrial safety measures established by the company do not prevent.

The first bulletin of the series, just issued, gives in considerable detail the activities of the Safety Division of the Milwaukee Chamber of Commerce, which is carrying out an ambitious program for assisting in the development of public and industrial safety. Methods of planning a safety organization and safety campaign are given.

Fall Meeting of the American Welding Society

THE fall meeting of the American Welding Society was held at the Fort Pitt Hotel, Pittsburgh, Pa., Oct. 24-26. In addition to the regular sessions of the society, meetings of the electric arc welding committee and of the board of directors of the American Welding Society were held and several inspection trips were made to neighboring industrial plants. At the industrial application session a paper was presented on the application of welding and cutting to industrial work. This included a description of various classes of work which have been done by the electric arc, oxyacetylene, resistance and thermit welding processes. Slides were shown illustrating practical work accomplished. The methods and illustrations relating to the electric railway field have already been published in previous issues of the ELECTRIC RAILWAY JOURNAL.

Utility Commissioners to Meet at Miami

THE thirty-fifth annual convention of the National Association of Railway and Utilities Commissioners will be held in Miami, Fla., beginning Dec. 4, and will last four days, according to an announcement by President Dwight N. Lewis.

The national association is an organization comprising all the railroad and public service commissions of the different states and the District of Columbia, together with the Interstate Commerce Commission and the commissions of Hawaii, Porto Rico and the Philippines. There is now a regulating commission in every state in the Union excepting Delaware.

The sessions of the convention will be devoted mainly to the presentation and consideration of reports from committees, and will include such topics as public ownership and operation; safety of operation of railroads and public utilities; the questions of service, rates and demurrage; express companies in their relations to the railroads; grade crossings; capitalization; motor vehicle transportation; telephone depreciation; valuation of railroads; and statistics and accounts. A special subject for discussion is the super-power movement, which has gained great headway in the last few years. Herbert Hoover, Secretary of Commerce, who has been one of the leaders in this movement, has been invited to address the convention. The discussion will be led by Hon. W. D. B. Ainey of the Public Service Commission of Pennsylvania.

Representatives of the railroads and other public utilities will be heard during the convention. Addresses will be delivered by Donald D. Conn of the American Railway Association, Carl D. Jackson and M. H. Aylesworth of the National Electric Light Association, J. B. Clumpp, president of the American Gas Association, and James P. Barnes of the Louisville Railway, representing the American Electric Railway Association.

Other questions to be considered will be the regulation of motor vehicle transportation, the valuation of the railroads by the Interstate Commerce Commission, elimination and protection of grade crossings of railroads and telephone depreciation.

American Association News

Bases for Valuation Compared*

By L. R. NASH
Stone & Webster, Inc., Boston, Mass.

IT IS not without significance that the committee on valuation now goes further than it did in 1919 in stating that it was strongly influenced in its recommendations by the fact that the courts have up to this time consistently held that present cost of reproduction must be considered. Obviously when seeking the protection of the courts, the methods which they adopt must be followed whether or not they appear most appropriate under existing circumstances.

In spite of the unbroken line of court decisions so far on record on this subject, it does not necessarily follow that some change with respect to public utilities may not be made because of special regulatory practices affecting them but not other industries subject to competitive influences. The Southwestern Bell Telephone case, referred to in the committee's report, occasioned a sharp division among the justices, disclosed in a dissenting opinion which presented in an able and forceful manner the advantages of prudent investment as a rate base. Although this basis was rejected in that case and in more recent Supreme Court cases, the actual recognition given in leading cases to present cost of reproduction as compared with investment has not been wholly encouraging up to this time. In no decision of last resort has present cost of reproduction been the sole measure of value, and in many cases fair value has been so brought down by averaging unit prices over a period of years, or by deductions for depreciation, or both, that the final finding of value has been but slightly higher than actual investment.

Regulatory commissions are still more strongly inclined to adhere to investment as the basis of return in rate cases. It is possible that a sufficient number of further decisions of our leading courts reversing this practice of the commissions would lead to their general adoption of the reproduction method as controlling. This process, however, would require a considerable period of years, during which, it is to be expected, there will be some decline from the present level of prices to a level much below the maximum prevailing in the post-war period, during which a large amount of public utility construction was necessary. If a few years hence construction prices have fallen to a level 50 per cent above the pre-war level, they will still be at least 33⅓ per cent below the peak prices prevailing in 1920. It is, therefore, conceivable that actual investment may not only approach consistency with reproduction cost, as pointed out in the report, but that it may materially exceed it after a period of years. A strict adherence to cost of reproduction might, therefore, in time work to the disadvantage of at least some utilities and holders of their securities.

It will be of interest to make certain assumptions as to the future level of prices affecting public utility properties and the growth of these properties to determine when, if at all, the cost-of-reproduction method will cease to yield a value higher than the actual investment. For this purpose a public utility has been assumed having, in 1913, 10,000 units of property, each with a value of $100 and, therefore, representing a total value (assumed to coincide with investment) of $1,000,000. Each year there is added to the property a number of similar units equal to 5 per cent of those then existing. Such an assumption is not inconsistent with the history of progressive public utilities. Next there has been determined the annual weighted average prices of units such as those assumed, and estimates have been made as closely as possible of the future movements of these prices. The prices of materials entering into public utility properties are now substantially higher than the average of all commodities. While the reasons for the discrepancy will in part continue, it is to be expected that there will be a tendency toward greater consistency within the next few years, after which a decline in public utility and other prices will continue at about the same rate as the increase which occurred during the period from 1896 to 1913 and the decrease during

*Abstract of written discussion on the report of the A.E.R.A. valuation committee.

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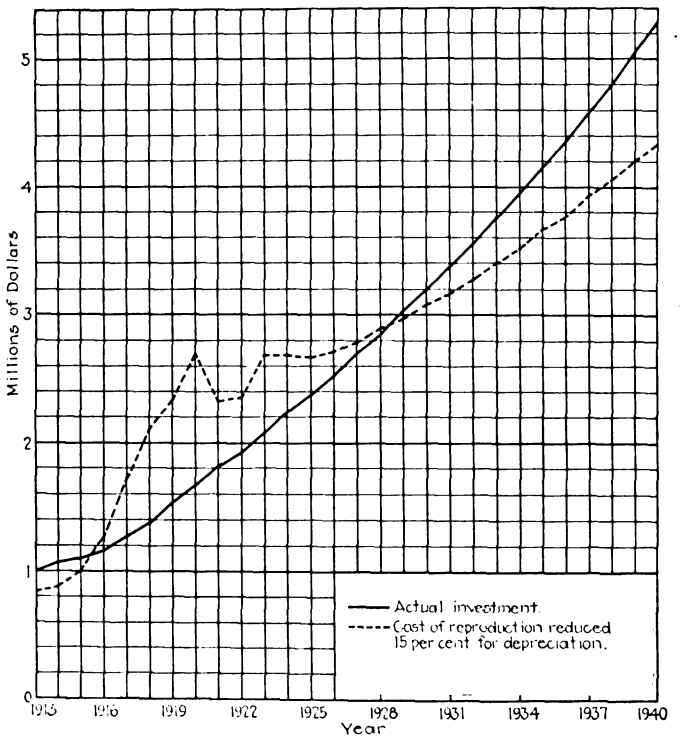
the preceding period which began about 1878. The rate of change in these periods was about 2 per cent per annum. It may appear inconsistent with the discussion and conclusions of the committee's report to assume a reduction in public utility construction costs continuing after they have come into accord with general prices, but such reduction is, nevertheless, anticipated by many well-informed people, and it is at least permissible to determine the results of such possible reduction.

The above assumptions are all embodied in an accompanying table which shows for a series of years from 1913 to 1940 the number of units in the property, the current costs of these units, and the actual investment, starting at $1,000,000 and increasing from year to year by the current costs of the added units. There has then been computed the cost of reproduction of the entire existing units in each year at the prices then prevailing. The figures shown are not exact, being obtained by slide-rule computations.

The columns of total investment and cost of reproduction show a steady increase in the former but a far less regular change in the latter. The cost of reproduction increases rapidly up to 1920, after which there is an actual decline in spite of the annual increase in number of property units, which decline is not overcome for several years. It appears that in 1938 the investment begins to exceed the cost of reproduction, the excess increasing from year to year. It follows under the assumptions made that if public utilities, either voluntarily or through unreversed regulatory action, are limited to return on the investment for the next fifteen years, it would thereafter be to their advantage to have this basis of value continue instead of changing to cost of reproduction.



Relative Trends of Investment and Cost of Reproduction, Public Utility Valuation

If other assumptions were made as to rate of growth or the trend of future prices, different comparative results would be obtained. It goes without saying that a property without any growth since 1913 would continue to gain advantage through the cost-of-reproduction method as long as current prices remained higher than those prevailing in 1913. On the other hand, if the rate of growth were more rapid than that assumed in the accompanying table, the investment would overtake the cost of reproduction at an earlier date. If, for example, the property units increased at the rate of 10 per cent per annum instead of 5 per cent, the investment would exceed the cost of reproduction within ten years.

If the prices of public utility materials fail to decline materially during the coming years, the investment would not equal cost of reproduction until a later date, if at all, depending upon the trend of prices. If, on the other hand, the decline is sharper than that assumed, the investment would overtake the cost of reproduction more promptly. Computations in which prices are assumed to have fallen to 150 in 1930 instead of 1933, as in the accompanying table, show investment overtaking cost of reproduction within ten years from now instead of fifteen years.

The uniformity in rate of growth, assumed in the accompanying table, does not represent the facts, particularly during the period of most rapid price fluctuations. Prior to and during our participation in the World War there was an enforced curtailment of construction except where required for war purposes. During the following years of continued business activity and also of maximum commodity prices, it was necessary for many public utilities to undertake an exceptionally large amount of construction, and so the effect of peak prices upon investment becomes more pronounced than under the assumptions of a uniform growth. It follows that under such circumstances investment will overtake reproduction cost at an earlier date.

It is to be noted also that no deductions have been made for accrued depreciation from any of the figures compared in the accompanying table. A study of rate decision shows very few cases where deductions have been made from investment for depreciation, but a comparatively large number in which such deductions are made when the reproduction method is used in determining value. If, therefore, it is assumed that cost of reproduction figures are generally subject to such deductions and actual costs are not, there is a further tendency for investment to show an earlier advantage. Actual investment overtakes the cost of reproduction, shown in the accompanying

PUBLIC UTILITY VALUATION—RELATION OF COST OF REPRODUCTION TO INVESTMENT

(5 per Cent Increase in Property Units per Annum)

Year	Number of Units Total	Number of Units Annual Additions	Current Unit Costs	Investment Total	Investment Annual Additions	Cost of Reproduction	Year	Number of Units Total	Number of Units Annual Additions	Current Unit Costs	Investment Total	Investment Annual Additions	Cost of Reproduction
1913	10,000	.....	$100	$1,000,000	.....	$1,000,000	1927	19,800	945	$166	$2,698,000	$157,000	$3,280,700
1914	10,500	500	98	1,049,000	$49,000	1,029,000	1928	20,890	990	163	2,859,000	161,000	3,405,000
1915	11,025	525	107	1,105,000	56,000	1,180,000	1929	21,935	1,045	160	3,026,000	167,000	3,510,000
1916	11,575	550	130	1,177,000	72,000	1,505,000	1930	23,030	1,095	157	3,198,000	172,000	3,616,000
1917	12,155	580	165	1,273,000	96,000	2,006,000	1931	24,180	1,150	154	3,375,000	177,000	3,723,000
1918	12,760	605	195	1,391,000	118,000	2,488,000	1932	25,390	1,210	152	3,559,000	184,000	3,859,000
1919	13,400	640	205	1,522,000	131,000	2,748,000	1933	26,660	1,270	150	3,750,000	191,000	3,999,000
1920	14,070	670	225	1,673,000	151,000	3,166,000	1934	27,995	1,335	148	3,948,000	198,000	4,143,000
1921	14,755	705	185	1,804,000	131,000	2,734,000	1935	29,395	1,400	146	4,152,000	204,000	4,291,000
1922	15,515	740	180	1,937,000	133,000	2,794,000	1936	30,865	1,470	144	4,364,000	212,000	4,444,000
1923	16,290	775	195	2,088,000	151,000	3,178,000	1937	32,410	1,545	142	4,583,000	219,000	4,600,000
1924	17,105	815	185	2,239,000	151,000	3,165,000	1938	34,030	1,620	140	4,810,000	227,000	4,764,000
1925	17,960	855	175	2,389,000	150,000	3,144,000	1939	35,730	1,700	138	5,045,000	235,000	4,940,000
1926	18,855	895	170	2,541,000	152,000	3,206,000	1940	37,520	1,790	136	5,288,000	243,000	5,103,000

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table and chart, in 1929 if the cost is reduced by 15 per cent for depreciation.

It would not be unreasonable, in the light of the above data, to predict that with only partial recognition of present cost of reproduction, which still prevails, and the deductions for depreciation which may be made because of such recognition, this basis of value will yield higher results than actual investment during only a few more years, after which its exclusive use would not be advantageous even if permissible.

This discussion, with its accompanying data, is not presented for the purpose of discouraging reasonable attention to cost of reproduction but to point out that investment should not be ignored. The report recommends that both these evidences of value should always be presented in rate cases as has been the general practice in the past.

Before the war the simplicity of the investment basis, which did not differ radically from cost of reproduction, had its appeal to both utilities and commissions. During and following the war departure from this basis was necessary to maintain the credit or solvency of many companies. A rate of return within the limits which the commissions felt free to authorize would not, when applied to investment, yield a return attractive to new capital. Other companies, however, passed through the war period with satisfactory rate adjustments without claims for value higher than investment.

With return to more stable economic conditions this basis should show increasingly favorable results, but, as the valuation report points out, cost of reproduction cannot safely be ignored whether it be greater or less than investment.

Publicity Committee Activities

BROAD plans for closer co-operation between the American Electric Railway Association and the state committees on public utility information have just been announced by Secretary James W. Welsh.

The outstanding feature of the new plans is to have a member of the committee on state and sectional co-operation in each state where there is a state committee on public utility information who will see that electric railways co-operate not only with the state and sectional association, but also with the state committees on public utility information. James P. Barnes, as chairman of the committee, already is bringing about closer co-operation, and the committee has arranged to have several speakers at state and sectional meetings in the near future. It is planned to have a speaker representing the American Association at each of these meetings throughout the coming year.

Representatives on the committee were chosen after conferences between W. H. Sawyer, chairman of the committee on publicity, and the directors of state committees. Other recent activities of the committee on publicity include:

A special interurban drawing designed to decrease crossing accidents has been reproduced on posters for hanging in car windows, waiting stations and elsewhere, and also on a postcard. Both posters and postcards are now being offered to the industry.

A special sticker for manufacturers' letters declaring that the manufacturer is dependent largely on electric railway sales for his business, and that the recipient as a customer of his should do all he can to help the electric railways, has been prepared and distributed. These stickers have proved very popular and orders for 50,000 already have been received.

The award of the special committee on inspection of exhibits at the Atlantic City convention, which was to determine what manufacturers were entitled to certificates of participation in the good-will work of the manufacturers, has been made. Certificates have been awarded to 115 companies, and the advertising section now is having the certificates signed and will place them in the manufacturers' hands in a few days.

The November issue of *Truth* has just been issued to the extent of 3,000 copies. Subjects with which it deals include Secretary Welsh's remarks regarding the increase in car riding; a story showing how it costs New York City taxpayers more than 10 cents to carry 5-cent passengers on the Staten Island trackless trolley; co-ordination of buses with electric railways; the decision of the Manchester (England) board of trustees that buses cannot perform the major traffic service; a human interest story regarding the introduction of new double-entrance cars in Brooklyn; the need for better vehicle laws; and the fact that workmen pay an average of $4 apiece in special taxes through railway fares which the companies do not get.

Important subjects on which the committee on publicity plans to produce advertising material include general interurban and tax problems and Xmas shopping between 10 and 4 o'clock. Work on material for the last-named problem is now under way.

New Members

THE following applications for membership in the American Electric Railway Association were approved by the executive committee at its recent meeting:

The Decatur, Champaign, and Bloomington & Normal divisions of the Illinois Power & Light Corporation.

Continental Secret Service, Philadelphia, Pa.

Keystone Lubricating Company, Philadelphia, manufacturer of lubricants.

For associate membership: Parsons, Klapp, Brinckerhoff & Douglas, New York, N. Y.

Newman Saunders & Company, Inc., New York, N. Y.

Ten applications for individual membership in the various associations were also approved.

A.E.S.C. Special Trackwork Committee Meets

THE second meeting of the sectional committee on specifications for special trackwork materials and design of 7-in. plain girder rail of the American Engineering Standards Committee was held Nov. 7 at the headquarters of the American Electric Railway Association, New York. After considerable discussion the report of the sub-committee on scope was adopted in the following form:

1. *Title of Specifications*—Specifications for special trackwork materials.

2. *Definition of Special Trackwork*—All rails, rail structures and fittings, other than plain unguarded track neither curved nor fabricated before laying.

3. *Principal Structural Items in Special Trackwork*—Switches; mates; frogs; crossings; guarded, curved and fabricated rails, etc. Appurtenances and fittings for the preceding items, such as plates, rods, fillers, braces, knees, guards, risers, stops, springs, housings, clips, bolts, nuts, washers, rivets, etc.

4. *Principal Materials in Special Trackwork*—(a) Rolled rails: tee, plain girder, girder grooved, girder guard. These rails may be of bessemer carbon steel, open-hearth carbon steel or manganese steel. (b) Rolled shapes: steel, iron. (c) Forgings: steel, iron. (d) Castings: gray iron, malleable iron, carbon steel, manganese steel.

5. *Specifications*—Existing specifications of A.R.A., A.R.E.A., A.E.R.E.A., A.S.T.M., M.T.S., etc., to be used as far as applicable.

6. *Steam Railroad and Electric Railway Special Trackwork*—Specifications to include all special trackwork for whatever use and of whatever type or gage, including steam railroad use in all services, including use in paved streets, electric railway service, storage battery, gasoline engine or any other motive power; industrial and mine tracks.

7. *Authority of Committee*—It is recommended that the tentative report of the sectional committee be submitted for information and suggestions to the track committee of the A.R.E.A. and the committee on way matters of the A.E.R.E.A. before final action is taken.

8. *Designs for Plain Girder Rails*—It should be understood that the designs are not necessarily to be confined closely to the weights of 90 lb. and 91 lb. for such rails as given in the assignment of the subject.

Those present at the meeting were: V. Angerer, chairman; R. C. Cram, vice-chairman; C. A. Alden, E. B. Entwisle, G. L. Fowler, H. H. George, E. P. Roundey, E. M. T. Ryder, J. B. Strong and G. C. Hecker.

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Maintenance of Equipment

Close Fitting Trolley Ears Reduce Line Maintenance Cost

By G. H. McKelway
Engineer of Distribution Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y.

WITHIN the last few years manufacturers of overhead line material have brought out round top hangers designed so that the ear can be screwed up snugly against the under side of the hanger. This construction is a great improvement. With the old design there was no certainty that the ear would be brought up close to the hanger, and after installation, the ear usually would have to be backed off a part of a turn to make it line up with the trolley wire.

The advantage of a tight fit and the damage that occurs to both the hanger and the ear by their slight relative movements if they are not securely fastened to each other can be seen by an inspection of the scrapheap. On one property I found from 50 to 75 per cent of the hangers were scrapped because the threads on the studs were so badly worn by movement that it was unsafe to reinstall them after they had been taken down, or to screw a new ear to them after the old one had been pulled off.

Worn Threads Limit Service

Many hangers with shells and insulation in splendid condition are made useless by worn threads, and years of additional service could be obtained if the studs were in good shape. In nearly all cases the ears attached to the hangers must be thrown away too, because of worn threads and not because of lips worn away or other defects.

Before the tight-fitting feature was added to round top hangers, good results were obtained by using either the cap and cone or "West End" hangers. With both of these types, however, there was liability of the stud unscrewing from the ear and letting the wire sag down. The turning of the stud can be prevented by the use of a lock washer, but this adds another part to the hangers, which are already composed of three parts, too many for quick and easy installation.

One engineer, seeing the advantage of keeping the ear close to the round top hanger, proposed making the hub of the ear thinner than was customary and dishing it out at the top. The outside rim of the hub would then bend down enough under pressure to permit twisting the ear another half turn. It would be necessary, however, to line up the ear if it should be out of line with the hanger. This plan was put into practice only to a limited extent and not enough to give it a conclusive trial.

The higher cost of the new design of hanger may seem to be a formidable objection, but careful consideration will show that there is a saving rather than a loss by the use of the newer type. If the old hanger costs 75 cents, and the new one 85 cents, and as not more than fifty-seven of these hangers are needed per mile, the increased cost will be only about $5.50 or $6 per mile.

The increase of life to be expected from the newer hangers over the ordinary type is at least 50 per cent and in some cases perhaps 100 per cent, so that the increased cost of 13½ per cent is more than offset by the saving. The ears when worn out will weigh 17 or 18 ounces and their scrap value is about 14 cents, at the present price of scrap copper. There will also be some saving in the number of ears, owing to the fact that a new car has to be installed practically every time a hanger is replaced. The percentage of such ears to the total number used will be very small, probably not more than 5 or 10 per cent, so that the saving on ears will reduce the difference in cost of the hangers by only about 3 cents.

The installation cost is still to be considered. If all of the hangers on a line are replaced at one time, this would be comparatively low, but the replacement of defective hangers is not done that way and often the line crew has to make a run of several miles, taking an hour or two of their time in order to replace a single hanger. Even under much better conditions it will be easy to calculate that the labor and trucking cost, whether the latter includes the use of horses, auto trucks or cars, will reach 50 cents for each hanger installed, and if that low amount be added to the other costs it will be found that the new type of hanger will cost only about 5 per cent more than the old type.

How Car-Type Resistors Can Be Standardized

AMONG the items of car equipment in which standardization will effect material reductions in the number of spare parts required for maintenance, grid resistors offer attractive posibilities. Railway systems using many types of equipment

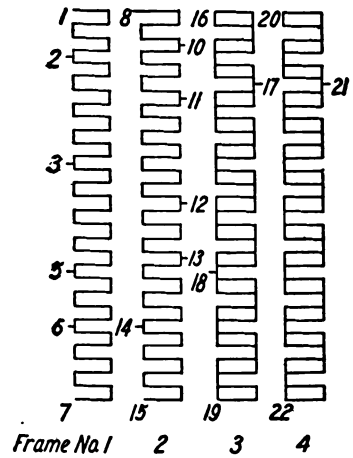

Fig. 1 — Standard Frames of 8-In., Three-Point Grid Resistors. Note That All These Frames Are of the Same Length (Thirty Grids) and Use Only Two Sizes of Grids

experience trouble and expense in maintaining resistors due to diversity in sizes and types. Under these conditions, according to the Westinghouse Electric & Manufacturing Company, a program of resistor standardization is practicable and will result in desirable saving in maintenance costs.

The ideal resistor equipment would be one in which grids of only one size are mounted in one frame, varying the number of these complete units on a car to suit the different motor and control equip-

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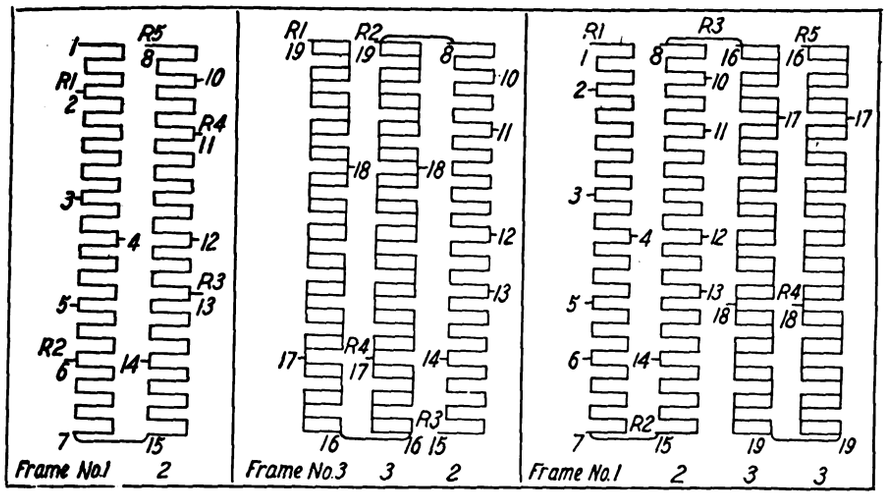

Fig. 2—Class "D" Standard Resistor. Made Up of One No. 1 Frame and One No. 2 Frame. Fig. 3—Class "J" Standard Resistor. Made Up of One No. 2 Frame and Two No. 3 Frames. Fig. 4—Class "C" Standard Resistor. Made Up of One No. 1 Frame, One No. 2 Frame and Two No. 3 Frames

ments. With many types of motor and control equipments on various types of cars, it is usually impossible to carry the standardization thus far, due to the capacity requirements and the various numbers of controller steps sometimes used on one property. The standardization usually can be carried to a point where not more than two different sizes of grids are employed. When more than one size of grid is required to provide for different equipments the individual frames should be designed, if possible, so as to use only one size of grid, i.e., with one current capacity and resistance value.

One Size Units Desirable

A desirable arrangement provides a group of standard resistor units all of the same frame length, so that from this group certain frames could be connected in an assembly to give the required acceleration and current carrying capacity to any particular car equipment. It is possible to get an assembly suitable for each type of motor and control equipment by using other combinations of frames from this group of standard resistors.

Fig. 1 shows four typical standardized frames in which, however, only two styles of grid are used. Frames 1 and 3 use style A grids connected respectively in series and in parallel, and frames 2 and 4 use style B grids, similarly in the series and the parallel arrangements. From these four frames combinations such as those shown in Figs. 2, 3 and 4 can be assembled for various motor equipments.

In applying this plan a number can be assigned to each standard resistor frame. Then in case of failure of grids it is only necessary to remove the defective frame and replace it by another of the same number, making the proper connections of resistor leads as shown on the car wiring diagrams. The car is then again ready for service. The damaged frame can be repaired later in the shop.

As a result of the decrease in types and sizes of grids that must be carried, this practice saves considerable investment in stock. In addition repairs can be made more quickly. The cars are therefore not kept out of service awaiting the assembly of special resistor frames. Still another advantage is that standardized resistor grids are readily obtainable from the manufacturer and will enable him to make shorter deliveries.

Beginning with the purchase of a certain lot of cars, the resistor frames for these and later purchases can usually be standardized. To extend this to older cars will, in some cases, require relocating other apparatus. The question to be determined, therefore, is that of selecting the standard frame length that can be applied to all cars, old and new, with the least expense in changing other apparatus under the car. Then the problem is to reduce the number of different grid resistors required to make up the frame to not more than three, and, if possible, two.

The standard resistor frame would provide for one standard tie rod with insulation, one type of terminals, etc., that are a part of the resistor. Further economies can be obtained by standardizing the insulated bolts, the hangers on the car and the method of mounting the resistors.

To carry out such a program, a thorough study of service conditions and requirements for different equipments on a given property must be made. In addition, the various weights of cars, types of motors, types of control, diameters of wheels, gear ratios, etc., must be considered.

Getting Best Results from Lightning Arresters

By R. T. Wagner
General Electric Company,
Schenectady, N. Y.

DISSATISFACTION with the protection afforded by lightning arresters is usually not the fault of the arresters. Improper installation and lack of maintenance nullify the protective value of any type. When dissatisfaction exists it is advisable to call in an expert so that the maximum benefit can be obtained from the investment that has been made in car arresters.

Users of arresters can, however, do much for themselves by thoroughly investigating the installations along the following lines:

1. Make a careful inspection of all the car arrester equipments and put them in proper mechanical adjustment. Check the coils, gap setting (25 mil gap standard) and resistance rods on the MD and MD-2 types. Inspect the carborundum block of the MP arrester and see that the circuit is continuous down to the arrester and from there to ground. Many of the old arresters are possibly in such condition that they should be removed and replaced with modern arresters, saving any parts in suitable condition for spares.

Roof Mounting Best

2. If possible to do so, a better installation can be effected by mounting the arresters on the car roof. Here they are away from the wheel wash and road conditions to which they are subject when located under the cars. The roof mounting also makes them more accessible for inspection and thus keeps them in better operating condition. With the under-car location, the only convenient time for inspection is when the car is run in over the pits. Furthermore, when installed on the roof on steel frame cars, a ground can be made right at the arrester, supplemented by the usual ground lead to the motor frame or axle housing.

3. With the gap-type arrester, in particular, some improvement can be effected by using a small choke coil

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in the leads to the controllers. This can readily be made up of ten or twelve turns of the line conductor on a wood core of about 6 in. diameter.

4. It is advisable to keep some record of actual failures on car equipments due to lightning, particularly to show the locations on the system where trouble occurs, as well as the nature of the failure and the effect on service. This would give a basis for a more logical analysis of conditions in the future.

5. The d.c. aluminum arrester is the only real solution of the lightning protection problem where severe conditions are met. This type, however, requires a definite amount of attention and has a higher maintenance charge than the gap type. Experience on a large number of 600-volt systems in the worst lightning zones in the country has clearly demonstrated that this extra maintenance and higher cost is more than warranted by the freedom from lightning troubles which this type of arrester insures.

Careful Maintenance Essential

On some street railway systems, however, a large proportion of the system is so shielded that severe conditions do not exist and the gap type should give a favorable degree of protection. Further analysis may show that certain lines or sections may require a better degree of protection. The first step would logically consist in giving the present arresters the best possible opportunity of performing their function. Obviously, there is no real advantage in investing in lightning arresters unless the arresters are properly installed and maintained.

The gap type of arrester as represented by the MD-3 arrester, which is the modern type of the MD and MD-2 arresters, is an arrester of limited discharge capacity and subject to the further limitations of any series gap arrester. This gap requires a certain definite voltage to break it down, and up to that point no protection exists. Where really severe lightning troubles exist, the direct current aluminum arrester offers the most nearly perfect protection that can be obtained on street railway work.

It is obvious that with the degree of shielding that exists on some systems there cannot be the amount of trouble from lightning that would occur on a similar amount of trackage and overhead lines in exposed open country. It is only on exposed sections outside the city that any very serious trouble might be expected. If conditions were such that cars were always operated on given lines, such exposed sections could be given a better class of protection than for the other lines. This has been followed with success in several instances. With the pooling of all equipment and its use anywhere over the system such a scheme is not feasible.

Supplying Sand to Locomotives

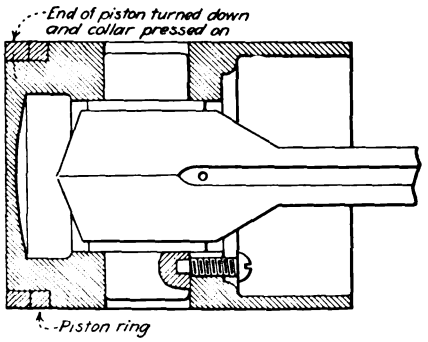
A CONVENIENT arrangement of elevated boxes for supplying sand to electric locomotives is used by the Norfolk & Western Railway at Bluefield, W. Va. Six sand boxes mounted on poles are arranged in two sets of three boxes each. These are placed so that the six locomotive sand boxes of a unit can be filled through the cab windows at one time by gravity, using the spouts which hang below the elevated boxes. An accompanying illustration shows the sand boxes and equipment. The sand boxes are filled from a drying room located on the near side of the track not shown in the illustration. The sand is conveyed from the drying room to the boxes by approximately 70 lb. of air pressure through 2-in. iron pipes, marked *B* in the picture. There are three of these riser pipes at the end of the first sand box of each group, one for each box. The distance from the drying room to the sand boxes is approximately 150 ft.

To fill the sand boxes on the locomotive the unit is run alongside and the spouts are placed in position through the cab windows. Valve handles marked *C* in the illustration open the discharge pipes. The boxes are 2 ft. x 4 ft. x 6 ft. in size.

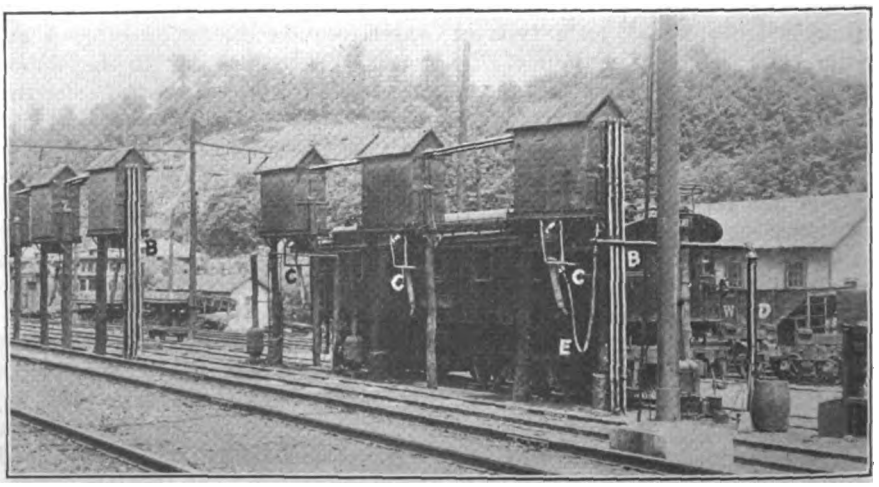
While receiving sand, the water rheostat used on the locomotive can also be filled. At the point marked *D* on the accompanying illustration there is a large pipe riser with a small horizontal cross pipe. A hose, marked *E*, hangs from this and is used to fill the rheostat.

Repairing Worn Piston Ring Grooves

WHEN the piston ring grooves in compressor pistons become worn to such an extent that a properly fitted piston ring cannot be installed, the New York Railways turns down the end of the piston and presses on a new collar to replace the metal removed. The accompanying illustration shows the method as used in the Fiftieth Street shop. By this method, the collar to be pressed on can be made of such a size as to give an accurate fit of the piston ring and make the cylinder practically as good as new in this respect.



Proper Fit of Piston Ring Is Made by Turning Down End of Piston and Pressing on a Collar to Replace Metal Removed



Special Arrangement of Elevated Boxes for Supplying Sand to Electric Locomotives of the Norfolk & Western Railway

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The News of the Industry

Battle Promised in New York Legislature

Different Interpretations Placed on the Recently Enacted Home Rule Measure

At the November election the people of the State of New York voted in favor of an amendment to the State Constitution known as the "Home Rule for Cities" measure.

Recently, John H. Delaney, former transit commissioner of New York City, is quoted as having remarked:

> We will contend that cities are given the right to regulate public utilities within their boundaries. We will press the Walker-Donohue bills at the 1924 session and claim that by the mandate in the amendment itself the Legislature is required to pass them. The only difference will be that they must be statewide rather than applying only to New York City.

Other authorities are broadcasting the statement that the acceptance of the Home Rule amendment by the people gives each and every municipality the immediate right to regulate utilities located within its boundaries.

Section 7 of the amendment itself, the opening sentence, states:

> The provisions of this article shall not affect any existing provisions of law, but all existing charters and other laws shall continue in force until repealed, amended, modified or superseded in accordance with the provisions of this article.

It appears entirely clear to others, however, that unless and until the Legislature itself, in accordance with the constitution and law, modifies or amends present public utility statutes, such laws will remain in full force and effect, and unless and until the Legislature makes special provision for the application thereof, the new powers conferred upon cities will not be effective. That the Legislature of 1923 has something of this sort in mind appears to be evinced by the fact that it authorized a commission to prepare appropriate legislation to put the Home Rule amendment into effect provided it was approved by the people.

The exact status of the situation is this: The ratification of the Home Rule amendment by the people restricts the Legislature from the passage of any law affecting just one city of the state except the Governor recommends such legislation be enacted, and 100 members of the Assembly and thirty-four members of the Senate vote for its passage. There can be no more passage of local bills relating to one particular city on a mere majority vote of the Legislature; there must be a two-thirds vote and the Governor must first recommend its passage.

This means, in short, if the city of Buffalo wants authority to operate bus lines, if the city of Syracuse would regulate gas and electric companies, if the city of New York would have complete supervision, untrammeled by state control, over the transit situation, the Governor must first recommend such legislation and then two-thirds of the Legislature must concur in its passage.

By the adopton of the amendment the Legislature has been deprived of the right to enact local legislation affecting one city or particular cities having certain population by a mere majority vote and in order to allow Buffalo to operate bus lines must authorize all cities to exercise the same function, but the cities themselves have apparently not gained anything in the way of regulation of utilities within their boundaries unless existing laws are amended and special legislation is enacted to enable them so to do.

Routing with Steam Property Delays Cincinnati Project

The reason has been revealed why the Cincinnati City Council has not acted finally on the ordinance granting the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad a franchise for an elevated structure from Anderson's Ferry to the heart of Cincinnati. Following the announcement of the intention of the city authorities to proceed with the Eighth Street viaduct reconstruction, notwithstanding the defeat of the bond issue for that project at the municipal election on Nov. 6, it was stated that the company's franchise ordinance would have to be revised to fit in with or accommodate itself to the general steam railroad terminal plans now being worked out by the managers' committee.

Stanley Shaffer, attorney for the Cincinnati, Lawrenceburg & Aurora, said it was true that delay regarding the ordinance was due solely to the fact that the routing of the line to coordinate with the steam railroad terminal scheme had not been determined, or at least disclosed. Mr. Shaffer, however, pointed out that a rerouting of the interurban line would be necessary only from near State Avenue eastwardly and that the plans already made would stand for that portion from Anderson's Ferry to State Avenue. He said he and his company wanted to "go along with" the general terminal plan, but they do not know what that plan is to be and when it will be possible for his company to proceed with construction. The plans of the interurban company call for the construction of an extension from Anderson's Ferry to Third and Walnut Streets. The elevated structure, a part of the general plan, would be built from State Avenue to Third Street over Mill Creek.

Transportation Systems Again Urged to Co-operate

Mr. Gadsden Urges Tax Reforms — Capital Can Be Obtained Only with Compensatory Rates

National transportation problems will be solved when steam, electric and gasoline systems are co-ordinated and when rates are established which will attract the investor in securities. This was the principal point emphasized in an address of Philip H. Gadsden, vice-president of the United Gas Improvement Company, Philadelphia, and former president of the American Electric Railway Association, before the Cincinnati Commercial Club, Nov. 17. Mr. Gadsden also is a member of a special committee of the United States Chamber of Commerce that recently has completed an extensive study of the national transportation situation.

No attempt should be made to elevate the taxes of motor cars to the present levels of electric railways, Mr. Gadsden said, because railway taxes are unfair.

On this subject of taxation he said that the broad policy to be adopted was not to load down the bus and the truck with taxes, as had been done in the case of steam and electric railways, but that action should be taken to review the whole subject of taxation of public utilities and instead of overburdening the bus and truck with taxation, the steam and electric railways should be relieved of all unjust and unnecessary taxation. He also said there should be worked out a principle of taxation for the public utilities on the basis of property value of franchises. He went on to say that when such equalization by way of regulation of taxation had been brought about the inevitable result would be that the field for the operation of the motor bus and truck would be as an adjunct and auxiliary of existing transportation systems.

Further that the proper solution of the whole problem could be found when it was approached from the standpoint of the economics of the transportation business. He said it was a matter of determining what was best for the country. Viewed from this angle, it meant that a system of transportation really was needed in which the steam railways, electric railways, bus and the truck had a proper and appropriate part to play.

He went on to urge the necessity of credit for effective railway operation. On this point he said that the companies ought to be allowed to charge such rates as will induce new capital to flow into the business.

The real test in the financing in the

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last analysis was the investment market, but unless the rate is such as will induce new capital to flow into the industry, the rate was inadequate whatever authority may have fixed it.

He said that transportation was the foundation of our entire business structure and it ought to be the highest interest of all to see that these public servants were kept in strong and effective condition.

Joint Hearing on New York Central Application

A joint hearing will be held by the Transit Commission and the Public Service Commission on Nov. 26 on the application of the New York Central Railroad for the relocation of its tracks on the west side of Manhattan and for an order specifying the electrification of the company's lines south of Spuyten Duyvil.

The petition of the company seeks the relocation of its west side tracks under the general change of grade law which provides that one-half of the cost shall be borne by the company and one-half by the city and state. The company's petition to the Public Service Commission relates entirely to its obligation to electrify all its lines in the city under the provisions of an act passed by the last Legislature.

The hearing before the commission, which will be open to all individuals and organizations, is required by law and must be held upon not less than ten days notice to the company.

Public Service Speakers' Bureau

With the announcement by the Illinois Committee on Public Utility Information of the appointment of Keith Spade to head the Public Service Speakers' Bureau comes the information that this bureau will enter into a larger public speaking program. In the past year the work of this bureau has been to co-ordinate all the companies and their employees behind the speaker when he appeared in a community, to obtain proper newspaper and other publicity on speeches so that the message might go to others than the audience, and to assist managers in developing speaking talent within their own organization.

Mr. Spade comes to the bureau from the Monmouth Chamber of Commerce. He will further the activities of this department so that during the coming year greater benefit will be derived from the efforts of the speakers than has been in the past. In order to start this "greater speaking effort," a conference of managers in territorial districts will be held at conveniently located cities to acquaint local and district managers with the details of the program and to perfect district organizations. Each district committee will be responsible for formation in each city or town of a local public service speakers' bureau or unit and each local unit will take care of local engagements of lesser importance.

Two-and-a-Half-Cent Increase to Michigan Employees

The board of arbitration chosen to settle the wage controversy between the employees of the Michigan Railway lines, Jackson, Mich., and its officials, recently granted a 2½-cent increase an hour, effective June 1, 1923. The award was signed by Richard Price, the company's arbitrator, and John H. Lourim, the third arbitrator. Samuel H. Rhoades, representing the employees, refused to sign the award.

The men demanded an increase of approximately 15 cents an hour on April 30 to take effect as of June 1. At that time they proposed a wage scale of 60 cents an hour for motormen and conductors on two-man city cars, 65 cents an hour for operators of one-man city cars and 70 cents an hour for interurban motormen and conductors. The men had also asked for time and a half for overtime, fifteen minutes additional time for turning in day's receipts and thirty minutes additional time for making out accident reports.

The board said that in view of the company's financial condition the rates for conductors and motormen would be as follows: On city divisions the first year of service on two-man cars 44½ cents an hour; one-man cars 49½ cents; thereafter on two-man cars, 47½ cents, and on one-man cars 52½ cents.

On interurban divisions for the first six months' service 49½ cents and thereafter 54½ cents. In addition to the above there should be 5 cents an hour paid for all work in excess of regular schedule runs.

Samuel H. Rhoads, employees' arbitrator, who refused to sign the award, said that he did not think that the maximum rate of 54½ cents was a reasonable wage for the men, contending that with the present cost of living the wage was not sufficient for a position that was so exacting and which entailed great responsibility. Discussing the contention that the company was unable to pay more he said that the remedy should not be to make the employees work for an unreasonably low wage. He said that the public, which was given the benefit of the service, should pay what it costs to operate the railway system, including the payment of reasonable wages and a fair return to the owners.

Candidate Under Indictment Defeated in Buffalo—Socialist Re-elected

State Senator Robert C. Lacey of Buffalo, who is under indictment in connection with the dynamiting of the Buffalo-Niagara Falls high-speed line of the International Railway during the strike a year ago, when about two-score passengers were injured, was defeated for member of the City Council at the last municipal election. He polled a larger vote, however, than the two members of the Citizens' ticket fostered by the Chamber of Commerce and other business interests of the city. Frank C. Perkins, Socialist, and an advocate of municipal ownership, who has been bitter in his attacks on the International Railway, was re-elected by the largest vote ever received by a candidate for public office in the city. He polled almost three times the number of votes cast for the Citizens' ticket candidate for better government.

Official Must Serve Sixty Days for Criticising Court

The United States Supreme Court held, in effect, in a decision rendered on Nov. 19, that Charles L. Craig, Comptroller of the City of New York, must serve a sentence of sixty days in jail for contempt of the United States District Court. The case arose out of receivership proceedings for the New York Railways in 1919. Receivers were named by the District Court. The city of New York applied for appointment of a co-receiver to represent it for the Brooklyn Rapid Transit Company. This the court refused. Comptroller Craig wrote Public Service Commissioner Louis Nixon a letter criticizing the court. The letter was published. Some months later contempt proceedings were brought and Mr. Craig was adjudged in contempt. The case reached the Supreme Court on a question of the competency of the court to hold Mr. Craig and not on the main issue of contempt.

Trackwork Recommended in Madison in Connection with Paving

The city engineer of Madison, Wis., has recommended that the City Council should take the proper steps to adopt an ordinance requiring extensions and improvements to be made by the Madison Railways to its system simultaneously with the city's street improvement work so that rails will be placed when the city starts carrying out its paving program.

A big track extension problem faces the railway if the city carries out the improvement of streets in which there are car tracks, as it will require the company to lay a west track on Breese Terrace, double tracks on University Avenue, North Hamilton Street from Pinckney to Johnson, and Williamson from Baldwin to the Yahara River. Heavier rails will also be laid by the company on Jenifer Street from Williamson Street to Baldwin Street, a distance of six blocks, if a resolution introduced before the Council for that purpose goes through.

An ordinance passed by the Council last summer provided that the company would hereafter be relieved of all future charges for paving between its track zones.

Must Not Abandon Line.—The State Supreme Court at Topeka, Kan., recently decided in favor of the city of Salina in a case brought to compel the Salina Street Railway to continue operation of a part of its line which the company had thought to abandon.

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Service Retained in Davenport

Agreement Between City Council and Tri-City Railway Allows for a Ten-Cent Cash Fare with Low Ticket Rate

Street car transportation has been retained in Davenport, temporarily at least, by the following major provisions of an agreement reached between the City Council and the Tri-City Railway of Iowa: A 10-cent cash fare, but fares as low as 6⅔ cents on a ticket plan, rerouting to eliminate approximately 4½ miles of trackage no longer needed, a faster service during the rush hours of the day, payment by the company of its assessed share of the 1923 paving program, valuation of traction lines on same basis as other business concerns for general taxation, single instead of double truck cars, trial period of four months for the new ticket plan, allowance of a 6 per cent return on the investment; city to favor enactment by the Iowa Legislature of provisions making it optional with cities to relieve electric railways of paving cost.

This settlement plan is not only accepted by the City Council and traction line but is also indorsed by a citizens' committee selected from nonpolitical and representative civic organizations. The report, accepted by the committee of the whole of the Council on Nov. 20, will be ratified on Nov. 28 at the regular Council session.

It is in response to a clear statement by President B. J. Denman of the traction lines of the possibility of discontinuing railway service that the present plan came into existence. The surface lines have lost money for several years past and their straits finally became so acute that the city was told service would be abandoned unless a relief plan could be devised. Negotiations of several months have finally resulted in the acceptance of the present plan.

By the sale of fifteen tickets for $1, seven for 50 cents and three for 25 cents, it is hoped that riding can be popularized to such an extent that it will be encouraged and revenues increased. The company is hoping that this will be the case, but acceeded to the city's request along this line with considerable doubt as to the possibility of thereby increasing the revenues. The fare up to the present time has been a straight 8-cent fare.

Also by this arrangement the company agrees to pay $120,000 for paving which it believes should not be assessed against a traction line. Such an investment will never bring in a cent of revenue and is also accepted by the company without enthusiasm and largely because of the fact that the company considered itself obligated to this payment.

The valuation on which the company is to be allowed a return of 6 per cent is $3,250,721, another concession by the traction lines, as the latter proposed a valuation of $4,250,000. The new system of fares is to go in operation on Jan. 1, 1924, and the system is to continue for a period of four months after the entire plan is put into operation.

It is provided that, in case the revenues in succeeding months do not return 6 per cent on the investment, first the fifteen tickets for $1 rate and later the seven tickets for 50 cents rate be abandoned and the three tickets for 25 cents rate be retained as the basic fare.

News Notes

Franchise Granted.—The Lake Shore Electric Railway, Cleveland, was granted a twenty-five-year franchise by the Sandusky County Commissioners on Nov. 13. Besides rights to operate cars through the county, the company can use the new concrete bridge to be built across Sandusky River at State Street, Fremont. Work on the new bridge will start at once. In return, the company must pay to the county $12,500 cash within sixty days and make an annual payment of $1,000 during the life of the franchise, or as long as it uses the bridge jointly with the county. The company must also move part of its track from McPherson highway, west of Fremont, to eliminate danger to traffic.

Inter-Utility Meeting Held.—For the first time in the history of Wisconsin utility circles an inter-utility meeting took place recently in Janesville. Approximately 130 executives and employees attended. Recommendations were unanimously passed to assemble informally at frequent intervals, affording individuals an opportunity to interchange ideas with one another.

Getting at Bottom of Dynamite Outrage.—New developments in the government's investigation of the dynamiting of the Buffalo-Niagara Falls high-speed car in August, 1921, during the strike of platform employees which resulted in the injury of almost forty passengers, are expected to implicate several more of the company's striking employees, it was stated at the office of Colonel William J. Donovan, United States District Attorney. The renewal of the investigation was prompted by alleged confessions by men believed to be involved in the dynamiting outrage. The fourteen men now under indictment will be placed on trial early next month in United States court.

Transit Work Hastened.—Following Director Twining's recent appearance before the City Council of Philadelphia, announcing that he would proceed with preliminary work on transit construction if he were given the necessary funds, it was immediately proposed that the money be provided. The preliminary work in connection with the Broad Street subway of the Darby line will be financed by an appropriation of $50,000, which the City Council will give the Department of Transit through a transfer bill. Director Twining said that the money would be expended in making borings, particularly in the Schuylkill, where it will be necessary to erect piers for the Darby line. Some part of it will be used for borings in North Broad Street.

High-Speed Line When Costs Come Down.—The Ohio River Edison Company, Youngstown, Ohio, a subsidiary of the Pennsylvania-Ohio Electric, in turn controlled by the Republic Railway & Light Company, is securing a right-of-way from the Ohio River Valley to this district for an electrically operated freight line to be built when conditions permit. The right-of-way for the contemplated freight line parallels that of a high-tension electric power line that the Ohio River Edison Company will build next year from its steam-electric plant at Toronto on the Ohio River to Youngstown.

Resolution Calls for Car Approval.—A resolution has been introduced before the City Commission of Trenton, N. J., calling for the approval of all trolley cars by that body before they can be placed in operation. The ordinance does not prescribe a type of car to be used by the Trenton & Mercer County Traction Corporation, but does provide that the type be of a character to meet the approval of the commission. The ordinance is understood to have been introduced on account of dissatisfaction with the conditions surrounding the one-man cars now being used in Trenton. The commission is said to be anxious to have the railway use larger one-man cars. The ordinance gives the commissioner the power to reject all cars not approved by that body.

Opposes Company's Relief Petition.—Protest against a petition filed with the Seattle City Council by the Seattle & Rainier Valley Railway, asking relief from certain franchise agreements, was voiced recently at a mass meeting of residents of the Rainier Valley district. The petition presented asks among other things that the road be released from the payment of a 3 per cent tax on its gross earnings, and from paving 1,000 ft. of the street between its tracks. W. M. Brown, manager of the company, appeared before the meeting and outlined the company's position in asking the relief, and stated that unless it is granted, the company will have to restore fares to the 10-cent level next month. The present cash fare is 10 cents. Three tokens are sold for a quarter.

Paving Plan Halted.—Denver figured a paving program, known as "the $4,000,000 paving job," but on the eve of starting, the city engineer's office finds that the Denver Tramway, which is supposed to stand its proportion of the amount, cannot pay for more—in any one year—than "between and for alongside of its tracks, a 6-mile length." City officials, the tramway officials and others are trying to work out a plan that will permit the city to proceed with the program.

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Foreign News

May Electrify Rumanian Railways

A recent report from Bucharest stated that the Rumanian government intends electrifying portions of the railways of the country. Some facts with respect to this property are noted in view of this report.

In September, 1923, the railway traffic on Rumanian territory amounted to more than 50,000 trains per month, or an average of 1,600 trains per day, as against only 287 trains per day in 1921. Of the total number 57 per cent are passenger trains and 43 per cent freight trains. The traffic is carried on by means of 2,000 locomotives, as compared with 1,540 in June, 1922, and 1,050 in June, 1921.

Most of the bridges have been reconstructed and rails and sleepers renewed. Large orders have been placed in Germany of late for all kinds of rolling stock and material. The railway lines in Bessarabia—formerly Russian territory—have undergone great improvements and the gage has been changed from the Russian to the standard Rumanian. However, the substructure of these lines leaves still much to be desired. The receipts of the Rumanian Railways rose from 64,000,000 lei in September, 1921, to 200,000,000 in 1922, and amounted in August, 1923, to 305,000,000 lei.

American manufacturers of electric railroad equipment would do well to pay close attention to the further developments of the Rumanian Railways. All the roads are owned and operated by the state (Caile Ferate Romane), with head offices at Bucharest.

Berlin's Record Under Private Company

The transfer of the Berlin Municipal Street Railways from direct municipal operation to operation by a private corporation seems to be working well, according to an article by Dr. Lademann in the Oct. 26 issue of *Verkehrstechnik*. It will be recalled, as the ELECTRIC RAILWAY JOURNAL for Sept. 15, page 423, pointed out, that the lines are still publicly owned.

The reorganization became effective on Sept. 10, 1923, and was accompanied by a large reduction in personnel and also a more practical interpretation of the municipality's eight-hour day rule for all employees. In the case of the street railways, this rule now means eight hours' platform time. The system has also been rerouted to great advantage and eighty-nine routes have been cut to thirty routes which are far more direct. The new lines are better balanced as regards traffic and there has been a reduction of car-miles by more turn-backs.

The lines now have a single fare without charge for transfer. This fare was 200,000,000 marks up to Nov. 1, but on that day it was to be increased tenfold. The same increase to the same fare was to be made on the subway and on the bus lines.

The earnings for the first five weeks of operation under the company plant, i.e., since Sept. 1, have proved encouraging. The deficit of 20,000 gold marks (100,000,000,000 paper marks) a day has been eliminated. The number of car-kilometers run has been reduced from the August average of 200,000 (124,000 car-miles) to 120,000 (74,400 car-miles) a day. The density of traffic has increased from 3.31 per car-km. (5.1 passengers per car-mile) to between 4 and 5 per car-km. (6.4 to 8 passengers per car-mile). It must be remembered in connection with the density figures that the average Berlin street car has less capacity than a Birney safety car.

Electric Cars Replace Mules in Maranhao

Mule-drawn cars operated by the State of Maranhao, Brazil, are to be replaced with modern electric cars. Maranhao, the sixth largest state with a population of more than 500,000, occupies a wide sweep of the north coast of Brazil.

Electrification Plans in Czechoslovakia

A comprehensive program of electrification of the steam railroads of Czechoslovakia is just beginning. The first line to be electrified will be the Prague-Kladno line, which is a single-track coal-carrying railroad 30 km. in length. After this will follow the Prague-Zdice-Plzen and Prague-Kolin-Pardubice lines, respectively 115 and 104 km. of double track.

Electrification work will be furthered by the construction of several electric central stations, the first of which, at Rvenice, in the north Bohemian lignite coal district of Chomutov, Most and Duchcov, is nearing completion and will have 40,000 kw. in service next year. A 100-kv. transmission line between Rvenice and Prague, over 84 km. long, is being erected. Following this a hydraulic plant will be built at Stechovice on the Vltava River, with a capacity of some 30,000 kw. Both these plants are being constructed by the Central Electric Plants Company, partly with public and partly with private funds.

The system of electric traction to be used has not yet been definitely decided. The neighboring lines of Germany and Austria employ single-phase current with 15 to 16⅔ cycles and 15 to 16 kv. on the trolley wire, but the high-tension direct-current system also has many adherents, as in France, Belgium, Holland and Great Britain.

The railroads are of light construction, with normal weights per axle of 14.5 metric tons and 1,435 mm. gage, thus giving only limited possibilities as to weight and dimensions of the traction machinery.

London Tube Facilities to Be Extended to Meet Competition

More than £13,000,000 will be expended on extensions of London's tube railways during 1924 and 1925. It has been demonstrated to the satisfaction of the London company's management that a short underground railway no longer can be operated profitably. For this reason plans have been perfected for joining existing lines and for the driving of new tubes, so as to make possible longer hauls. Provision will be made for the operation of more express trains and the maintenance of much higher speeds. This will require some substitution of rail and extensive roadbed betterments.

The announcement has been made that during this month construction will be started. These new works were authorized by an act of Parliament passed last summer, and the beginning of operations has been expedited in order to help in the coming winter the relief of unemployment. It is stated that this new work, along with other projects, will give employment to 25,000 or 30,000 men for nearly two years.

The principal extensions will be the driving of the London Electric Railway's Hampstead tube from Golders Green to Eggewear and the carrying of the tube of the City & South London Railway from Clapham Common to Morden. This latter extension also involves heavy reconstruction in increasing the bore of the existing tube from 10 x 7 ft. to 11 x 8 ft. A new cut-off will be put through which will give the South London line through service from two great traffic centers—Charing Cross and Waterloo Station.

The Piccadilly tube of the London Electric Railway is to be extended from Hammersmith so as to connect with the District Railway near the junction of its branches to Richmond and to Uxbridge. This will make possible the operation of through tube trains from those important suburbs. The Piccadilly line runs under the very heart of the business district, but its income comes largely from short-haul traffic.

These major improvements have been hastened by the loss of buses of short-haul business. Underground lines in 1923 have been running some 500,000 passengers weekly behind the 1922 figures. The decrease is due almost entirely to the use of buses for the shorter trips it is believed. Since some 60,000,000 passengers are carried weekly on the underground railways, the loss is less than 1 per cent as compared with 1922, but the management believes these losses will continue at an increasing rate and steps are being taken to meet them.

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Financial and Corporate

Interurban Control Changed

Bondholders Now Operate Iowa Road—New Interests Hope to Make Line Profitable

Control of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, has passed into the hands of the holders of the first mortgage bonds of the company through their protective committee. E. B. Kane, chairman of that committee, has explained that on Oct. 27 it secured control of 21,700 shares of the total outstanding of 23,330½ shares of the common stock. The stock has been transferred to him as trustee for the bondholders' protective committee for the purpose of enabling the committee to take over the company and all its property and assets and operate them without immediate recourse to the remedies provided in the deed of trust under which the first mortgage bonds are secured.

Immediately following the transfer of stock, the old management resigned and was succeeded by the following new directors representing the bondholders' protective committee: C. M. Cheney and J. B. Knowles, Waterloo, Iowa; George E. Hise, Des Moines, Iowa, and Charles J. Hetburn and Edward B. Kane, Philadelphia. The officers who resigned were L. S. Cass, president; J. F. Cass, vice-president; C. D. Cass, general manager, and W. H. Burk, secretary, treasurer and auditor. Officers were elected as follows to fill these vacancies: C. M. Cheney, president and general manager; C. D. Cass, vice-president, and J. B. Knowles, secretary, treasurer and auditor.

Mr. Kane explains that the immediate effect of the change of management was a reduction of expenses. It is believed that other economies are practicable without affecting the efficiency of the service. The developments just noted clear the way for constructive efforts. Radical changes, he says, must not be expected at once. Reasonable time should be allowed the new management for the application of new policies, the introduction of economies and the development of new business. Not until these influences have been fully tested, will the committee be able fairly to gage the earning possibilities of the property under the reorganization.

Mr. Kane says that the strategic position of the road with its valuable freight belt line and its connection with five steam trunk railroads suggest the practicability of a merger under the new railroad act. This, too, he says will require time for consideration and negotiation. He explains that the company is at present earning little more than its operating expenses, taxes and maintenance. Liberal allowance has, however, been made for upkeep so that the property is in fair physical condition. What with economies, increased traffic and reduced bus competition, the new management hopes to present in the coming year results which will reflect a favorable contrast with the past.

Up to the present time, 85 per cent of the outstanding bonds have been deposited with the protective committee. In view of the developments just noted, the committee has decided that the time for the deposit of additional bonds under the bondholders' protective agreement shall be extended to Dec. 31.

Deficit in Cincinnati in October

Compared with October, 1922, when a 7½-cent fare was in effect, the report of the Cincinnati Traction Company for October, 1923, shows that while the income of the company was slightly in excess of the corresponding period last year, there were fewer cash fares paid. In October, 1923, when the 8-cent fare was started the traction company carried 9,263,041 pay passengers and the revenue obtained was $730,643. During the same period in 1923 under the 7½-cent rate the number of car riders was 9,282,803 and the revenue produced was $705,295.

Other revenues received by the traction company during October, 1923, bring the total receipts to $737,391. The traction company paid for operating expenses during October $499,533, and the remainder was used to pay off other obligations due under the service-at-cost franchise, with the excepton of $29,989 due the city for that period as a franchise tax.

The traction company during October incurred a deficit of $73,350. In the event the company shows a deficit in its operating expenses for November it will be compelled to raise the rate of fare another half cent to 8½ cents on Jan. 1. Under the terms of the service-at-cost franchise the traction company is permitted to raise its rate of fare following deficits in its operating expenses for two consecutive months.

J. K. Newman Reported in Kansas City Reorganization

It is expected that J. K. Newman of Newman, Saunders & Company, New York and New Orleans, will head the movement to reorganize the Kansas City Railway. Mr. Newman is said to be at the head of a syndicate which has purchased through the Chase National Bank, New York, $5,000,000 of defaulted notes and bonds of the Kansas City Railways. The consideration is not known, but the company's first mortgage bonds have been quoted at 40 cents on the dollar, and second mortgage paper much lower.

Mr. Newman has been conferring with other security holders in the company in Chicago, Philadelphia and other northern cities.

Resolution Authorizes Bond Issue by Philadelphia Rapid Transit

A resolution was introduced in the City Council of Philadelphia recently by Mr. Weglein which authorized the Philadelphia Rapid Transit Company to float a $2,500,000 first-mortgage bond issue. The $2,500,000 bond issue, made possible under the transit agreement of 1907, will be secured by mortgages on the Luzerne Street and Callowhill Street carhouses, and upon the terminal to be built at Twentieth and Johnston Streets. At present there is an existing mortgage on the Luzerne and Callowhill Streets terminals for $1,300,000, of which $335,000 has been paid off. The proceeds of the $2,500,000 issue will be used to pay off the $965,000 outstanding and to complete the construction of the South Philadelphia terminal.

A second ordinance, which was also presented by Mr. Weglein, would permit the company to buy up $8,874,000 of a $10,000,000 bond issue floated in 1912. The bonds were sold with the understanding that they could be recalled at any time up to Dec. 31, 1923, and resold at a higher figure. According to a letter to Mr. Weglein from W. C. Dunbar, president of the Philadelphia Rapid Transit Company, the issue is recalled because the company wants to avoid a permanent sale of the bonds at the low figure.

Another Melon at Montreal

The *Canadian Financial Post* says that there is reason to believe that shareholders of the Montreal Tramways will shortly have the opportunity of subscribing for about $1,000,000 of stock of their corporation. The stock is now selling at $150 a share. The amount of capital stock outstanding is only $4,000,000, and a $1,000,000 issue would give each shareholder the opportunity of buying one share of stock at $100 for each four shares now held. This would make the "rights" of subscription worth about $12.50 for each share at present outstanding.

There was $2,000,000 of Montreal Tramways stock issued at the time of organization. In April, 1913, stockholders were offered $1,000,000 at par. and as the stock went to about 235 in the next year the privilege of buying the stock at par was valuable. In September, 1915, another $1,000,000 was allotted at par, although the stock was selling in the neighborhood of 220.

Negotiations for the sale by the Montreal Tramways of an important right-of-way owned by it in the city of Montreal to the Canadian National Railways has attracted attention. The right-of-way parallels the C. N. R. line, which requires additional land to bring its right-of-way up to the minimum requirements of the Board of Railway

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Commissioners. The sale, which is understood to have been consummated, would add a comfortable sum to the company's cash position.

Washington-Virginia Securities in Default

The Washington-Virginia Railway, Washington, D. C., has defaulted in the payment of principal and interest of its 6 per cent bond secured gold notes, dated Jan. 1, 1920, maturing Jan. 1, 1922. In consequence it has been announced that the Bank of North America & Trust Company, Philadelphia, trustee, will sell on Nov. 28, at public auction, $3,000,000 first lien refunding mortgage gold bonds of the company, dated Jan. 1, 1919, due Jan. 1, 1969.

The company operates 63 miles of line from Washington, D. C., to Alexandria, Mount Vernon, Arlington, Fort Meyer, Rosslyn, Clarendon, Vienna and Fairfax.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons, there were sold this week 400 shares of Interborough Consolidated Corporation, common $6 lot, and 1,000 shares of Brooklyn Rapid Transit (old stock), $12 lot. There were sold last week 300 shares of American Cities, 6 per cent preferred stock, $16 a lot; seventy-five preferred parts of the Kansas City Railway Company beneficial certificates, $77 lot, and 1,618 shares of the Omaha & Council Bluffs Street Railways Company, common, $1,600 lot.

High-Speed Electric Line Pays Dividend.—The West Jersey & Seashore Railroad has been put on a semi-annual dividend basis by declaration of 2 per cent paid Oct. 15 to stock of record Oct. 1. Last March the company resumed dividends with a declaration of dividend of 2 per cent out of earnings for 1922. The Pennsylvania Railroad owns 54 per cent of the stock. At a meeting of a committee of stockholders of the West Jersey & Seashore Railroad appointed by the board to consider a lease of property to the Pennsylvania, David Baird resigned as chairman of the committee on account of press of other business and in his stead William J. Sewell was elected chairman. Mr. Baird remains a member of the committee.

Authorizes Interest Payments.—The receivers of the Pittsburgh Railways were recently authorized by Judge Gibson, in the United States District Court, to pay the Union Trust Company of Pittsburgh, trustee under the Southern Traction Company mortgage, $100,000, representing interest coupons due Oct. 1, 1923. The receivers were also authorized to pay the Guaranty Trust Company of New York $63,475 which was the installment due Oct. 1, on the outstanding bonds secured by the general mortgage of the Pittsburgh Railways.

Authorizes Bond Issue.—The Arkansas Railroad Commission has authorized the Fort Smith Light & Traction Company to issue $107,000 in bonds, the proceeds to be used for extensions and improvements.

Stage Lines Affect Railway's Earnings.—Invasion of the Portland-Williamette Valley district by stage lines has so depleted the earnings of the Oregon Electric Railway, serving this district, that the line was unable to meet its bond interest payments on Nov. 1. Whether the Spokane, Portland & Seattle Railway, which owns the line, will advance the necessary funds in the sixty days allowed before default is problematical, in the opinion of W. F. Turner, president of the Oregon Electric. The net loss from operation, taxes and bond interest during the present year so far amounts to $204,000, or approximately $40,000 greater than the corresponding period of last year. It is expected, Mr. Turner stated, that the deficits for the entire year of 1923 will exceed $300,000. In the event of foreclosure proceedings, a reorganization of the Oregon Electric Railway to bid in the property may be undertaken, it is said.

Preferred Stock for Sale.—Bonbright & Company, New York, are offering at 97½ and accrued dividends to yield about 6.15 per cent, $2,400,000 of the Electric Bond & Share Company 6 per cent cumulative preferred stock. The preferred stock will be followed by $22,400,000, par value, of common stock, all owned by the General Electric Company.

Bonds Offered.—The National City Company, New York, is offering $1,000,000 of the Tennessee Electric Power Company ten-year 6½ per cent debenture bonds. The bonds are dated Oct. 1, 1923, and are due Oct. 1, 1933. The proceeds from the sale of these bonds will be used to finance additional property expenditures and to increase the company's working capital. The issue has been authorized by the Railroad & Public Utilities Commission of the State of Tennessee.

Bonds Called.—In connection with the sale of the properties of the Tuscaloosa Railway & Utilities Company to the Alabama Power Company, arrangements have been made for the surrender of the cancellation of more than 90 per cent of the first mortgage, twenty-five year 6 per cent bonds dated July 1, 1940. For the purpose of redeeming and cancelling the bonds, the company has called in all of the bonds at 102 and interest on Jan. 1, 1924.

To Hear City's Appeal.—The Superior Court will hear during the week of Dec. 10 the appeal of the city of Philadelphia from the ruling in which the Public Service Commission fixed the valuation of the Philadelphia Rapid Transit property. This is the result of an order of that court signed by President Judge Orlady. The date had been set for Nov. 19, but under an agreement the hearing was deferred.

State Commission Fixes Buffalo Valuations.—The New York State Tax Commission has submitted to the municipal authorities of Buffalo the valuation figures it puts on the special franchises held by up-state public utility companies for use as the basis for calculating their taxes. The figures as relating to traction lines are as follows: Buffalo & Lackawanna Traction Company, $200,000; International Railway, $7,345,000; South Buffalo Railway, $22,800. The commission will hold a hearing in Buffalo on Nov. 27, at which the corporations will have an opportunity to protest if they feel the valuations are too high.

Conspectus of Indexes for Nov., 1923

Compiled for Publication in this Paper by

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Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Nov. 1923 **6.95**	Oct. 1923 **6.95**	Nov. 1922 **6.98**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	Oct. 1923 **161**	Sept. 1923 **163**	Oct. 1922 **177**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages* 1913 = 100	Nov. 1923 **218**	Oct. 1923 **218**	Nov. 1922 **208**	Sept. 1920 **232**	Apr. 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Oct. 31 1923 **4.67**	Sept. 30 1923 **5.04**	Oct. 31 1922 **6.90**	July 31 1920 **11.12**	Feb. 28 1922 **4.14**
U.S. Bank Clearings Outside N. Y. City (Billions)	Oct. 1923 **16.18**	Sept. 1923 **13.90**	Oct. 1922 **15.37**	Mar. 1920 **18.54**	Feb. 1922 **10.65**
Business Failures Number	Oct 1923 **1,584**	Sept. 1923 **1,280**	Oct. 1922 **1,602**	Jan. 1922 **2.722**	Sept. 1923 **1,280**
Liabilities (millions)	**74.43**	**27.50**	**39.94**	**185.7**	**27.50**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	Nov. 1923 **220.9**	Oct. 1923 **220.3**	Nov. 1922 **188.6**	June 1920 **273.8**	Mar. 1922 **182.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Oct. 1923 **153**	Sept. 1923 **154**	Oct. 1922 **154**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	Nov. 1 1923 **13.14**	Oct. 1 1923 **13.10**	Nov. 1 1922 **13.35**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's—Wholesale Commodities 1913 = 120.9	Nov. 1 1923 **191.8**	Oct. 1 1923 **190.8**	Nov. 1 1922 **182.3**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Oct. 1923 **150**	Sept. 1923 **149**	Oct. 1922 **143**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Oct. 1923 **164.1**	Sept. 1923 **163.4**	Oct. 1922 **157.1**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

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Orders Seven per Cent Stock Issue.—The directors of the Public Service Corporation of New Jersey on Nov. 7 directed that an issue of the 7 per cent preferred stock be made totaling $11,000,000, which is approximately 12½ per cent of all outstanding shares. The stockholders of record Nov. 17 have the option to take such stock at par in proportion to their holdings. For each eight shares of stock held, common or preferred, the stockholders will be entitled to subscribe for one share of 7 per cent preferred stock. The stock may be paid for in full or in installments, one-tenth with the subscription and at least one-tenth on Feb. 1, 1924, and the first day of each month thereafter. The subscribers will be allowed on such payments interest at the rate of 6 per cent per annum to be accounted for at the time such stock is fully paid for.

Company Is Insolvent.—C. A. Fagan, receiver of the Pittsburgh Railways, has filed a report with the United States District Court at Pittsburgh stating that his company is still "manifestly insolvent" and not in a condition to be returned to its owners in a reorganized state. Mr. Fagan is acting independently of his collegues, U. D. George and S. L. Tone. Mr. Fagan took issue with Special Master Wasson, who predicted that a surplus of $264,987 would be shown for the end of the first year after the lifting of the receivership. Mr. Fagan believes that a deficit of at least $1,549,194 would appear.

Preferred Stock Issue Approved.—The Wisconsin Railroad Commission has placed its approval on the proposal of the Eastern Wisconsin Electric Company to issue $40,000 of preferred stock for the purpose of securing funds with which to pay for additions and extensions.

First Report Since Reorganization Submitted.—Commissioner Paul H. Maloney of the Department of Public Utilities of New Orleans has submitted to the Commission Council the first annual report of the Public Service, Inc., since reorganization. It covers the trial period of one year, during which it was agreed that the company was to earn a return of 7½ per cent on a valuation fixed by the city. The returns of the corporation for the year show that the net profits were only 6.69 per cent. No comment was made by Commissioner Maloney upon the report in submitting it to the Commission Council, other than the announcement that the figures are now being gone over by the Auditing Department of the city, and that the report will soon be available.

Seeks Authority for Issue.—The Oklahoma City-Shawnee Interurban Railway has applied to the Interstate Commerce Commission for authority to operate the 38 miles of main track and other properties acquired at a receivers' sale on Sept. 28, and for authority to issue common stock and first mortgage bonds to the extent of $800,000 each to be delivered in payment to H. R. Hudson for the title to the railroad. The stock is to be full paid, non-assessable, of a par value of $100 per share. The bonds are to be issued for twenty years in denominations of $1,000, to bear interest at 6 per cent. The application is signed by C. A. Birge, president; Ernest Warley, secretary; and E. W. Shartel, attorney.

Income Increases.—For the first nine months of the current year the Twin City Rapid Transit Company, Minneapolis, reports gross revenues of $10,210,796, against $10,251,795 for the first nine months of 1922. Operating expenses were $7,455,143 for the nine months period last year and this year they were $7,267,192. The net income increased from $1,044,509 for the January-September period in 1922 to $1,151,756 for the same nine months of the present year.

Line Bought.—The Pennsylvania-New Jersey Railroad, a 26-mile branch line from Bristol to Doylestown, Pa., was recently bought by the S. Snyder Corporation, Rochester, N. Y. Salvaging of the line will be begun soon. The purchasers acquired all the track, overhead wires, culverts and stations of the Bristol road, in addition one $50,000 steel bridge. The Bristol-Doylestown branch was bought by the Pennsylvania-New Jersey Railroad for about $550,000 in 1912. Automobile competition has been instrumental in the suspension of the railway service.

Preferred Stock Offered.—W. A. Harriman & Company and Dominick & Dominick, New York, are offering at 89½ flat to yield more than 7.8 per cent, $4,000,000 of the West Penn Company, 7 per cent cumulative preferred stock. The preferred stock is redeemable as a whole or in part on any dividend date on thirty days notice, at 115 and accrued dividends. The West Penn Company owns directly or through subsidiaries substantially all the common stock of the company, constituting the West Penn system. This system is the largest unit in the group of public utilities, controlled by the American Water Works & Electric Company, Inc. The railway comprises 520 miles of track.

Bonds Offered.—W. C. Langley & Company and John Nickerson & Company, New York, are offering at 94½ and accrued interest to yield about 7 per cent $1,200,000 of the Mississippi Power & Light Company first and refunding mortgage sinking fund gold bonds, known as series A, 6½ per cent. The bonds are dated June 1, 1923, and are due June 1, 1943. The Mississippi Power & Light Company was organized recently to acquire and merge a group of properties which furnish the entire light and power service in Jackson, Vicksburg and several other communities in Mississippi, also railway service in Jackson, Vicksburg, and Greenville. The proceeds from the sale of these bonds and from the sale of preferred stock will be used to pay for additions, extensions and improvements to the properties of the company, to retire certain underlying obligations for other corporate purposes.

Certificates Offered.—Stone & Webster, Inc., will offer $1,115,000 of Electric Railway Equipment Securities Corporation 6 per cent equipment trust gold certificates, known as the trust of Nov. 1, 1923. These certificates are to be dated Nov. 1, 1923, and will be payable in serial installments Feb. 1, 1924, to Oct. 1, 1928, both inclusive.

Stockholders to Meet.—A meeting of the stockholders of the St. Charles Street Railway has been called for Dec. 12, when that utility, the New Orleans Gas Light Company and the New Orleans & Carrolton Railway, whose stockholders will meet subsequently, will be amalgamated with the New Orleans Public Service, Inc. There are only a few shares of these companies outstanding at the present time, the combination being simply a matter of form, as the merging of the utilities named was provided for when a reorganization of the companies was effected. Carrying out of the plan has been delayed by legal technicalities.

Dividend Declared.—The first dividend to be declared on the second preferred stock of the Portland Railway, Light & Power Company, Portland, Ore., amounted to 1½ per cent. This is payable Dec. 1, to holders of record Nov. 17. The second preferred stock is a 6 per cent non-cumulative issue.

Must Pay Taxes.—Despite protests, the Wisconsin-Minnesota Light & Power Company will be required to pay taxes on property in Chippewa Falls although it is not being used and of no revenue producing value. This decision was handed down by the Wisconsin Tax Commission which sustained the opinion of the city tax assessor, who placed a value of $95,000 on the property. The company held that this assessment was illegal in that the property was not being used due to the fact that high water in the river in the spring of 1918 damaged the flume which supplied water for power producing purposes from the river to the electric light plant, causing the property to be abandoned shortly thereafter. The city sought to compel the company to pay taxes on the property since 1919, but the commission invalidated this point, allowing the city, however, to place this property on its tax rolls as of 1923 for taxation purposes.

Seeks Bill Dismissal.—The Chicago Railways has opened its case in the Federal courts to dismiss a bill of equity filed by a protective committee of holders of the series 1 participation certificates. These certificates required the company to show cause why $1,478,400 in cumulated dividends had not been paid. The counsel for the company claimed that there was no money to pay dividends because the earnings had been used for capital expenditure. Attorney for the participation holders asserted that bonds should have been issued to provide for capital expenditures and that the certificate holders had a prior claim on the earnings. Dividends on the series 1 participation certificates have been in arrears since 1917.

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Traffic and Transportation

Would Settle Out of Court

Committee of Citizens at Houston Advances Plan for Straightening Out Transportation Tangle

The Houston Electric Company's court case for an injunction to prevent the city from enforcing the present fare ordinance has again been postponed, this time until Nov. 21. This postponement was granted at the request of a committee of citizens who are endeavoring to settle the case out of court.

John A. Beeler, New York, the expert employed by the city, in his report to the city stated that the jitney was the greatest obstacle to an adequate railway system in Houston.

It is Mr. Beeler's opinion that Houston offers a field for both the electric railway and buses, but that both systems should be controlled by one company so that the two systems could be co-ordinated and duplicate service thereby avoided. With this thought in mind, he recommends that the present jitneys be abolished and that the Houston Electric Company be required to establish bus lines wherever they may be needed.

The report recommends several changes in the present operation of the railway system in order to speed up the cars and increase the earnings. The suggestions include several minor changes in present cross-town lines and track layout, the use of one-man cars, double berthing and use of street collectors in the downtown district, a reduction in number of stops per mile (at present cars stop at every corner or about every 250 ft.), and a change in the transfer system so as to reduce the misuse of transfers.

Acting on these recommendations a group of citizens, calling themselves the Citizens' Committee, filed a report with the City Council recommending settlement of fare litigation along the following lines.

Fare case to be suspended pending jitney election. If elimination of jitneys is voted company and city will agree to:

1. Drop fare case.
2. Begin bus operation on Austin Street immediately.
3. Put into effect all of Mr. Beeler's service and operating recommendations within a year.

It is estimated that the immediate improvements will cost $450,000. The agreement further provides that the Houston Electric Company shall in addition expend $250,000 during 1924, $375,000 during 1925 and $375,000 during 1926 for extensions and bus lines which are detailed in the report.

It is interesting to note that Mr. Beeler states in his report that twelve of the nineteen car lines now in operation are not self-sustaining, while some of the lines have been losing money for years. His final report supplements the one presented to the City Council. It was addressed to the Citizens' Committee and the public. The report follows substantially in full:

To substitute for Houston's present dual system of transportation, now part railway and part jitney, all railway or all jitney affords opportunity for further interesting comparisons that should be understood by the users, taxpayers and public generally, in order that the merits of the respective methods may be weighed so as to determine what the best plan for the community may be.

To handle the city's combined load by the jitney alone, some new problems are presented, as from 1,500 to 1,800 jitneys will be required during the maximum rush hour.

New elements will enter into the operation, some of which will have a tendency to raise present operating costs. The service will have to be organized under a corporation or central control in order that the outlying and sparsely settled non-paying section will receive necessary service, and such a large force of men will call for a systematic and close supervision in order properly to schedule and control the service.

This will require a well-organized force of supervisors as between 2,250 and 2,700 drivers alone will be employed. Accidents and insurance costs will rise, and schedule speed will be decreased on account of the congestion.

Our report shows that the longer haul of the car rider, on the present jitney fare basis, calls for an 8.67-cent fare. With these increases in operating costs, it is safe to say that with the whole city covered, the fare will have to be very close to 10 cents. This will bring the riders' annual bill up to $4,000,000, or about $1,500,000 more than the railway charges under the present rate of fare.

Other items of expense should be considered, even though they may be indirect. Many streets now unpaved will have to be improved in order to permit of the extension of this method of service. This item is likely to run into large figures, and will all be at the expense of the property owners and the city.

In addition to this, increased wear and tear on the streets already paved will result from the tremendous increase in traffic. More traffic officers will be necessary to control the increased traffic. All of these items will increase the cost of operating the municipality, and must be met by increased taxation, so that these indirect costs will still further augment the total cost of the city's local transportation should the jitney be adopted.

With the great number of jitneys on the streets, the congestion will become most acute, especially in the downtown business district, and all traffic will be retarded, including that of jitneys itself. Thus it will lose a portion at least of what is now its chief asset—fast speed.

At the intersection of Travis and Franklin the 146 street car movements through this intersection will require 1,946 jitney movements per hour to give the same passenger capacity. The present vehicular flow at this intersection is 1,314 per hour. By combining the two, 3,260 vehicular movements result. This will give a fair idea of conditions that will pertain to this and the other downtown corners under the jitney method.

On the other hand, properly to care for the jitney passengers in addition to its present patronage, it will be necessary to place in daily operation twenty-eight additional cars.

The cost of the improvements as specified in our report to the Mayor and Commission Council, submitted Nov. 5, 1923, and the establishment of the bus line to Southmore, is estimated to be $438,000. Concerning the other extensions of service that may be desirable, the cost and effect upon the company's net earnings must be given consideration, as capital expenditure must not be allowed to expand too rapidly.

The time required to obtain new cars, construct the additional track and remodel the present equipment, recommended in our report, will require from six to eight months. As these are necessary to the complete carrying out of the revised plan, the full benefit resulting from the operating economies cannot be obtained until this is done. Therefore, steps should be taken to secure these improvements forthwith.

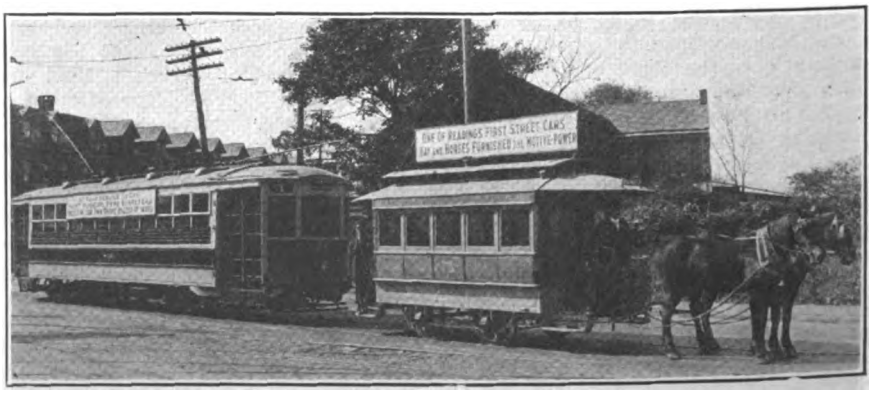
Since 1913, the net income has not been what it should be to insure the perpetuation of the system as the relation of capital to operating revenues and net earnings fails to follow proportionally the investment as shown in the record cost, and which it must do if the system is to continue to remain self-sustaining.

In making all future additions to the plant and equipment and extending the service, we cannot emphasize too strongly that extreme care must be exercised by the city to see that the capitalization of the company is not unduly expanded; this is especially true in connection with the building and operating of the extensions. At present the company is operating nineteen lines. Twelve of these lines are not self-sustaining. Six of these lines are operating in sparsely settled districts; some of them have been losing money for years, and many undoubtedly will continue to do so indefinitely.

The remedy, as we have already pointed out, lies in combining and co-ordinating the two methods into one comprehensive plan of transportation. These two forms of transportation should not be competitive and destructive, so that one system breaks down the other, but in every case the method best suited to the requirements of the section to be served should be employed. Thus under proper regulation a broad and constructive policy may be adopted, making practical economical and efficient operation of this important public utility. This will build for permanency and future development of the city's transportation requirements.

Should the city see fit to adopt the suggestions we have made, and relieve the railway of the jitney competition, then there will rest upon the company a most sacred duty to furnish rapid, ample efficient service, commensurate with the traffic demands of this city. Failure upon the part of the company to do this will invite a return of jitney competition and will constitute on the company's part a flagrant violation of the solemn obligation which it owes the public.

Reading Rejoices



READING TRANSIT & LIGHT COMPANY'S CONTRIBUTION TO THE RECENT CELEBRATION COMMEMORATING THE ONE HUNDRED AND SEVENTY-FIFTH ANNIVERSARY OF THE FOUNDING OF THE CITY OF READING, PA.

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The recommendations for additional street car service in the event jitney traffic is discontinued include increased service by large one-man cars on the West End-Pierce, Heights-South End and Harrisburg and Central Park lines and by small one-man cars on the North Main-Leeland, Woodland-La Branch and Mandell-North Main lines. This would add twenty-six cars and 204 car-hours to the daily schedule.

The estimated cost of improvements which, it is asserted, should be made right away, is given as follows:

Building 3.66 miles of track with necessary connections and special work, $163,000.

Purchase of fifteen double-truck one-man cars, $180,000.

Remodeling platforms and doors of fifty-three cars to permit separate entrance and exit of passengers, $45,000.

Purchase of five modern buses with garage facilities, $50,000.

Only an Eight-Cent Fare Will Save Buffalo Company

Unless the International Railway, Buffalo, is permitted to charge an 8-cent fare on its local lines, the company will face a deficit of $145,900 the next fiscal year. Witnesses for the railway testified to this effect before the Public Service Commission at the resumption of hearings on its plea for a higher rate of fare in Buffalo. It was testified that if an 8-cent fare is charged in 1924 the net income of the International would be $419,000. The present fare of 7 cents, or four tokens for 25 cents, would yield the International, it was testified, an operating income of $10,935,700, while an 8-cent fare would yield an operating income of $11,530,900. Gross income on the present 7-cent fare next year was estimated at $1,383,000, as against $1,958,400 on an 8-cent fare.

Additional evidence tending to support the company's claim that its system is valued at $98,000,000 was presented by expert witnesses for the railway. A. E. Hibner, valuation manager of the International, and W. K. Meyers, vice-president of finance of the Philadelphia (Pa.) Rapid Transit Company, were among the witnesses. Mr. Hibner testified that the reproductive cost of the entire International system, including interurban lines, would exceed $100,000,000.

One-Man Cars and No Transfers Saves Brooklyn Line

The Transit Commission, acting under the authority of Chapter 748 of the Laws of 1923, has issued a special permission to the Nassau Electric Railroad of the B.-M. T. system to operate the Park Avenue Line, in Brooklyn, without transfers, for another year from Nov. 2, 1923.

Last year, acting under authority of a legislative act of 1922, the commission authorized the company to reopen the line for service after a shutdown of about two years, following the strike of 1920. Receiver Garrison was directed by the courts not to resume operation of some of the deficit-making lines. Hence the Park Avenue line was shut down until legislative enactment permitted its resumption with one-man cars without the extra expense of a widespread transfer system.

The line begins at Central Avenue and Cooper Street and terminates at the Sands Street, Brooklyn, end of the Brooklyn Bridge. It issues and accepts transfers good across the Brooklyn Bridge, a total ride of about 6 miles from Manhattan to the Bushwick terminus.

Freight Service to Be Continued by Wisconsin Road

The Eastern Wisconsin Electric Company will contnue to furnish freight and express service between Neenah and Fond du Lac in connection with its interurban passenger service. This service, recently established, aroused the ire of business men and residents of the city to ask the Council for its abolishment on the score that further operation of this service through the main business district was detrimental to the well being of the city and lowered abutting property values. Representatives of business houses suggested that the company build a suitable terminal in the outskirts.

Urges Washington Traffic Study

Appearing before the United States Senate committee on traffic of the District of Columbia on Nov. 20, J. Rowland Bibbins, consulting engineer, Washington, D. C., recommended that a thorough engineering survey of traffic and transportation in the district be be made. The object would be to determine basic facts now entirely unavailable which would be obtained to inform Congress and the District of the need for improvements and for use in working out a definite program fundamentally sound as well as flexible. A similar recommendation had already been made to the committee by W. F. Ham, president Washington Railway & Electric Company. Mr. Bibbins urged that this survey should be made under the jurisdiction of the engineer-commissioner of the District so that the fund of engineering data already in the hands of the commission could be utilized and continuity of effort thus be secured.

Mr. Bibbins urged that Washington should take the lead in solving its traffic problems as it has been looked upon as the model city of America. In common with all other cities, Washington is faced with the necessity of devising ways to speed up the movement of street cars and vehicles generally.

Rail Service Replaced by Bus

At a recent meeting of the City Council of Streator, Ill., the Public Service Company of Northern Illinois was granted permission to cease railway operation and tear up the tracks of the Illinois Light & Traction Company. As stipulated in the agreement the Public Service Company guaranteed satisfactory bus service for the next five years. At the same meeting an independent company, known as the Yellow Bus Company, was authorized to take up operation with a view toward supplying the citizens with adequate bus service. If this company fails in its attempt, the Public Service Company of Northern Illinois will see to it that some other bus operator gives service in the community. The railway in Streator is one of the oldest in Illinois. It established service thirty-three years ago.

Bus System Proposed for Jersey Shore Towns

Application has been made to the Board of Commissioners for permission to operate a $200,000 intercity bus system at Asbury Park. The applicant was George B. Cade, assistant to the secretary of the Atlantic Coast Electric Railway, operating from Pleasure Bay to Sea Girt and the belt system at Asbury Park. The application was made for the Atlantic Coast Transportation Company, a subsidiary of the Atlantic Coast Electric Railway, the officers of which will comprise the personnel of the new concern. It is said that the plans for operating buses include four intercity systems. Mr. Cade said that operation of the railway belt line service in Asbury Park may be suspended during the winter months and buses substituted.

Use of Bus Planned by Hartford & Springfield Line

J. T. Hambleton, general manager of the Hartford & Springfield Street Railway, has asked the city transportation board of Springfield, Mass., for a franchise to operate buses from that city to Suffield, Conn., in place of trolley cars, operation of which it is proposed to discontinue north of Suffield. This is said to be the first step in a plan for the installing of buses over the entire west side route of the Hartford & Springfield, thereby enabling the company to end the railway service and remove the tracks and wires which furnish connections between the Springfield Street Railway and the lines of the Connecticut Company on the west side of the river.

Mr. Hambleton told the transportation board that the entire equipment on the west side was becoming unfit for use and that the company had no funds for replacements. Earnings of the company so far this year are only 70 per cent of the earnings last year. He asked for a quick decision by the city.

The proposed arrangement is subject to approval by the receiver, H. B. Freeman, Hartford, and the bondholders, but no objections are anticipated from these sources. The Springfield Street Railway has indicated that it will not object to the proposed bus service provided it does not offer competition with that company between Springfield and Suffield.

Mr. Hambleton has received encouragement from the Springfield authorities, and he believes the Agawam, Mass., and Suffield, Conn., Selectmen will give their approval, in which event it is hoped the bus service can be started by Dec. 1.

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Personal Items

H. C. De Camp Leaves Dayton

Former Assistant General Manager to Devote Himself to Promotion of One-Man Car Operation

H. C. De Camp, the work for which he went to Dayton, Ohio, completed, has resigned as assistant general manager of the City Railway to promote the efficient and economical operation of one-man cars. The Dayton work consisted of converting the system there to 100 per cent one-man operation, with double-truck cars. Upon it Mr. De Camp entered in July, 1921, and physically the change had been made by June of this year, but a few touches still remained then to perfect operation with the new equipment.

SERVICE SAVED TO DAYTON

Between the dates mentioned more than twenty-six cars were rebuilt, and all other details were worked out successfully which go with a physical change of this magnitude. Economies in management had to be introduced if the City Railway and a 5-cent fare were to be saved to the people of Dayton. Through the change to one-man operation it was possible to reduce the number of trainmen from 240 to 126, replace all regular runs on a car-for-car basis and add trippers so that service to the public actually was bettered.

The story of this change in equipment to one-man operation as carried out at Dayton is a mighty interesting one. Mr. De Camp himself was induced to tell it for the benefit of others in an illustrated article which appeared in the ELECTRIC RAILWAY JOURNAL for Nov. 10, page 809.

Before going to Dayton Mr. De Camp had been with the railway department of the Westinghouse company in the Cincinnati office for eleven years. So long had he been engaged in production that even those who knew him well had come to look upon Mr. De Camp primarily as representing the sales end of the business.

MR. DE CAMP AN AUTHOR

As a matter of fact the transportation end of the business has always had a strong appeal for him, and he has a fund of both railway operating and selling experience at his command. He started with the General Electric Company several years ago, but later went over to the operating end, serving with the old Utica & Mohawk Valley Railway, the Brooklyn Rapid Transit and the Third Avenue Railway. Then followed his long sales connection. During all that time, however, Mr. De Camp kept up his interest in the operating field, particularly along the lines of efficiency in management.

Mr. De Camp has never lost the common touch, as Mr. Kipling puts it. He has always felt that the trainmen have received less attention than they deserved and so he wrote a series of "Letters of a Retired Motorman to His Son." If it is a test of literature to strike a sympathetic chord, then these letters come pretty close to being literature. Ever since he has been in the Central West Mr. De Camp has been active in the affairs of the Central Electric Railway Association. At the 1920 cruise of the association he was "parson," and at the meeting last January he presented the paper "Emergency Stops," which resulted in the tests made later near Indianapolis and reported in the ELECTRIC RAILWAY JOURNAL.

H. C. De Camp

A. S. Coleman, manager of the Alabama Power Company's office in Gadsden, has become district manager at Montgomery. He has been succeeded at Gadsden by J. O. Henkel, Jr., who has been manager of the eastern division at Anniston.

George W. Scott has succeeded Ralph Chandler as second vice-president of the Phoenix Railway, Phoenix, Ariz. L. M. Ford is now treasurer, replacing A. D. Haskell, acting in that capacity. Both officials are located in Los Angeles.

Charles B. Cooke, Jr., has succeeded Franklin P. Jones as president of the West Chester Street Railway, West Chester, Pa. Thomas L. Hodge has been made treasurer, replacing M. G. Woodside.

Robert J. Costigan is claim agent of the Trenton & Mercer County Traction Corporation, Trenton, N. J. The duties of claim agent were formerly performed by Edward J. Peartree, general manager.

John N. Duerr, North Tonawanda, has been promoted to the position of general superintendent of the Buffalo-Lockport interurban division of the International Railway, Buffalo. Mr. Duerr has been in the employ of the International for twelve years. For some time he has been assistant superintendent of the Buffalo-Lockport division.

W. H. Evans, Wilkes-Barre, has been selected as the general superintendent of the Williamsport Passenger Railway and the Jersey Shore Street Railway. The position has been vacant more than three months.

W. Stewart has been made assistant treasurer of the Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.

M. J. Binkley has been made secretary of the Buffalo & Lake Erie Traction Company, Erie, Pa.

F. A. Clark will resign as superintendent of power of the City Light & Traction Company, Sedalia, Mo., to take a position in the construction department of Henry L. Doherty & Company at Washington, Pa.

Douglas Shaw, Madison, treasurer of the Wisconsin River Power Company, Madison, formerly vice-chairman of the accounting division of the Wisconsin Utilities Association, was elected chairman of that division at the closing session of a two-day conference of heads of accounting departments, held in Madison, on Oct. 23 and 24. He succeeds Emil Jorgenson of the Wisconsin Gas & Electric Company, Racine, who recently tendered his resignation.

Rawson Collier, for some years prominently connected with the Georgia Railway & Power Company, but for the past two years with the Hudson River Gas Company, Poughkeepsie, N. Y., has resigned the latter post and will return to Atlanta as representative for Dwight P. Robinson & Company. He is a brother of Charles Collier, sales manager for the Georgia Railway & Power Company.

Obituary

Edward C. Crosby, former builder of street railways in Vermont and Massachusetts, died in Brattleboro, Vt., on Nov. 2. He was born in Marlboro, Vt., in 1846. In 1895 he built the Brattleboro Street Railway and in 1897 the Springfield (Vt.) Street Railway. In the early '90s he took a leading part in the building of lines from Northampton to Amherst and Greenfield, Mass. When several of these roads were combined in the Connecticut Valley system he became chairman of the board of directors. He represented Brattleboro in the Legislature in 1912 and was elected State Senator last year.

James W. Sale, president of the Marion & Bluffton Traction Company since 1914, died recently at Easthaven Hospital, Richmond, Ind. He was sixty-five years old. Aside from his con-

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nection with the Marion & Bluffton Traction Company, Mr. Sale was prominently identfied with other business enterprises throughout the state and was active in politics.

Samuel W. McCall, ex-Governor of Massachusetts and a member of the board of public trustees of the Eastern Massachusetts Street Railway, died recently at Winchester, Mass.

William J. Lloyd, general superintendent of the West Lynn works of the General Electric Company, died suddenly on Oct. 28 in an automobile as he and friends were entering the grounds of the Tedesco Country Club. For several years he was connected with the Westinghouse Company, but for the past twenty-five years he had been with the General Electric Company, four years of this period being spent at the plant of the British Thomson-Houston Company at Rugby, England. Mr. Lloyd for several years was at the Pittsfield works of the General Electric Company and about twelve years ago was transferred to Lynn. He assisted in establishing a plant of the company in Australia about four years ago, returning again to the Lynn works. In July, 1922, he was made general superintendent of the West Lynn works.

Clifford Thorne, noted attorney and authority on railroad subjects, died in London on Nov. 13. Mr. Thorne was a member from 1910 to 1917 of the Iowa Board of Railway Commissioners and chairman for the last five years of his service. He was president of the National Association of Railway Commissioners in 1914 and 1915. He was a member of the American Bar Association, of the American Economics Association and the American Academy of Political and Social Science. Mr. Thorne's expertness in questions of economics brought him into prominence as a contributor to various magazines.

Changes Proposed in New York Rapid Transit Routes

The Board of Estimate of New York has before it a proposal for changes in the route of the West Side extension of the Brooklyn-Manhattan Transit Corporation subway that have been adopted by the Transit Commission. If the board aproves the modifications the new subway will be constructed under Central Park instead of under Central Park West, and will go north between 110th and 125th Streets under Eighth and St. Nicholas Avenues instead of under Manhattan Avenue. It is estimated that the change will result in a saving of $2,500,000 to the city. The Transit Commission has also modified the West Side route so that it will extend from its original terminus, 162d Street, under St. Nicholas Avenue to Fort Washington Avenue at West 175th Street. The line will have four tracks and be under ground all the way. To be effective, these changes must be ratified by the Board of Estimate, which is expected to act on the new proposals some time next week.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Railway Supply Manufacturers Will Hold Convention

At a meeting of the executive committee of the Railway Supply Manufacturers' Association, held in conjunction with the American Railway Association, mechanical division, Master Car Builders-Master Mechanics, held in New York City on Nov. 8, 1923, it was mutually arranged that a convention and exhibition would be held in Atlantic City, N. J., June 11-18, 1924.

Slack Demand for Steel Castings

October bookings of steel castings by companies representing more than two-thirds of the commercial-castings capacity of the United States amounted to 37,446 tons, as against 47,574 tons in September. The accompanying table shows the bookings of commercial steel castings for the past ten months by sixty-five identical companies, with a monthly capacity of 96,900 tons, of which 38,300 tons are usually devoted to railway specialties and 58,600 tons to miscellaneous castings.

	Total		Railway Specialties	
Month 1923	Net Tons	Per Cent of Capacity	Net Tons	Per Cent of Capacity
January.....	100,605	103.8	47,879	125.0
February....	90,152	93.0	39,845	104.0
March.....	143,564	148.2	76,409	199.5
April.....	90,968	93.9	39,610	103.4
May.....	89,493	92.4	38,788	101.3
June.....	84,878	87.6	42,773	111.7
July*.....	52,066	53.7	16,741	43.7
August.....	50,515	52.1	18,332	47.9
September....	47,574	49.1	21,685	56.6
October.....	37,446	38.6	9,840	25.7

* Two companies with a capacity of 785 tons per month on miscellaneous castings now out of business.

October Cement Output Sets Record

The production of portland cement in the United States during the month of October was greater than in any other month this year or during 1922. Compared with the same month a year ago, the figures were 13,350,000 bbl. for 1923 and 12,287,000 bbl. for 1922. In fact, the total production for the first ten months of 1923 is very nearly equal to that for the whole of the year 1922.

Heavy Shipments of Paving Brick Continue

According to the National Paving Brick Manufacturers' Association the paving season is running later in the fall this year than is customary. This is indicated by the continued heavy shipments of vitrified paving brick for the month of October, which were 34,287,000 as against 34,761,000 for September. Total number of brick manufactured was 34,317,000 for October and 34,457,000 for September. Stock on hand was reported at 76,613,000 for October as against 86,530,000 for September. It is thought that this unusual fall activity is the result of a wet spring and a late start to the paving season.

Maintains Carbolineum Is Always Available at Fair Price

The Carbolineum Wood Preserving Company, Milwaukee, Wis., has written the editors of the JOURNAL commenting that it was gratifying to note in the report of the American Electric Railway Engineering Association wood preservation committee, published in the JOURNAL, that the committee confirmed the report of the previous committee in acknowledging carbolineum as the most suitable preservative for brush treatment of wood poles. The manufacturer wished to differ, however, with a subsequent statement made by the committee that carbolineum was not always obtainable at a reasonable cost.

The manufacturer states that, calculating at the highest prices for carbolineum and labor, the cost of brush treating a pole is not more than 50 cents. When it is considered that the pole costs from $7 to $10, at present, and that the brush treatment will give an additional life of at least 100 per cent under the most severe exposure, the 50 cents extra cost for brush treatment, even at highest prices, is certainly justified. The manufacturer says that it is difficult to understand why any one should try to economize in this process by using a cheaper material. It is claimed that in many years' experience customers of this company have rarely objected to the price. In ninety cases out of a hundred they have simply asked for the manufacturer's standard material.

Metal, Coal and Material Prices

Metals—New York	Nov. 20, 1923
Copper, electrolytic, cents per lb.	13.00
Copper wire base, cents per lb.	15.50
Lead, cents per lb.	6.90
Zinc, cents per lb.	6.25
Tin, Straits, cents per lb.	44.875
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.425
Somerset mine run, Boston, net tons	2.375
Pittsburgh mine run, Pittsburgh, net tons	1.925
Franklin, Ill., screenings, Chicago, net tons	1.45
Central, Ill., screenings, Chicago, net tons	0.85
Kansas screenings, Kansas City, net tons	2.00
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.50
Weatherproof wire base, N. Y., cents per lb.	16.50
Cement, Chicago net prices, without bags	$2.10
Linseed oil (5-bbl. lots), N. Y., per gal.	$0.94
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	11.25
Turpentine, (bbl. lots), N. Y., per gal.	$0.94

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Rolling Stock

Schenectady Railway is overhauling most of its equipment. Many cars are in the shops being entirely rebuilt except for the steel underframe. New bodies will take the place of the old.

Southwestern Traction Company, Temple, Tex., has remodeled its passenger cars, converting them into one-man cars with a pay-as-you-enter feature. The converted cars were put in operation on Nov. 5.

Des Moines City Railway will receive in December the first of the twenty-five new steel cars ordered some time ago.

Montreal Tramways has purchased fourteen one-man Birney safety cars from the F. B. Cutter Company, New York City. These cars are the first of this type to be put in service in Montreal.

Department of Street Railways, Detroit, has placed orders for 100 new Peter Witt type cars which are to be equipped with safety car devices and are generally similar to the other cars of this type recently purchased for Detroit. The order has been divided equally between the McGuire Cummings Manufacturing Company and the Osgood Bradley Car Company. Delivery starting Feb. 28, 1924, is specified. The principal specifications follow:

Seating capacity	52
Bolster centers, length	23 ft. 9 in.
Length over all	48 ft. 5¼ in.
Width over all	8 ft. 4 1/16 in.
Height, rail to trolley base	10 ft. 9¾ in.
Body	Semi-steel
Interior trim	Cherry
Headlining	Agasote
Roof	Arch
Air brakes	Not settled
Car signal system	Faraday
Control	K-35
Curtain fixtures	Curtain supply No. 88 Ring
Curtain material	Double-faced Pantasote
Destination signs	Hunter
Door-operating mechanism	Safety Car devices
Door engines	National pneumatic
Door signals	National Pneumatic safety interlocking
Fenders or wheelguards	H. B.
Hand brakes	Peacock staffless
Heater equipment	Gold nichrome wire
Headlights	H.D.B.-96 Root type
Lighting	Center with Electric Service Supplies fixtures and shades
Motors	Four G. E. 35 hp.
Paint	Pratt & Lambert
Sanders	Osgood Bradley
Sash fixtures	O. M. Edwards
Scrapers	Root No. 7 air operated
Tail lights	Nichols Lintern duplex
Trolley catchers	Ohio Brass No. 13141
Trolley base	Ohio Brass Company
Thermostat	Railway Utility
Trucks	Taylor
Ventilators	Railway Utility
Wheels	Rolled steel
Watt-hour meter	Sangamo

International Railway, Buffalo, has equipped 100 passenger cars on its local lines with scrapers or small snow plows which can be lowered to the rails during the winter as necessity arises. Announcement of this valuable addition to the company's snow-fighting equipment was made by Herbert G. Tulley, president of the International. Each line will be equipped with its share of these cars, so that the scrapers can be brought into play immediately snow starts to fall. The company's snow-fighting equipment, in addition to these cars, consists of fifty-four plows and sweepers. These have been thoroughly overhauled and are now assigned to the various carhouses throughout Buffalo for immediate service.

Track and Line

Philadelphia Rapid Transit Company has placed an order with the Union Switch & Signal Company for the material required for installation of an electro-pneumatic interlocking plant at Fortieth Street, on the Market Street Elevated Line. The interlocking consists of a crossover layout with complete signal protection and automatic stops involving eight working functions. Two of the signal levers will be equipped with Mercury automatic time releases to provide automatic time locking.

Southern Public Utilities Company, Winston-Salem, N. C., is making an extension from the end of the West Highland line to the Richard J. Reynolds High School.

New York, N. Y.—The Transit Commission has received bids for the construction of the tracks in the Jerome Avenue yard of the Interborough Rapid Transit Company near Jerome Avenue and Mosholu Parkway. The Slattery Engineering & Construction Company was the low bidder, offering to do the work at $59,879.

Jackson Railway & Light Company, Jackson, Tenn., has spent $70,000 this year in improving its track, buying new equipment and laying extra heavy rails. The East Jackson line, from Royal and Main Streets to the end of the line on East Preston, has been completely rebuilt. Extra heavy rails have been laid on Arlington Avenue from Highland to Prospect and a new curve has been built into the line at the corner of Arlington and Prospect. The North Royal line was also completely rebuilt. The superintendent recently announced that all track improvements for the year had been completed.

Power Houses, Shops and Buildings

West Jersey & Seashore Railroad, Camden, N. J., will purchase power hereafter from the Philadelphia Electric Company. Electricity generated in Philadelphia will be turned into the West Jersey & Seashore Railroad's third-rail line between Camden and Atlantic City early in December. Railroad officials more than a year ago found it would be cheaper to purchase power from the Philadelphia Electric Company, convey it to New Jersey over high-tension lines on the Delair Bridge and run it through substations to the railroad line than it would be to continue the generation of electricity at Westville, N. J. Part of the Westville plant will be used as a substation.

Trade Notes

Templeton, Kenly & Company, Ltd., Chicago, almost immediately after the quake had subsided, received cablegrams to rush to Japan quantities of No. 329 Simplex pole-pulling and pole-straightening jacks, which they were partially able to do through the stock maintained at San Francisco and by borrowing from the stocks of the Western Electric Company and other jobbers on the coast. Additional quantities were immediately dispatched from Chicago to San Francisco, and it is safe to predict that the telephone and power lines will be quickly restored through these first-aid tools.

William Porter White has been appointed to act as personal assistant to M. O. Troy, new executive assistant manager of the central station department of the General Electric Company. His headquarters will probably be at Schenectady in common with Mr. Troy. Mr. White is a graduate of Clemson College, class of 1906, whence he entered the student test course at the Pittsfield works of the General Electric Company. In 1908 he started work in the transformer engineering department there, where he received a thorough training in designing. In 1911 he was transferred to the transformer sales department at Schenectady and, in 1912, was placed in charge of exploitation and sale of feeder voltage regulators and generator voltage regulators. He received another promotion in 1913, taking charge of commercial engineering work in the transformer sales department at Pittsfield.

Bridgeport Brass Company announces the appointment of E. E. Helm as district manager at Detroit. Mr. Helm comes from Akron, where for two years he was manager of the Industrial Bureau of the Akron Chamber of Commerce. He is particularly well known in rubber and automobile trade circles by reason of his connection for five years with the Goodyear Tire & Rubber Company in publicity work.

New Advertising Literature

International Steel Tie Company, Cleveland, has issued a thirty-two page booklet on "Joints." It gives the laboratory and service data on the strength of rail joint on steel twin ties. The articles contained in the leaflet are reprinted from a recent issue of the ELECTRIC RAILWAY JOURNAL.

United Electric Company, Canton, Ohio, has issued a pamphlet, "Vacuum Cleaning Data for Architects and Engineers." The pamphlet states that the lack of a ready reference work on vacuum cleaning has been felt by architects and engineers. The demand for this compilation of information is evidenced, in the opinion of the company, by the fact that this pamphlet has reached its fifth edition.

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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 22

View the Bus in Its Place

WE HEAR a lot about the bus—and perhaps rightly so. Like the faithful colored servant, it is a very helpful adjunct, if kept in its place. And like that servant it may "talk up" out of all proportion to its importance, relative to the master of the situation, the electric railway.

To be specific, the bus in 1922 was 0.09 per cent as important to the general public as the electric railway. It carried nine-hundredths of 1 per cent as many revenue passengers as did the trolley—in figures, 11,852,726 on the bus and 12,665,300,050 on the electric railway—eleven million against twelve billion—according to the Bureau of the Census.

But that was 1922, the bus enthusiast will say. Well suppose we allow a 100 per cent increase in bus passengers carried for the year 1923, which is known to be a very generous allowance. And suppose the railways hauled no more passengers in 1923 than in 1922. On this basis of comparison the bus in 1923 will have carried 0.18 per cent as many passengers as the electric railway—less than two-tenths of 1 per cent.

These figures show clearly the place of the bus in transportation importance. It is a tiny infant as yet, though growing with remarkable rapidity. But what an extravagant statement one makes when he says the day of the trolley has passed.

Insurance Is Good—Fire Prevention Is Better

FIRE insurance is a tremendously important thing for all electric railway companies, and they should be very certain that their properties are adequately protected—a condition, strangely enough, which often does not exist. But even more important than the assurance that the physical property loss will be reimbursed in case of fire, is the need for effort and attention expended in the direction of preventing fires. The fire insurance collected does not reimburse a company for the loss of revenue which occurs during the four months to one year period that may elapse before the property burned (cars, for example) can be replaced; nor does it compensate the public for the loss of service which it must suffer.

This is all by way of emphasis of the necessity for a regular inspection of the fire protection facilities installed on most railway properties and of the general housekeeping conditions over the property. For example, on a recent check-up of the conditions on a street railway system, it was found that only three automatic fire doors worked out of ten tested. A test of the company supplying the watchman service, wherein the regular ring-in at several boxes was skipped, failed to bring any response from the company for over an hour. Various other conditions were found over the property which not only contributed seriously to the fire hazard existing, but would have been cause for a material increase in the insurance rates on various pieces of plant, had they been discovered by the insurance company's inspectors. It is a comparatively simple thing to install fire alarm systems, sprinkler systems, watchman protective service, automatic fire doors, and various other devices for minimizing the danger of fire. It does not take any great amount of managerial ability to get these things installed. But unless the manager supplies the incentive for eternal vigilance in keeping these things in working order they are of little use, and the company might better have saved the investment.

Every railway property should have a periodic, systematic check-up on the fire conditions. Fire prevention is the thing—insurance only for the truly unavoidable fire. Such a policy is always reflected in the rates a company is required to pay.

Transportation Field Needs to Be "Sold" to Faculties

LIKE some investment bankers who recommend today to their clients that electric railway securities should be avoided, the faculties of some of the universities are very lukewarm, if not completely negative, about the opportunity which the transportation field offers for young college trained men. Both classes of men are not keeping up with the progress made in this field in the last three years. The attitude of the bankers merely makes money a little harder to get, but this attitude on the part of faculties tends to deprive the transportation industry of a supply of good personnel for taking over the active positions of the industry in the future. The latter is the more important concern, for with the proper brains in the field, the money problem will take care of itself.

In view of all the advertising that has been given to the troubles of the industry it is rather natural, of course, that people not closely in contact with the everyday developments in the transportation field should at the present time have the idea that the field is not a promising one for the young man to enter. But while this impression is explainable, the industry should not be satisfied to permit it to continue, as there has been such a decided change for the better.

The airing given to transportation troubles was necessary as the only means of bringing about a public realization that conditions fundamentally wrong had to be corrected. The process of education thus given so much momentum by the dire necessity of the situation, has had a profound effect in the course of these few years in building up a public understanding of transportation. This has again placed the industry in a favorable position.

Furthermore, the transportation problems of the present day are so great and so varied, and they are increasing so much each year, that this industry offers opportunities for the exercise of engineering, financial, administrative and legal skill and vision beyond parallel in almost any other line of endeavor. The whole

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fabric of industry in the United States is so thoroughly interwoven with transportation that its development is bound to continue at a very rapid rate—and in a much more enlightened way in the future in view of the public knowledge on the subject that has been gained. The United States already has more transportation facilities than any other nation in the world, yet with the advent of the motor bus and motor truck we have only made a beginning to date in comparison with the development that is in prospect during the next twenty-five years.

The steam railroads and the electric railways are going to make extensive use of the gasoline propelled vehicles, and the automotive industry sees this and is lining up with these major transportation agencies for the policy of co-ordination of the various transportation facilities. In addition there is coming a truly remarkable use of automotive vehicles in fields not now served by rail transportation, and independent of the railway companies. A vital aid to this development is the rapidly spreading acceptance of the philosophy that transportation is too vital a public service to permit its destruction through competition, and therefore development will be aided by the sounder doctrine of utilizing each kind of transportation in its proper sphere in relation to the other kinds, in order to secure the most economical results while supplying the kind of service demanded by the public.

All of this active development simply points to the great need for the highest caliber of men—which means that transportation holds forth an attractive future for the young college graduate.

The Light-Weight Car Is Revolutionizing Light Interurban Practice

THERE was a time when no interurban operator would consider the use of any equipment but that of a heavy type similar to steam railroad coaches. These cars had motor equipment geared for speeds of 50 m.p.h. or even higher, but on many properties the trolley voltage fell so low due to heavy draft of current that the maximum speeds attainable in ordinary service were far below this. The heavy cars also proved very destructive to track and roadbed.

A much saner view of light interurban service has been taken in recent years. The principle of the light-weight car, so successful in city service, has been applied with equally good results in the interurban field. The use of one-man operation in interurban service has also been found entirely practical on many lines, introducing a substantial economy. It has been found that a car with properly designed entrance and exit can save time at stops, and by virtue of a large reduction in weight, the motor capacity can be made less and high rates of acceleration and reasonable running speed can be attained without excessive line drop. This in turn often gives an actual improvement in the average schedule speed. For example, it has been found in practice, as noted again in an article in this week's issue, that a certain type of car embodying these improvements, and having a rated maximum speed of 45 m.p.h., could make the same schedule as the old heavy type geared for 60 m.p.h., and with somewhat more leeway. Furthermore, the material reduction in energy consumption, when a line is operated with the light cars, often avoids the necessity, which the company faced with its old cars, of increasing power plant and substation capacity. Or if power is purchased, the light cars make possible not only a saving in the energy consumption, but they also reduce the maximum demand charge.

Every interurban manager using heavy cars will do well to study the results indicated in the article on page 927, and see if a similar plan for improved operation can be applied to his property. The use of these light cars is spreading at a remarkable rate. They afford an opportunity to give the public better service because of their lower operating cost; and more frequent headway will almost invariably create additional riding. More than one interurban that was a financial failure when operated along old-time methods has been placed on a sound basis and has been enabled to earn some return on the investment by getting rid of its old cars and substituting the light-weight one-man type.

Utility Debenture Bonds Are Sold on a 5⅝ per Cent Basis

ONE cannot read the pages of any financial paper, or the financial pages of any of our large metropolitan journals, without being impressed with the space given to public utility securities. One has only to compare this condition with that of ten or fifteen years ago to see the tremendous strides in public popularity which have been made by public utility securities as investments. Forty years ago the railroads presented the principal field for general security investment. Following this period came the industrials which now, if we include in this group the "motors," represent a large proportion of the securities whose sales are quoted on the exchanges. Up to the present most of the utility issues have been dealt in either locally or off the board in New York by investment houses, but that they are growing in public approval no one can deny. The fact that they are less subject to sudden fluctuations in business than the industrials and less affected by national labor movement than the steam railroads, commends them to the cautious investor.

In this connection there is food for thought that last month the investing public promptly absorbed an issue by the American Telephone & Telegraph Company of $100,000,000 in 5½ per cent debentures on a 5⅝ per cent basis. This is a large issue, even in these days of gigantic companies and big loans, yet these bonds were simply debentures without side frills like the assumption of 2 per cent for federal income tax or the 4 mill Pennsylvania or Connecticut tax. There are not many utility companies that could hope to do as well as this, even on a smaller issue. The telephone company is a national organization with property in every city, a long record of dividend payments in the past and net earnings many times the interest on these bonds. Its securities naturally attract a better market than even those of its local subsidiaries.

Nevertheless, the success of the sale should be encouraging to all other utilities. The various telephone companies controlled by the American Telephone & Telegraph Company are subject to the same kind of regulation as the electric railways and power companies; indeed they are under the same regulators in most states. They have as customers the same people as ride on the trolley cars and use electric light. They are affected by the same economic laws in regard to the purchase of materials and the hiring of labor. If the public has come to consider telephone issues as among the most desirable investments on the market, this sentiment is likely to be reflected also in the purchase of the issues of other utilities.

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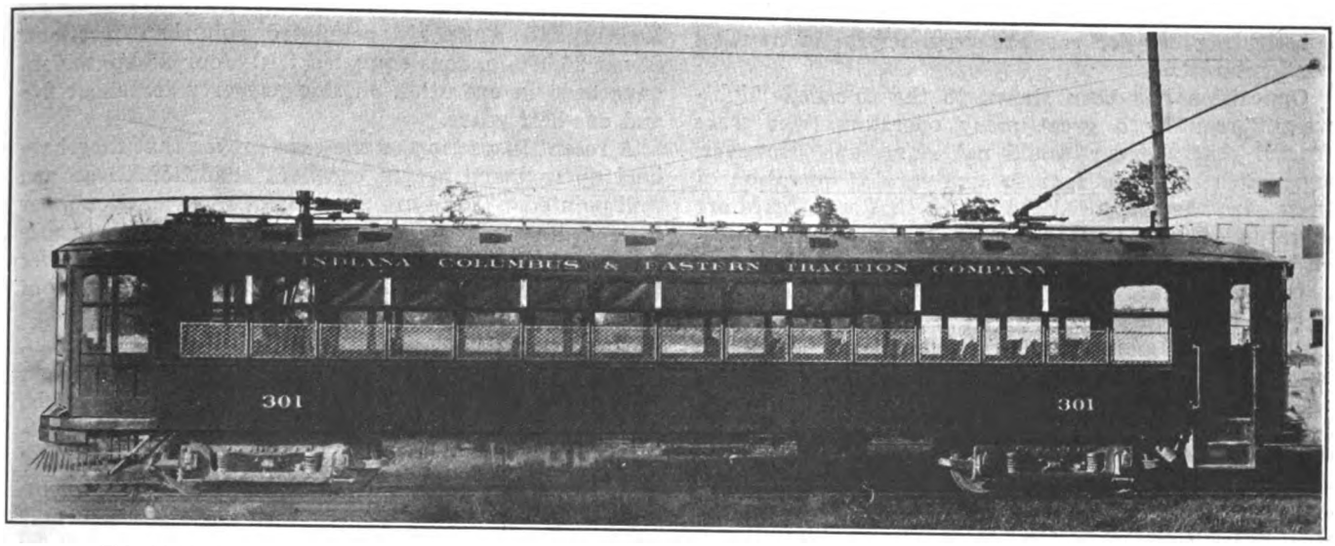

This 50,000-Lb. Interurban Car of the Indiana, Columbus & Eastern Traction Company Seats Fifty-eight and Has a Baggage Compartment. Its Free-Running Speed Is 55 M.P.H.

Experience Shows Light Cars Increase Net of Interurban Lines

Operating Results Analyzed on Several Properties Over a Period of Six Years Show Material Reduction in Operating Costs as Compared with Heavy Cars —The Light Cars Take Less Power and Can Make Schedules Better— Revenue Increases Have Followed the Improvements in Service Made Possible

By C. T. DeHore
General Electric Company, Cincinnati, Ohio

MODERN light-weight cars designed especially for interurban service have now been used for a sufficient length of time so that definite results are available for comparison with previous records. In practically all cases the savings have far exceeded expectations and have shown the car of this type to be far superior to the heavy and expensive type which it replaced.

The writer's attention was directed to the subject about six years ago, when the Cincinnati, Lawrenceburg & Aurora Electric Railway put into operation seven 26,000-lb. interurban cars, equipped with four 25-hp. motors geared for 35 m.p.h. After the order was placed and while the cars were being constructed every one connected with the proposition waited "in fear and trembling" to see what had been bought and how it would perform. That is now a matter of history. The saving has run about $40,000 a year.

After watching this installation the writer felt that there were wonderful possibilities in lighter-weight cars for all interurbans. The results obtained from actual operation from a number of installations at present under consideration are worthy of note.

In a number of instances the replacement of the heavy rolling stock with lighter-weight equipment has carried with it the abandonment of the railway company's old power plant and the purchase of power from a large central station. For instance, a small interurban road operating about 600,000 car-miles per year and using, say, 3,000,000 kw.-hr. may be generating its power in an old station for about 1.75 cents or a total cost of $52,500. To purchase such power at 1.5 cents from the central station would save $7,500 per year. This might not be enough reduction in cost to justify making a change. If, however, by reducing the weight of the rolling stock the energy consumption could be cut squarely in two, the cost of 1,500,000 kw.-hr. at 1.5 cents would be $22,500. This could not be compared with power generated in the old station at the previous rate, as the much smaller load would run up the cost per kilowatt-hour. The purchased energy for the light cars would show a saving of $30,000 total as compared with the energy for the heavy cars from the small station, and under these conditions probably would justify the change.

On other systems purchased power has not been available, but due to the lighter load fewer generators have been used, materially cutting down the amount of coal consumed. On still others it has been possible to shut down substations completely and to reduce the number of units used in substations.

Where railway companies furnish light and power, the reduction in demand and consumption is extremely important, particularly where this business is growing and the released station capacity can be immediately put to use.

The primary object of the light-weight car is to reduce the operating costs to such an extent that better service can be given to the public, which means increased receipts and improved public relations. On some roads the business available does not warrant much increase in service, but the economies effected by

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substituting car for car are very helpful in meeting bond interest.

Opposition has been shown to the so-called "light-weight" car by a great many operators, who were fearful that the car would not stand up. However, experience based on four to six years of operation of these cars has convinced the writer that such fears are ungrounded, and that the cars will stand up as well, or better, than the older heavy type of car.

In considering the "light-weight" car, it must be remembered that most of the weight saved has been in the trucks and motors, and what weight has been taken out of the body is useless weight from the standpoint of life and strength. For instance, one of the large city properties in the Central States recently purchased a number of 26,000-lb. passenger cars, seating fifty-two. It had some 33,000-lb. cars seating the same number, which were built nine years ago, and equipped with maximum traction trucks and two 65-hp. motors. It was decided to change these trucks and motors to four 25-hp. motors on 26-in. wheel trucks. This change reduced the weight of the car from 33,000 to 28,000 lb., or only 2,000 lb. more than the new light-weight car. The car builders advise that the remaining difference in weight was due to two things: First, the old car had a roof 8 in. higher than the new car; second, the excess weight of knee beams necessary to support the drop platform on the old type car.

The weights of passenger interurban cars in the Central States vary from 25,000 lb. to 102,000 lb. One truck equipped with two motors as used on some of the heavier cars weighs more than the entire car on other properties, and yet both cars are doing almost identical work. It is true that some of the heavier cars run faster than the light ones, but there ought to be some better way of getting a little more speed than to multiply the weight by four.

The number of light-weight installations has grown to such an extent that it is impossible for the writer to mention all of them or give the details of each, but the accompanying list covers a number of the interurban roads which have adopted the new idea. Specific references to some of these properties will show what results actually have been obtained.

Cincinnati, Lawrenceburg & Aurora—This is an interurban road 32.5 miles long operating half-hour service through a thickly populated suburban territory. Seven 26,000-lb. cars equipped with four 25-hp. motors have been in operation on this property for about five and one-half years.

A recent inspection of the cars proves that they have held up well and are in excellent condition, clean and well painted. There are no signs of deterioration other than ordinary wear and tear, and their maintenance has cost less than 1.5 cents per car-mile, averaged over the entire period. For 1923 this item is at the rate of 1.45 cents per car-mile.

These cars have made a total of 2,900,000 car-miles, or 414,000 car-miles per car in the five and one-half years of operation. The schedule speed is 20 m.p.h., with the stops per mile averaging 1.5. Energy consumption is 1.63 kw.-hr. per car-mile, which includes all losses to the a.c. bus. At a cost per kilowatt-hour, including substation expense, of 1.32 cents the energy cost per car-mile is 2.2 cents. The a.c. maximum demand for six cars is 203 kw.

The operating costs per car-mile for these cars are as follows:

	Cents per Car-Mile
Maintenance of way and structures	3.55
Maintenance of equipment	1.48
Power	2.20
Conducting transportation (two-man operation)	8.68
General and miscellaneous	3.60
Total	19.51

When this property purchased the light-weight cars it also shut down its old power plant and purchased two 200-kw. automatic substations. The net cost of making the change was $60,000. The saving per year has run about $40,000, or a total to date of approximately $220,000. The cars have just been equipped with safety features, and are now operated by one man.

Kentucky Traction & Terminal Company—This installation, with headquarters at Lexington, Ky., is the most interesting that has come to the writer's attention. Here was a company with a considerable amount of money invested in about 100 miles of electric railway. Bus competition suddenly developed on each of its four interurban lines. Realizing that a 36-ton two-man interurban car is a poor weapon with which to fight a 5-ton one-man bus, a very thorough investigation was begun at once of the merits and operating

LIGHT-WEIGHT INTERURBAN CARS IN USE OR ON ORDER BY ELECTRIC RAILWAYS

Central States Road	Number of Cars	Type	Number of Operators	Weight, Tons	Years in Service	Length of Line, Miles
Cincinnati, Lawrenceburg & Aurora	7	Passenger	1	13	5½	32
Union Traction Company (Nashville)	5	Passenger	1	14	4	28
	1	Express	2	16	4	
Cincinnati, Milford & Blanchester	3	Passenger	1	15	3	29
Pittsburg County Railway	3	Passenger	2	15	2½	25
Kentucky Traction & Terminal Company	12	Passenger	1	12½	1½	70
	2	Freight	1	14	1	
Toledo & Western Railroad	3	Passenger	2	13	1½	75
Youngstown & Suburban Railway	2	Passenger	1	14	1	39
Western Ohio Railway	8	Passenger	2	17	1	120
Fostoria & Fremont Railway	2	Passenger	2	17	1	22
Dayton, Springfield & Xenia Southern Railway	4	Passenger	2	13½	½	20
Chicago, North Shore & Milwaukee Railroad	2	Passenger	2	18	½	35
Cincinnati, Georgetown & Portsmouth Railroad	6	Passenger	1	12½	1	60
Maumee Valley Railways & Light Company	7	Passenger	1	12½	½	20
Northwestern Ohio Railway & Power Company	4	Passenger	2	17	*	60
Pennsylvania-Ohio Electric Company	12	Passenger	1	17	*	120
Indiana, Columbus & Eastern Traction	6	Passenger	2	25	*	300
Texas Interurban Railway (Dallas-Terrell)	6	Passenger	1	16	1	30
Indiana Service Corporation	6	Passenger	2	22	*	78
Eastern Wisconsin Electric Company	5	Passenger	1	18	†	42
Chicago, Aurora & Elgin Railroad	7	Passenger	2	17	*	24
Cleveland, Southwestern & Columbus Railway	12	Passenger	2	16	*	220
Eastern States						
Bangor Railway & Electric Company	6	Passenger	2	14	2½	66
Northampton Transit Company	8	Passenger	1	17	½	25
Warren & Jamestown Street Railway	4	Passenger	2	17	*	22
Shore Line Electric Railway (Norwich, Conn.)	5	Passenger	1	17	*	35
Conestoga Traction Company	5	Passenger	2	12½	*	160

* On order. † In service two months.

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costs of light-weight interurban cars and motor buses. At the conclusion of the investigation it was decided to install light-weight cars, making them as comfortable and attractive as possible; to improve service by cutting headway from one and one-half hours to one hour, and to make a reduction in the rate of fare.

The results of the change were described at length in the ELECTRIC RAILWAY JOURNAL for Sept. 1, 1923, page 327. Some of the things that happened were that the company increased the car-miles 38 per cent, and the passengers carried increased 30.6 per cent. This was accomplished with a reduction of the ticket fares of 12.5 per cent, so that the passenger revenue was 12.7 per cent greater than before. The expenses per car-mile decreased 37 per cent, so that the net income from operation was 102.4 per cent greater with the new cars. The demand on the power station decreased 350 kw. Trains late decreased 64.2 per cent, and cars put out on account of such delays decreased 30 per cent.

The approximate cost of operation on this property is as follows:

	Cents per Car-Mile
Maintenance of way and structures	3.5
Maintenance of equipment	1.5
Power	3.4
Conducting transportation (one-man operation)	8.1
Traffic	0.5
General and miscellaneous	3.6
Total cost per car-mile	20.6

In the maintenance-of-way department prior to the installation of the light cars, the budget requirements per year were approximately 20,000 new ties. For the ensuing year, the requirement was only 9,000 ties.

Since the original installation of ten interurban passenger cars the company has purchased two additional interurban passenger cars, two light-weight interurban freight cars and twenty-seven light-weight single-truck city cars.

This property now has but one type of motor, wheel, axle, etc., for all of its forty-one new cars. All cars are operated by one man.

Cincinnati, Milford & Blanchester—This is an interurban road, 30 miles long operating hourly service. It also sells light and power. The new 30,000-lb. cars, equipped with four 25-hp. motors, have been in operation on this property for three years, with excellent results and low maintenance. These cars have averaged about 275,000 miles each and still have some of the original 26-in. wheels under them.

At the time the light cars went into operation the company also shut down its old 25-cycle power station and purchased 60-cycle power, replacing 1,100 kw. nominal rating in substations by 400 kw. The demand on the power station, which had previously required the railway company to run two 500-kw. engine-type generators, dropped to 315 kw. Since the change-over was made, the company has been able to go after the lighting and power business extensively, so that it has increased the lighting business over 200 per cent in the three years.

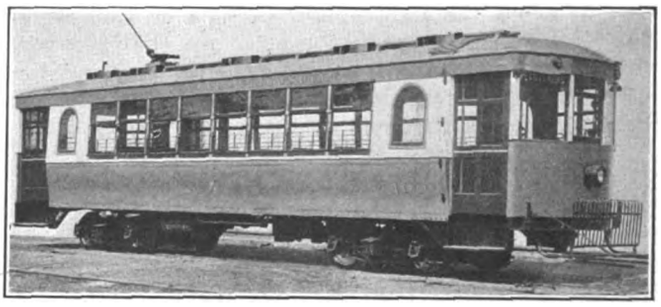
The cars are operated by one man with a fare-box system of collection. There are twenty-two fare zones, and no trouble has been experienced in making a schedule of 20 m.p.h. or in handling passengers.

As a result of the rehabilitation, this company has changed from a property that could not earn its bond interest to one that now pays a dividend on its common stock.

Cincinnati, Georgetown & Portsmouth—This road has about sixty miles of track; does a large carload freight business, and some light and power.

For a number of years the property has not been able to make any progress due to its obsolete power station, heavy cars and infrequent headway.

The management was changed about a year ago, and the new operators at once purchased four 12½-ton passenger cars, one express car of the same weight and four semi-automatic substations. The old plant was shut down and power purchased. The cars are equipped with safety features and are operated by one man.



This Interurban Car for the Maumee Valley Railways & Light Company Weighs 25,000 Lb. and Seats Forty-nine Passengers

The mileage has been increased about 25 per cent, and notwithstanding a considerable amount of bus competition, the railway is making a very satisfactory showing.

While the new system has not been in service long enough to make an exact comparison over a period of months, the following figures may be interesting:

	New System	Old System
Energy per car-mile, including locomotives, kw.-hr.	3.05	4.10
Cost of energy, cents per kilowatt-hour	1.21	1.74
Cost of energy, cents per car-mile	3.69	7.13
Power demand, in kilowatts	755	1.200

The reduction in power bill alone is now running at the rate of $24,000 per annum, and in maintenance of equipment at the rate of $3,600 per annum. These two items of saving will pay more than 30 per cent on the total investment, not considering any increased riding due to the 35 per cent increase in service. The results obtained have been so satisfactory that the company has ordered two additional cars.

Maumee Valley Railway—This company operates a belt line out of Toledo, having about twenty miles of track.

The company had been unable to make its operating expenses for some years past, and in 1921 was thrown into receivership, which lasted until December, 1922.

The old equipment was scrapped and replaced by seven 25,000-lb. cars equipped with four 25-hp. motors, single-end K control and safety features.

One-man operation was installed and six cars are now operated on fifteen-minute headway as compared to four old two-man cars on twenty-six-minute headway, an increase of about 42 per cent in service.

The public immediately showed that it appreciated the new cars and improved service by riding on them in considerably increased numbers. While the six-car schedule has only been in operation for ninety days, the indications are that the receipts have increased about 45 per cent. Serious bus competition has been encountered by this line. Whether or not the new cars and improved service, together with the new bus regulation recently passed by the Ohio State Legislature,

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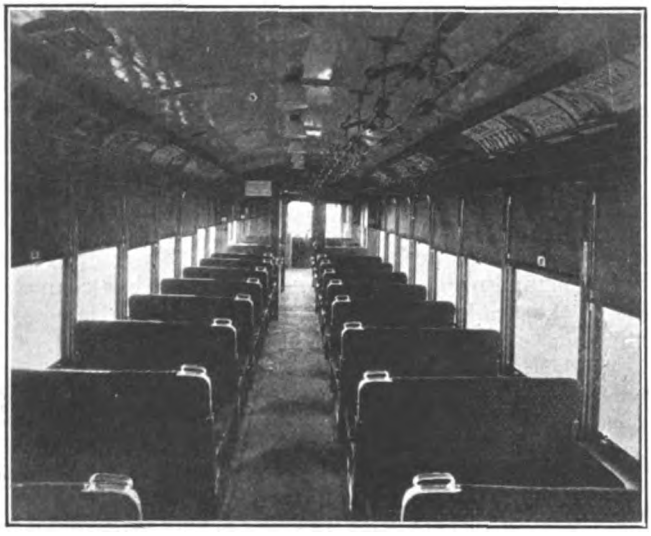
will curtail bus activities remains to be seen. If they do, this road will be able to pay its way and further increase its rolling stock and improve its service.

Some of the comparative figures are given below:

	Old Cars	New Cars
Number of cars in operation	4	6
Headway, minutes	26	15
Operating costs, cents per car-mile	33	23.5
Receipts per month, approximate	$8,000	$11,500
Expenses per month	8,250	8,100

The results have been so satisfactory that the directors have authorized the purchase of three more cars.

Western Ohio Railway—This was the first high-speed line to adopt the light-weight cars. The cars weigh 34,000 lb., seat forty-eight people, are equipped with four 35-hp. motors and have a free running speed of 45 m.p.h. They make a schedule speed of 25 m.p.h. in local service and 31 m.p.h. in limited. They have been



An Interior View of the Indiana, Columbus & Eastern Interurban Car

in service now for more than a year, and the average energy consumption at the car is running 1.27 kw.-hr. One rotary in each substation is now shut down, making a further reduction in power cost. A considerable reduction has been made in maintenance costs, both for labor and for material.

The running time has been cut slightly from what it formerly was. Even with this change the light cars geared for a maximum speed of 45 m.p.h. hold to the schedule better than did the old 35-ton cars geared for a maximum speed of 60 m.p.h. This is due to better line voltage, faster acceleration and quicker loading and unloading. For instance, in one of the winter months last year, with 2,220 trains, only twenty-one trains reached their destinations late, or less than 1 per cent.

Dallas-Terrell Interurban—This is a new road, 31.5 miles long, operating 16-ton cars with four 35-hp. motors. On the interurban section, 28 miles, the run is made in one hour.

Equipment maintenance has averaged 0.6 cents per car-mile, and energy used, including all losses, is running less than 2.5 kw.-hr. The railway is well satisfied with the results obtained; in fact, they have considerably exceeded expectations.

Indiana, Columbus & Eastern—This is the largest road in Ohio, and one which has a considerable amount of private right-of-way suitable for reasonably high-speed operation. Six combination baggage, smoker and main compartment cars, seating fifty-eight, equipped with four 60-hp. motors, geared for about 55 m.p.h. have just been put in service.

While these cars are for use primarily on the Dayton-Union City division, which is 55 miles long, they are geared so that they are capable of making limited runs on the Dayton-Columbus and Springfield-Lima divisions, where schedule speeds of 35 m.p.h. and better are maintained.

Cleveland, Southwestern & Columbus—The latest and also one of the largest interurban roads to begin the use of the light-weight car is the Cleveland, Southwestern, operating more than 200 miles of track.

The Southwestern has recently placed an order for twelve 32,000-lb. cars, seating fifty, equipped with four 35-hp. motors, geared for 45 m.p.h. These cars will completely equip what is known as the "Main Line, Western Division," running from Cleveland to Elyria, Oberlin and Wellington, a distance of 42 miles.

The company is purchasing these cars primarily in order to give better service, it being the plan to run half-hour service out of Cleveland, every other car being a limited. The cars themselves are designed to give the maximum comfort to the passenger, and no expense has been spared to get this result.

The outcome of this installation will be watched with interest all over the country, as the company is in competition with the New York Central Railroad and a large number of motor buses. The officials of the Southwestern believe that thirty-minute service in new, comfortable, easy riding cars will bring back to their road a large portion of the business now handled by private automobiles, motor buses and steam railroads. It certainly looks logical; no one knows how much patronage the buses can stand to lose, but unless all signs fail, the Southwestern is going to find out.

Other Properties—All of the other properties mentioned in the accompanying table are well satisfied with the change from heavy to light cars, and the writer does not believe there is a single instance where a return to the heavy car would be considered.

Light Cars Permit Added Service

The general possibilities available from the use of light-weight cars are many. Where one-man operation is used, it takes but 8 or 10 cents per car-mile additional to put on an extra car where it will relieve congestion and give real service. Such extra service reduces the number of private automobiles, and also reduces the number of "pick-ups" by such vehicles. These increased receipts gradually climb into a considerable number of dollars, and the railway companies that are in position to do these things by reason of having light-weight rolling stock are the ones that are most likely to make a profit.

A number of the installations of light-weight interurban cars mentioned in the accompanying table have been described in the pages of the ELECTRIC RAILWAY JOURNAL. Chief among them are the following:

Cincinnati, Lawrenceburg & Aurora, Dec. 13, 1919, page 915; Cincinnati, Milford & Blanchester, May 28, 1921, page 982; Kentucky Traction & Terminal Company, June 3, 1922, page 983, and Sept. 1, 1923, page 327; Youngstown & Suburban Railway, Jan. 27, 1923, page 181; Western Ohio Railway, Sept. 30, 1922, page 517; Chicago, North Shore & Milwaukee Railroad, Sept. 23, 1922, page 470, and June 9, 1923, page 959; Texas Interurban Railway, April 7, 1923, page 595; Bangor Railway & Electric Company, April 15, 1922, page 643.

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Gaining Public Good Will in a City of 100,000*

Friendly Relations with Newspapers, Co-operation with City Authorities, Prompt Settlement of Claims, Courteous Trainmen, Clean and Freshly Painted Cars and Other Means Have Been Used Effectively in El Paso

POPULARIZING the street car service in El Paso, Tex., has largely been the result of gaining the good will of the public, of developing good relations between management and employee, and of conducting a very successful safety program.

The El Paso Electric Railway officials feel that it is difficult to say just how the public came to a realization of the fact that street railway transportation is of vital importance to it, and that it is even more difficult to attempt to set forth in anything like a brief statement the various methods which have been used to accomplish this end.

During the past year the company has used a very large amount of space in the daily papers telling the story to the public. That is one definite thing that has doubtless been of great help.

The company is a firm believer in the principle that the public is reasonable, and even generous, when it is fully acquainted with conditions, and has earnestly striven to interest it in the various phases of the company's business. The heads of departments are prominently identified with the local civic clubs, and several of them have been honored with the office of president. Through these clubs a very kindly feeling toward the company is built up, and newspaper articles on the business of the company frequently refer to the railway department as "Dixon's Railroad" (Alves Dixon is superintendent), or to "Warren's Company" (Alba H. Warren is manager). It is interesting to observe how quickly the public generally takes to this personal equation of the situation, and how quick patrons and customers are to speak to the individuals regarding the good points of the service. Whereas a few years ago complaints were numerous, both in the daily press and in the form of written and telephonic communications, the company is at the present time receiving at least twenty complimentary communications to one of an adverse nature.

Good Service Builds Good Will

This kind of public good will makes it possible to give better and better service, and the company states that its relations could hardly be improved upon. This is evidenced in so many ways that all of them could not be mentioned in an article of this kind. Several illustrations will prove of interest and are typical of the situation.

The citizens from a certain section of the city succeeded in eliminating jitney competition, despite the fact that the car fare is 6 cents, whereas the jitney fare was 5 cents. When a protest was made and the jitney men employed attorneys to fight the repealing ordinance these citizens again went before the Council and their spokesman, a minister, made such a splendid plea for the company and against the jitneys that the ordinance eliminating the jitneys was permitted to stand.

There are three daily papers in El Paso, and two of them are not only friendly to the company, but seem even eager to assist it in every way possible, both from the standpoint of news items and by editorial comment, on the way the business is being run. The other paper, which is owned by the Scripps McRae syndicate, has not attacked the company.

On the contrary, its news columns have been unusually fair, and an editorial complimenting the company on the courtesy of its trainmen appeared in one of its recent issues.

There has been no newspaper opposition to anything the company has done during more than a year. This has been due largely to the fact that before inaugurating a change the management has gone to the newspaper men, has discussed the proposed change with them, has given the reasons and has asked their advice. In every instance this plan has been entirely successful.

The result has been that the company has not only been able to avoid criticism, but has, on the contrary, had the active co-operation and editorial backing of the newspapers.

Getting Backing of Municipal Authorities

That the municipal authorities appreciate that the company is trying to render the best possible service, and that its efforts are directed solely in the interest of the upbuilding of the city of El Paso, has been accomplished by thoroughly acquainting the municipal authorities with the difficulties of operating a street railway system in these days of high costs. This has been done through a comprehensive education in the details and problems of operating, maintaining and financing, which has cost no little time and effort, but according to the company the results have been well worth while.

Among other things, for example, when streets outside of the business district are paved, it is a practically settled policy that the tracks of the company are to be left unpaved, even though it is stipulated in the franchise that the company must pave when the streets are paved. This has saved approximately $200,000 during the past few years.

Appreciating the fact that some companies make the mistake of advertising and taking their story to the public only when in distress, the El Paso Electric Railway has, for the past year, been using regularly each week space in the local papers to convey information concerning some particular phase of the business. Sometimes these notices have described the workings of various departments, at other times they treat of some

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

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particular problem of the company as a whole. Frequently causes of certain types of accidents are mentioned and these are what are called "timely," such as warnings against tangling kites in electric wires during kite season, etc.

Advising the Public of Schedule Changes

Whenever it is found necessary or advisable to change car schedules, the public is first notified through the newspapers and then cards are placed in all of the cars on the line affected. It is made a point to emphasize that the change is being made for the improvement of service, and the public has been found very appreciative of this advice. A serious handicap in the operation of the cars is the fact that two transcontinental railway lines run through the heart of the city within half a block of each other, and long and heavy trains frequently occasion considerable delay to the street cars. These trains, on account of the heavy grade, frequently stall or pull out a drawhead, and the service is then delayed longer than usual. On several occasions when the railroad made no effort to remove the trains promptly, the street cars have been delayed almost half an hour. On these occasions the company has advertised the cause of the delay in the local papers. This has not only enlightened the public as to the cause of the delay, but has been decidedly helpful in stirring up the railroads to act more promptly under similar circumstances.

Sometimes the claim department is unable to locate witnesses at the addresses given to conductors, and occasionally an out-of-town address is given. In such circumstances a questionnaire is sent them, and upon its return the company's acknowledgment thanking them for their kindness in mailing it. This acknowledgment is signed by the manager.

Good Public Relations Assist in Increasing Car Fare

In 1916 a strike of the company's trainmen took place, which was won by the company. Owing to the fact that El Paso is, to a considerable extent, a union town, this left much hard feeling. That this feeling has been overcome was very definitely illustrated when, two years ago, the company went before the City Council with its request for an increase in car fare. Not a single protest was raised. On the contrary, heads of several of the local unions and the managing editor of the local union paper were present and stated to the Council that they were of the opinion that the company was entitled to this increase. There has not been one single request for a decrease in fare in El Paso since that time.

Customer Ownership

The company believes that customer ownership is one of the biggest factors in the building up of the utility's public relations. It makes each patron, who is a security holder, a booster, provided that the company is properly managed and that the security holder receives a compensatory return on his investment. El Paso is one of the cities of the West where growth has been rapid during the past ten years. This has resulted in a scarcity of local investment capital and high interest rates. For example, the mortgage interest rate on commercial property with a 50 to 60 per cent equity is 8 per cent, and the interest rate on residential property is, in a large number of cases. higher. The common stock of this company is paying a 10 per cent annual dividend. With a par value of $100, its present market price is $126, making the annual return on this basis 7.9 per cent. The preferred stock is paying a 6 per cent annual dividend. With a par of $100 and an existing market price of $88, the annual return is 6.8 per cent. The 5 per cent first mortgage gold bonds of the company, due in 1942, are at present selling for $93, or at the rate of 5.4 per cent per annum.

Under these conditions it is most difficult to sell the bonds, common and preferred stock of the company yielding less than 8 per cent return to the investor in competition with an 8 per cent local interest rate. Again, the city is frequently floating a community enterprise of one nature or another, which affords greater dividends than the company can pay on its stock. For instance, money is now being raised for a 5,000-spindle cotton mill, on the theory that it will pay a 15 to 50 per cent annual return on the capital stock.

Despite the conditions above set forth, and at a time when new money was more costly than it is at present, in 1920 and 1921, the company sold locally to 512 customers a total of $268,800. The security issued was a 7 per cent five-year gold convertible note, and was sold at $96 and accrued interest to yield 8 per cent.

Co-operation with Police Department

When a new chief of police was appointed several months ago, he was found exceedingly progressive and earnestly desirous of operating his department at the maximum of efficiency. The company has been helpful in traffic matters, and has assisted him in installing an up-to-date system for keeping record of traffic accidents. These records include maps where accidents, fights, burglaries, etc., are shown by location, and by the use of colored-headed pins indicating the type of occurrence. The company also supplied him with a clock chart, whereon the time of day when various types of accidents occur is indicated.

The company operates a telephone dispatch system, and the police department has been given keys to all of the telephone boxes. In return, the police department has furnished the company with keys to its telephone boxes, so that the co-operation between the two departments has been very helpful to both.

Courteous Trainmen Important

While it has long been realized that courteous trainmen are a valuable asset, this fact has not been fully appreciated until recently in El Paso, when the company has benefited in most unexpected ways and from unexpected quarters on account of some courtesy extended some one by its men. Not long ago an elderly lady who had stopped in El Paso a few days en route to Seattle wrote a friend in New York that one of the outstanding impressions of her trip across the country was the exceptional and remarkable courtesy of El Paso trainmen.

Trainmen are taught that they must be far better than merely good operators, and that each man in the organization must do his part toward selling the company to the public. It is astonishing how the men have taken this up themselves, and how they have gone even further in matters of courtesy than the company could expect or require. In addition to the instructions which new men are given in this respect, each man receives a special lecture twice a month by his divisional inspector.

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Good-looking and attractive equipment is a very large factor in securing public good will, and though in El Paso it would be possible easily to run the cars eighteen months without repainting, the schedule calls for a new paint job every year. The principal difference is that by yearly painting the cars are kept bright and attractive, whereas when they are permitted to go for a longer period they become dingy and unattractive.

The cars are kept scrupulously clean, and never are permitted to go out in service with dirty windows.

Public Service Department

The company has recently established a Public Service Department which performs a number of functions and has proved one of the largest factors in securing the excellent relations which the company now enjoys with the public. This department handles the various odds and ends which other departments have had to handle incidental to their regular business. Its activities comprise, among other things, the following: Advertising, handling of complaints, analyzing and filing all complaints, safety talks in schools, talks within the organization, talks among contact employees, talks among civic clubs, cultivating friendship of newspaper men, promoting the use of "Better Service" slips, entertainment of employees, such as dances, picnics, etc., educational work among the employees, which promotes a greater use of correspondence school courses, use of motion picture and stereopticon machines in getting the company's story over to the public and employees, establishing and charge of a company library, promoting greater use of the Boston Office Library, files and permanent forms of old newspapers and collections of clippings of all news items pertaining to the company. In addition this department is also in charge of the company's publication, *Cactus Points*. A closer contact with the various departments may be kept by every member of the organization through reading *Cactus Points*, and it is establishing a feeling of good fellowship which was never enjoyed prior to its publication.

In the handling of complaints this department is particularly valuable. A written complaint is immediately acknowledged, and if of any importance, by special delivery. The acknowledgment states that while the company regrets the necessity of the complaint, it is grateful to the writer for having taken the trouble to make it, and assures him that it will receive prompt and thorough attention. After the circumstances surrounding the complaint have been ascertained, the head of this department calls in person on the complainant and is almost invariably able to straighten it out to the entire satisfaction of all concerned. By the company's process of elimination, most of the causes of complaint can be disposed of, with the result that complaints become fewer and fewer in number. As an illustration of this, two years ago through the inspector of public utilities an average of twenty complaints a month was received. During the past year these complaints fell off to less than two a month, and quite recently the office of the inspector of public utilities was abolished, largely for the reason that complaints of street car service, which had formed a large part of its business, had been practically eliminated.

Other Means of Improving Public Relations

An ordinance exists in El Paso prohibiting vehicles from passing street cars which are receiving or discharging passengers. Many automobilists are either unacquainted with or willfully violate this ordinance, and in order to help remedy the situation the word "Stop" has been painted on one of the folding doors. Some of these signs are painted on the wooden part of the door, and others on the glass. The ones on the glass are, perhaps, more easily seen at night, but both of them have aided very much in having automobilists bring their cars to a stop while the street cars are loading or unloading passengers.

Upon the company's initiative, without any suggestions from outside sources, its poles have been removed from the business districts, and, instead, span wires are fastened to adjacent buildings, greatly improving the looks of the streets.

In its advertisements and other ways the company, to a far-reaching extent, has sold to the public the idea that it is a local concern. All the company's trucks and automobiles carry the company name, and it is now planned to erect an office building to help maintain the "Home Company" idea. The company's name is displayed on the power plant, office building, etc. Following out this idea, the company has originated a letterhead which has been adopted by all Stone & Webster properties in the Texas district. This letterhead carries the names of the executives and departmental heads and their positions. This idea has lately been carried into the company's general advertising, the names of departmental heads being carried in advertisements affecting their department.

A further effort to localize the company is the practice of training the men for promotion. When a vacancy occurs anywhere in the organization, every effort is made to fill it from within the company's own ranks, and to go outside the organization only as a last resort.

It is planned to issue to the company's patrons on the first of the coming year a book giving the details of the activities of the company during the year just closed. This book will contain such information as it is felt the customer would like to know, and what the company would like to have him know about itself. Of late, the company has emphasized the three partners, i.e., customer, company and employee. Their wants must be fully satisfied before the company is willing to admit that its operation is, in every sense, successful.

Every year a report is issued to the stockholders, detailing such information therein as is believed will be of pertinent value. Through the medium of the company publication and various other means, employees are constantly advised of the company's activities. In other words, the company's activities are got over to the employees and the stockholders in a pretty definite and concrete way. The thought is that this should be done also for the patrons of the service.

This booklet will start out with a statement about the utility's aims and ambitions in the matter of serving its patrons; it will attempt to show the difference between operating a public utility and other businesses from a financial standpoint, with particular emphasis on the fact that the company turns its capital over only once every three or four years at best, and stressing the large amount of annual capital requirements.

Following this will be detailed the amount of money expended for construction during the year, stating precisely what the money was used for, why it was needed and the improvement that resulted because of the expenditure. What has been done to improve all personal contact relations with the patrons will be

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shown. Definite things that have been done to assist in the further growth of the prosperity of El Paso will be mentioned. Figures and statistics will also be presented showing the growth of the company, special consideration being given to kilowatt-hour output, car-miles run, analysis of accident situation, and other pertinent statistics of similar nature. Figures will be given as to the capacity and nature of equipment in the power plant, number of street cars owned, miles of track, etc. The company's income and detailed expenses will be shown. A copy of the balance sheet will be included.

Photographs of the officials and executives of the company will be shown, possibly with group photographs of the various departments, with a little story as to the part each plays in rendering service. It will also contain a statement showing the small proportion of a man's annual income that is spent for utility service, and other things tending to illustrate and prove the cheapness of electric service.

The company's final thought is that this booklet will portray to the patrons, a splendid idea of the company's activities and is calculated to improve and build up public confidence in and an appreciation of the problems of a street railway company.

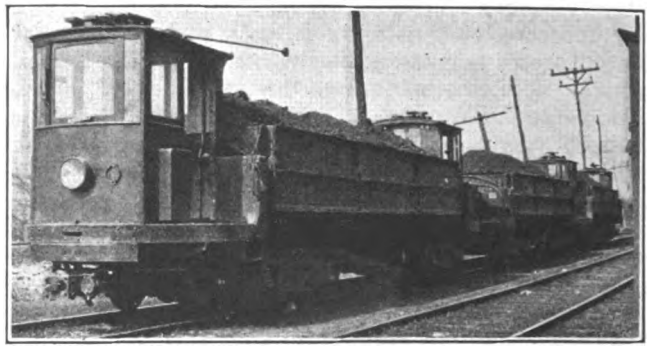
Railway Finds New Source of Revenue

Steel Dump Cars Increase the Income of the Wheeling Traction Company by Hauling Mine and Power Waste on Contract Basis

THE Wheeling Traction Company does not rely for revenue only on its passenger transportation business or interurban express service. The railway has availed itself of an opportunity that was presented to solve the problems of two brother utilities—a power plant and a coal mine—and at the same time improve its own finances. After the completion of the 150,000-kw. power plant of the Beech Bottom Power Company at Windsor, W. Va., some means of disposing of the ashes from the boilers had to be found. A hopper car stationed on a siding into which the daily refuse would go was out of the question because the plant was not situated adjacent to a steam railroad. The traction company's right-of-way, however, passes close by the power plant and a spur siding made it possible to bring its cars very conveniently to a loading hopper.

For the railway the proposition meant a considerable expenditure for equipment to handle the work. Steel dump cars were recommended as the best for this purpose, and arrangements were made for the disposition of 490 tons of cinders daily.

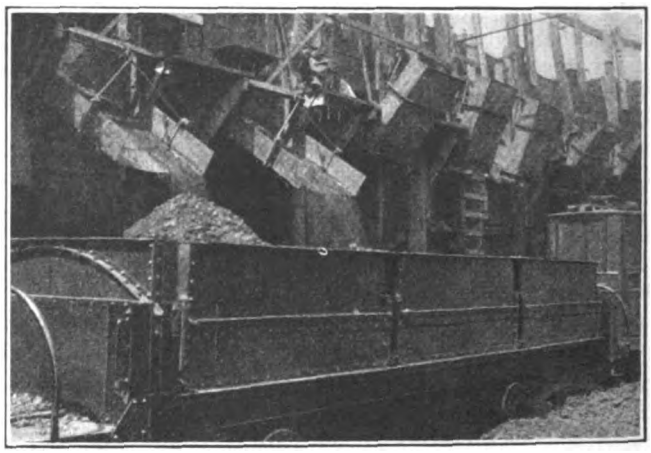
Three Differential dump cars constituted the initial equipment. It was planned to use two motor cars and a trailer in train operation. Each one of the three cars equipped with additional side boards has a capacity of 18 tons. The motor cars are propelled by quadruple equipments of Westinghouse 532-A motors, each motor having a 50 hp. capacity. Electro-pneumatic HL control is provided for double-end control and arranged for multiple-unit operation, as is required when the three dump cars are used together. The dumping mechanism is operated by a Westinghouse type "HK" 5-hp. motor and a type 810 switch and control panel.



Three-Car Train of the Wheeling Traction Company, Consisting of Two Motor Dump Cars and One Trailer

Another matter of importance was a suitable and convenient location where the ashes could be disposed of. The owner of a ravine at Glenn's Run, Warwood, consented to have the ashes used for filling the ravine, the depth of which averaged 35 ft. The fill extends over an area of about 15 acres. From the cinder pit at the power plant to the dump the distance is about 5½ miles.

Another opportunity for additional revenue was



Loading Ashes at the Power House Hoppers

grasped by the railway management a short time after it had begun serving the power company. At a mine belonging to the Richland Coal Company the point had been reached where some disposition of the "gob" must take place immediately. The traction company again offered a proposition similar to that accepted by the power company. Tracks were laid, another dump car purchased and today the daily refuse of from 150 to 200 tons is being handled with mutual satisfaction. The mine "gob" is hauled about 2.2 miles to the dump.

Filling in a Deep Ravine with the Ashes

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Automatic Feeder Control Prevents Service Interruptions

A Combination of Automatic Substation and Special Automatic Feeder Operation with Supervisory Control Insures Continuity of Service on Cleveland Railway Lines—Short Circuit Is Burned Off, Without Shutting Down the Section, by Connecting Several Feeders to the Shorted Line Through Resistance

By Maurice E. Reagan
Switchboard Engineer Westinghouse Electric & Manufacturing Company

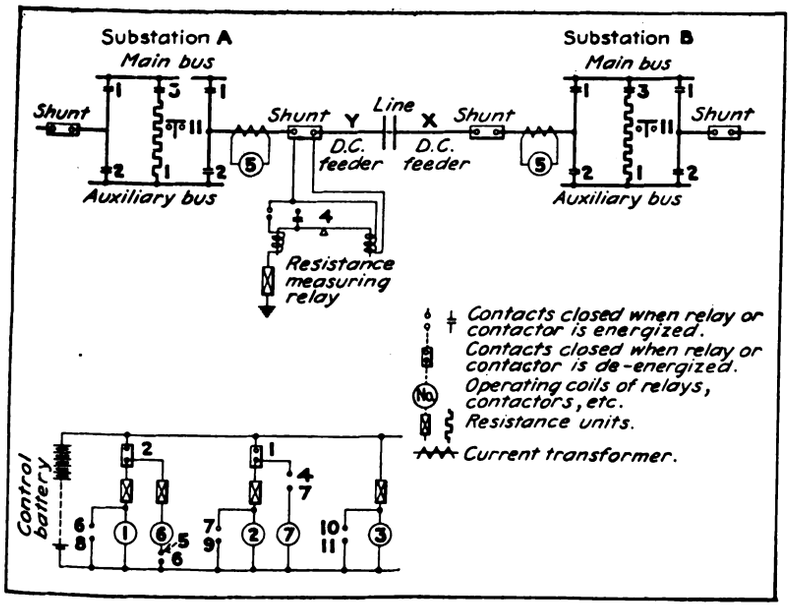
A PLAN has been devised and applied on the system of the Cleveland Railway whereby the individual feeders are automatically controlled, but the load dispatcher is given a chance to transfer the circuits in case of a short circuit in such a manner that the short may be burned off without taking an entire feeder section out of circuit. This has been accomplished by the use of a number of new devices worked out to meet the peculiar conditions prevailing on the metropolitan city system and applied first on the Cleveland Railway system.

In order to understand fully what has been accomplished in this installation, the distinctions between automatic substation control of the ordinary type and this Cleveland installation will be sketched briefly.

Early Automatic Control Unsuitable

In the earliest form of automatic feeder control, both for light and heavy traction service, large-capacity iron resistance units were inserted in a feeder circuit upon occasion of overload on that section. The overloaded feeder would thus operate on reduced voltage from at least one of its ends during the period, while remaining sections feeding from the same station would be undisturbed. Satisfactory results were obtained by the foregoing method when the effective resistance of the circuit consisting of feeder cable, trolley, and rail return to the nearest adjacent "feed-in" point was comparatively high, as is the case in light traffic centers.

In heavily loaded districts encountered in city service the relative resistance of feed-lines is low. Also, the majority of urban feeders are connected to more than one station. The insertion of a resistance in the feeder circuit lowers the voltage, and shunts a portion of the load to other adjacent stations feeding the same section. Of course, the right value of resistance must be used, or too great a share of the load may be transferred to the other station, resulting in the automatic insertion of resistance at that point. If enough load is dropped from the near-by station, the breaker at the near end recloses, and surging back and forth is inevitable. Furthermore, if the overload persists long enough to overheat the resistance at any station, the feeder is



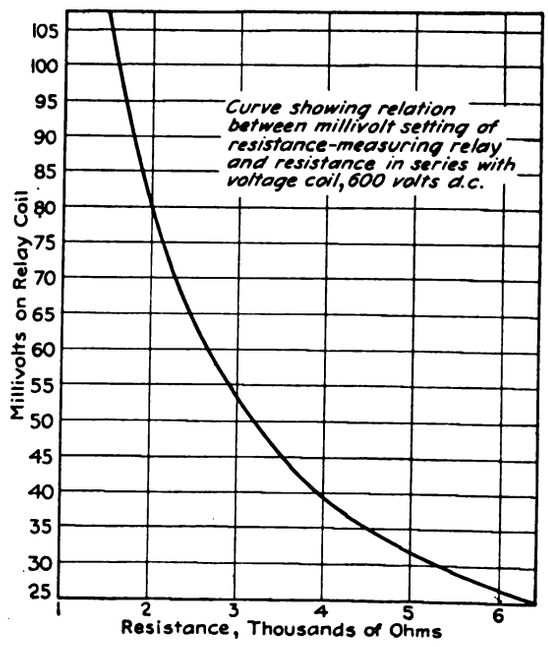


Fig. 1 (At Left)—Typical Cleveland Feeder Layout with Automatic Control. Fig. 2 (At Right)—Relation Between Setting of Resistance Measuring Relay and Resistance in Series with Voltage Coil at 600 Volts

Key to Fig. 1

1. Contactor connecting feeder to main bus.
2. Contactor connecting feeder to auxiliary bus.
3. Bus-tie resistance contactor.
4. Resistance measuring relay.
5. Short-circuit detector relay.
6. Auxiliary short-circuit detector relay.
7. Auxiliary reclosing relay.
8. Supervisory control relay.
9. Supervisory control relay.
10. Supervisory control relay.
11. Bus-tie resistance protective thermostat.

X. 80 per cent of distance from station A to station B.

Y. 80 per cent of distance from station B to station A.

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disconnected from the bus until the resistance cools. In the meantime, the cars supplied by this feeder are without power. Also, during the period of greatest load lower voltage is supplied to the cars, causing lower speeds and greater congestion.

The above principle of operation was, therefore, found entirely unsuited for heavy traffic conditions where two or more substations were automatically operated in parallel. Since the machines in the substations had sufficient capacity for any legitimate load, only trouble on the feeder system should disturb the flow of energy. The machines being protected from overheating, it should be necessary to disconnect a feeder from the bus only in case of a short circuit on it.

Automatic Relay Detects Short Circuits

To take care of this condition, a device known as the "short-circuit detector" was developed, by means of which the feeder breaker would remain closed through all periods of overload. Only a short circuit would cause it to open. This relay consisted of a sensitive moving element whose operating coil was connected across the secondary of a current transformer. The primary of the current transformer was the main outgoing feeder cable. The iron circuit of the current transformer had a small air gap to prevent saturation from the normal direct-current load and give a straight saturation curve. Then a short circuit of a certain resistance would induce a definite current in the secondary of the transformer regardless of the direct-current load being carried at the time the ground occurred.

The time required for the current to reach its maximum value on closing a circuit depends on the inductance of the various portions of that circuit. Thus with the sudden application of an inductive load, such as street car motors, the current will build up so slowly as to induce very little energy in the secondary of the current transformer. Since a short circuit has little inductance, the rise of current presents a very steep wave front, transferring a large amount of induced energy to the transformer secondary and hence to the relay coil. The current induced in the secondary of the transformer is then a direct measure of the value of the short circuit. If the current flowing exceeds a certain amount it is desirable to disconnect the feeder from the main station bus. The relay acts accordingly, and the feeder breaker opens.

Shortly after the feeder breaker opens, a circuit operating on the Wheatstone bridge principle is set up to measure the resistance of the feeder circuit, the object being to indicate when it is safe to reconnect the feeder to the main station bus. As the ground is removed the resistance suddenly rises and the reclosing relay sets up the circuit for reclosing the contactor. This scheme of operation keeps the section dead until some one picks up the broken trolley or in some other way removes the low resistance path.

Precautions to Prevent Service Interruptions

On systems such as the Cleveland Railway every precaution is taken to prevent the slightest interruption. Provision had therefore to be made to keep power on the section of line affected by the short circuit, if possible.

Each substation has two direct-current buses. The main bus normally is connected to the positive terminals of the converters when they are in operation, while the second or auxiliary bus is connected to the main bus through a high capacity resistance by means of a contactor. Each outgoing feeder has a double contactor arrangement so that it may be connected to either the main or the auxiliary bus. The two contactors are so interlocked, however, that only one of them may be closed at one time.

The feeder contactor connecting to the main bus may be opened in two different ways. The first is automatic, through action of the "short-circuit detector" upon occasion of a ground. The second is by means of the "supervisory control system" at the will of the load dispatcher. This man, located in a downtown office, has before him an operating board displaying two lamps corresponding to each contactor and each main piece of apparatus in the substation. One lamp is red, the other white. The red lamp shows that the particular part of the equipment to which it corresponds is in the closed or energized position. If the position of any portion of the equipment in any substation changes, the dispatcher gets an immediate indication by means of the change in lamp signals. The system of remote control provided enables the dispatcher to transfer any feeder from the main to the auxiliary bus, retransfer it back to the main bus, or lock it out of service entirely by opening both contactors.

Auxiliary Bus Used to Insert Resistance When a Ground Occurs

In normal operation all feeders are connected to the main bus, with the bus-tie resistance connected ready for operation. Should a ground occur, the feeder on which it occurs is at once automatically transferred to the auxiliary bus. The feeding is then from the main bus through the bus-tie resistance to the auxiliary bus and thence into the short-circuit. The load dispatcher is at once informed by the corresponding change in lamp signals that the feeder has been transferred. He also gets an approximate indication of the voltage on the auxiliary bus, which gives him some idea of the resistance of the fault. Following out the object of this special arrangement, which is to clear the trouble as quickly as possible, he transfers other feeders in the station from the main to the auxiliary buses in order to raise the voltage. This causes a larger flow of current into the faulty section and the ground is soon burned clear.

When the fault is removed, all feeders must automatically retransfer to the main bus. To ascertain if the line is clear, the resistance of the circuit in trouble is being measured while the feed is taken through the auxiliary bus. The usual resistance-measuring relay which operates on the Wheatstone bridge principle is not applicable in this system, since the voltage of the auxiliary bus may have any value up to 600. A relay is required which will measure a resistance from a variable voltage source. This has been taken care of by a type of resistance-measuring relay which has two operating coils pivoted on a common balance arm. One of the coils is connected with a variable resistance in series between the auxiliary bus and ground; the other coil is connected across a shunt in the outgoing feeder circuit. Hence, one coil measures the voltage of the auxiliary bus, while the other determines the flow of current into the fault. At a point slightly below that set for reclosing, the two coils are calibrated to have the same pulling effect, so that a balance is reached.

When a feeder has been grounded and has been transferred to the auxiliary bus, this relay is placed in the

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circuit automatically, with the current coil overbalancing the voltage coil. If the resistance of the short-circuited feeder remains constant while the voltage of the auxiliary bus rises, the pull of the voltage coil increases. However, this is accompanied by a corresponding increase in the pull of the current coil. Thus the relay gives an accurate measure of the resistance, regardless of the value of voltage on the auxiliary bus. As the resistance rises to a value at which it is permissible to reclose the feeder to the main bus without again operating the "short-circuit detector," the relay acts, making a contact to retransfer the feeder.

The coil of the "short-circuit detector" relay which is connected across the secondary of the transformer has several taps brought out so that the relay may be calibrated by changing one screw on the terminal board. Each feeder on the system has an individual setting depending on its resistance to the nearest adjacent feeder station. Having determined the corresponding short-circuit current, 80 per cent of this value is taken as the value at which the "short-circuit detector" should operate.

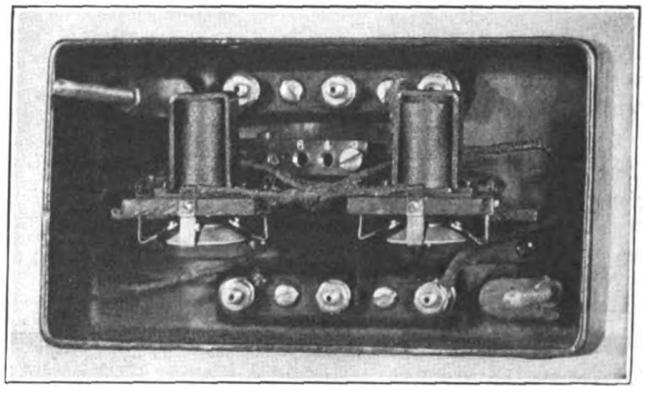
Referring to the diagram of connections given, this means that a short circuit occurring on the right hand side of point *X* would transfer the station *B* feeder to the auxiliary bus but would not affect station *A*. On the other hand, a short occurring to the left of point *Y* would cause a transfer of the connections at station *A* but would not affect station *B*. However, should trouble take place between *X* and *Y*, both stations would be transferred. The reason for this arrangement is that this same feeder may be used to carry current to burn off a ground on some other feeder leading out of the far station. It would be undesirable to transfer it to the auxiliary bus at the near end if connected to the auxiliary bus at the far end by the load dispatcher. The proper calculation is made on each individual feeder circuit, and a relay setting is made to correspond. In case a radical change is made in the feeder circuits a new relay setting is required.

Operation of Reclosing Relay

After the tripping value of the feeder has been determined by the foregoing method, the reclosing relay is set at a point approximately 25 per cent below this amount. As stated before, this adjustment is accomplished by the variation of a resistance in series with the voltage coil of the resistance-measuring relay. Suppose, for example, a feeder is set to transfer on a short circuit of approximately 2,000 amp., and it is desired to retransfer the feeder to the main converter bus when the resistance of the feeder is such that 1,500 amp. will flow when connected to a 600-volt circuit. Since the current coil is connected to a 2,000 amp. shunt, there will be approximately 37.5 millivolts on the current coil at the point of retransferring. Approximately 40 millivolts are required on the voltage coil to overbalance and make contact. By referring to the curve, the necessary amount of resistance to have in series with the voltage coil is determined to correspond with 40 millivolts and set the rheostat accordingly.

The feeder usually transfers from the main to the auxiliary bus only upon occasion of a short circuit. At such a time precautions must be taken to keep the converter from dangerous flashing. As the heavy load is thrown onto the converter, the armature is pulled back from the synchronous position an amount depending on the resistance of the ground. If the load is suddenly removed by opening the feeder breaker, the armature jumps quickly ahead to a position as determined by the remaining legitimate load. All of the armature energy corresponding to the difference in phase position is given up. If this amount of energy is great enough, the converter will flash.

Developments at the present time to prevent flashing include high-speed breakers, having enough feeder resistance between the machine and the first connection to the trolley or by the insertion of sufficient resistance in the machine circuit to limit the current to a value within the commutating capacity of the converter before opening the circuit. The use of the high-speed breaker, which opens the circuit before the armature can be pulled a dangerous amount away from the synchronous position, entails features such as opening under a slight reduction of voltage, etc., which renders it undesirable for such application. Having a permanent resistance of



Short-Circuit Detector Relay and Auxiliary Relay, Nos. 5 and 6 in Fig. 1

sufficient value in the feeder is also undesirable because of the constant loss, the drop in voltage under heavy loads, and the extra copper required to feed the territory nearest to the station.

The system now in use in Cleveland temporarily inserts resistance in the machine circuit for several cycles before the feeder breaker opens. This allows time for the armature to settle in a position from which all load may be suddenly relieved without causing damage. To accomplish this, an air-gap current transformer with a "short-circuit detector" is placed in each machine circuit as well as each feeder circuit. The impulse from the steep wave-front current curve starts both the machine and feeder "short-circuit detectors" operating at the same instant. The time differential comes from the difference in timing between the two contactors. As soon as the feeder breaker opens, disconnecting the feeder from the main bus, the resistance is removed from the machine circuit.

The majority of contactors used in railway feeder application have been of the magnetic type. The natural limitation of this type of contactor is that it will not close on less than 60 per cent of normal voltage. However, since a feeder should be operative when the station is out of service so that other stations may feed through to sections out of their normal zone, the energy for closing the feeders must come from some separate and reliable source. Pneumatic contactors similar to those in use for years in railway car and locomotive service have been adopted in Cleveland. The energy to operate the air valves is supplied by a storage battery.

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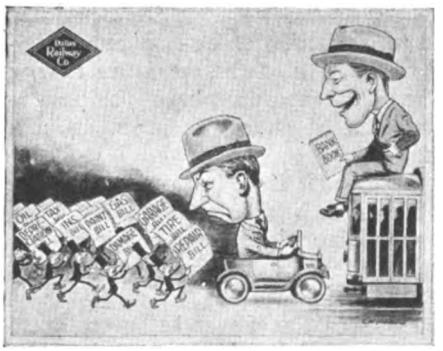

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School Tax paid by this Company annually pays for one year's education for over 1000 pupils. Each street car pays for the schooling of five Dallas children.

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How many street car rides in a Gallon of Gasoline?

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Our service is always given with a smile.

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A few examples of the effective car-card advertising used by the Dallas Railway Company

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Census Figures for Nine More States

These Reports Follow the Trend Indicated in the Census Statements Previously Published—The Track Mileage Has Decreased Slightly Since 1917—Incomes of Electric Railways in These States Have Increased on Account of Higher Fares

Washington—A decrease of 6.5 per cent occurred in track mileage and a decrease of 6.8 per cent in the number of passengers carried. Gross railway operating revenues amounted to $13,852,442 in 1922, an increase of 52.1 per cent as compared with 1917, but on account of a more rapid increase in expenses net income decreased by 57.8 per cent.

	1922	1917	Per Cent of increase, 1917–1922†
Number of operating companies	**19	20	.....
Miles of single track operated††	1,001.69	1,071.33	*6.5
Number of cars, all types	1,988	1,969	1.0
Number of electric locomotives	31	30	.....
Number of persons employed	4,578	5,857	*21.8
Salaries and wages	$7,125,954	$6,291,027	13.3
Primary horsepower, total	27,985	274,224	*89.8
Kilowatt capacity of generators	17,700	173,160	*89.8
Current generated, kilowatt hours	75,510,512	626,948,720	*88.0
Current purchased, kilowatt hours	191,120,960	116,797,063	63.6
Passengers carried	§173,728,486	186,361,737	*6.8
Revenue car mileage	36,299,115	36,128,262	0.5
Railway operations, revenues	$13,852,442	$9,109,642	52.1
Railway operations, expenses	$10,903,804	$6,624,286	64.6
Net revenues, railway operations	$2,948,638	$2,485,356	18.6
Auxiliary operations, revenues	$1,315,885	$6,305,468	*79.1
Auxiliary operotions, expenses	$786,606	$2,694,495	*70.8
Net revenues, auxiliary operations ¶	$529,279	$3,610,973	*85.3
Net operating revenues	$3,477,917	$6,096,329	*43.0
Taxes assignable to railway operations	$599,788	$1,296,612	*53.7
Operating income	$2,878,129	$4,799,717	*40.0
Non-operating income	$576,290	$653,940	*11.9
Gross income	$3,454,419	$5,453,657	*36.7
Interest and other deductions from gross income	$2,898,121	$4,136,448	*29.9
Net income	$556,298	$1,317,209	*57.8

** Reduction in companies due to mergers.

†† Includes 48.62 miles in 1922, and 49.73 miles in 1917 lying outside the state, but owned by companies within the state, and excludes 0.5 mile in 1922 and 0.09 mile in 1917 operated in the state, but owned by companies outside the state.

§ In addition there were 713,798 passengers carried by twenty-six motor buses operated by electric railway companies.

¶ Chiefly revenues from electric light and power departments of electric railways.

Indiana.—In spite of a decrease of 2.4 per cent in track mileage, there was an increase of 13.4 per cent in the number of passengers carried. Gross railway operating revenues amounted to $24,700,557 in 1922 as compared with $17,127,101 in 1917, a gain of 44.2 per cent.

	1922	1917	Per Cent, of Increase 1917–1922
Number of operating companies	†27	32	.....
Miles of single track operated‡	2,297.80	2,353.18	*2.4
Number of cars, all types	2,908	2,692	8.0
Number of electric locomotives	12	9	.....
Number of persons employed	8,855	8,184	8.2
Salaries and wages	$10,509,432	$6,586,842	59.6
Primary horsepower, total	149,115	168,883	*11.7
Kilowatt capacity of generators	114,625	125,262	*8.5
Current generated, kilowatt-hours	297,116,367	288,205,284	3.1
Current purchased, kilowatt-hours	96,633,780	71,298,793	35.5
Passengers carried	262,320,348	231,290,386	13.4
Revenue car mileage	58,551,813	52,213,871	12.1
Railway operations, revenues	$24,700,557	$17,127,101	44.2
Railway operations, expenses	$17,874,164	$11,429,824	56.4
Net revenues, railway operations	$6,826,393	$5,697,277	19.8
Auxiliary operations, revenues**	$3,743,959	$2,401,910	55.9
Auxiliary operations, expenses	$2,215,513	$1,287,248	72.1
Net revenues, auxiliary operations	$1,528,446	$1,114,662	37.1
Net operating revenues	$8,354,839	$6,811,939	22.7
Taxes assignable to railway operations	$1,766,198	$867,049	103.7
Operating income	$6,588,641	$5,944,890	10.8
Non-operating income	$424,183	$400,342	6.0
Gross income	$7,012,824	$6,345,232	10.5
Interest and other deductions from gross income	$5,215,951	$5,341,878	*2.4
Net income	$1,796,873	$1,003,354	79.1

† Reduction in companies due to consolidations and to the fact that four companies with 28.22 miles of track discontinued operations prior to 1922.

‡ Includes 31.20 miles in 1922 and 33.03 miles in 1917 lying outside the state, but owned by companies within the state, and excludes 44.47 miles in 1922 and 35.43 miles in 1917 operated in the state, but owned by companies outside the state.

** Chiefly revenues from electric light and power departments of electric railways.

New Jersey.—The figures show a slight decrease in track mileage and a reduction of 12.8 per cent in the number of passengers carried. Gross railway operating revenues amounted to $31,716,476 in 1922, an increase of 42.8 per cent as compared with 1917, but owing to a more rapid increase in operating expenses and taxes, the net income from all sources decreased by 95.1 per cent during the five-year period.

	1922	1917	Per Cent of Increase, 1917–1922
Number of operating companies	†19	22	.....
Miles of single track operated‡	1,329.22	1,354.35	*1.9
Number of cars, all types	3,359	3,364	*0.1
Electric locomotives	2	2	.....
Number of persons employed	9,638	7,461	29.2
Salaries and wages	$13,419,003	$7,888,127	70.1
Primary horsepower, total	30,116	18,966	58.8
Kilowatt capacity of generators	18,200	14,550	25.1
Current generated, kilowatt-hours	23,021,695	22,895,276	0.6
Current purchased, kilowatt-hours	234,541,378	245,049,086	*4.3
Passengers carried††	484,084,796	555,286,203	*12.8
Revenue car mileage	69,214,150	68,966,244	0.4
Railway operations, revenues	$31,716,476	$22,204,776	42.8
Railway operations, expenses	$22,523,541	$13,387,865	68.2
Net revenues, railway operations	$9,192,935	$8,816,911	4.3
Auxiliary operations, revenues**	$375,655	$59,305	533.4
Auxiliary operations, expenses	$183,823	$48,183	281.5
Net revenues, auxiliary operations	$191,832	$11,122	1,624.8
Net operating revenues	$9,384,767	$8,828,033	6.3
Taxes assignable to railway operations	$3,054,252	$1,831,691	66.7
Operating income	$6,330,515	$6,996,342	*9.5
Non-operating income	$266,554	$269,212	*1.0
Gross income	$6,597,069	$7,265,554	*9.2
Interest and other deductions from gross income	$6,551,768	$6,342,569	3.3
Net income	$45,301	$922,985	*95.1

† Three companies with 27.86 miles of track discontinued operations prior to 1922.

‡ Includes 0.66 miles of track in 1922 and 1917 lying outside the state, but owned by companies within the state, and excludes 14.37 miles in both years operated in the state, but owned by companies outside the state.

†† In addition there were 10,279 passengers carried by six motor buses operated by electric railway companies in 1922.

** Chiefly revenues from electric light and power departments of electric railways.

Texas—A slight increase occurred in track mileage, and there was a gain of 23.9 per cent in the number of passengers carried. Gross railway operating revenues amounted to $16,038,086 in 1922, an increase of 47.2 per cent as compared with 1917.

	1922	1917	Per Cent of Increase, 1917–1927
Number of operating companies	†24	32	....
Miles of single track operated‡	966.01	940.41	2.7
Number of cars, all types	1,606	1,493	7.6
Number of electric locomotives	1	1	....
Number of persons employed	5,736	4,914	16.7
Salaries and wages	$7,286,684	$4,189,408	73.9
Primary horsepower, total	68,511	63,200	8.4
Kilowatt capacity of generators	49,732	46,871	6.1
Current generated, kilowatt-hours	171,734,012	119,510,988	43.7
Current purchased, kilowatt-hours	62,411,775	53,737,334	16.1
Passengers carried	229,165,045	184,912,268	23.9
Revenue car mileage	44,570,642	39,682,183	12.3
Railway operations, revenues	$16,038,086	$10,894,860	47.2
Railway operations, expenses	$11,241,975	$6,742,007	66.7
Net revenues, railway operations	$4,796,111	$4,152,853	15.5
Auxiliary operations, revenues**	$2,853,341	$1,876,360	52.1
Auxiliary operations, expenses	$1,489,218	$928,689	60.4
Net revenues, auxiliary operations	$1,364,123	$947,671	43.9
Net operating revenues	$6,160,234	$5,100,524	20.8
Taxes assignable to railway operations	$1,299,174	$748,239	73.6
Operating income	$4,861,060	$4,352,285	11.7
Non-operating income	$267,675	$234,476	14.2
Gross income	$5,128,735	$4,586,661	11.8
Interest and other deductions from gross income	$2,558,162	$2,182,321	17.2
Net income	$2,570,573	$2,404,340	6.9

† Six companies with 20.83 miles of track which reported in 1917 discontinued operations prior to 1922, and in addition 4 companies were merged with other companies.

‡ Excludes 8.62 miles in 1922, and 9.53 miles in 1917 operated in the state, but owned by companies outside the state.

** Chiefly revenues from electric light and power departments of electric railways.

Virginia.—The figures show a decrease of 4.5 per cent in track mileage and a gain of 2.7 per cent in the number of passengers carried. Gross railway operating revenues amounted to $8,016,948, an increase of 24.4 per cent, but

*Indicates decrease.

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owing to a more rapid increase in expenses, net income from all sources decreased by 31.2 per cent.

	1922	1917	Per Cent of Increase, 1917–1922
Number of operating companies	†14	16	.....
Miles of single track operated‡	555.02	581.35	*4.5
Number of cars, all types	1,141	1,015	12.4
Electric locomotives	4	1	.....
Number of persons employed	4,462	3,406	31.0
Salaries and wages	$5,243,754	$2,547,194	105.9
Primary horsepower, total	179,616	121,536	47.8
Kilowatt capacity of generators	126,812	85,289	48.7
Current generated, kilowatt-hours	314,336,019	210,427,025	49.4
Current purchased, kilowatt-hours	33,195,804	21,063,702	57.6
Passengers carried	139,049,282	135,411,909	2.7
Revenue car mileage	24,312,340	21,968,083	10.7
Railway operations, revenues	$8,016,948	$6,444,415	24.4
Railway operations, expenses	$6,792,444	$3,959,244	71.6
Net revenues, railway operations	$1,224,504	$2,485,171	*50.7
Auxiliary operations, revenues**	$7,402,022	$3,648,872	102.9
Auxiliary operations, expenses	$3,867,384	$1,455,805	165.7
Net revenues, auxiliary operations	$3,534,638	$2,193,067	61.2
Net operating revenues	$4,759,142	$4,678,238	1.7
Taxes assignable to railway operations	$986,298	$482,452	104.4
Operating income	$3,772,844	$4,195,786	*10.1
Non-operating income	$404,526	$257,743	56.9
Gross income	$4,177,370	$4,453,529	*6.2
Interest and other deductions from gross income	$2,899,097	$2,594,523	11.7
Net income	$1,278,273	$1,859,006	*31.2

† Reduction in companies due to consolidations and to the fact that one company discontinued operations prior to 1922.

‡ Includes 3.88 miles in 1922 and 4.69 miles in 1917 lying outside the state, but owned by companies within the state, and excludes 2.50 miles in 1922 and 4.02 miles in 1917 operated in the state, but owned by companies outside the state.

** Chiefly revenues from electric light and power departments of electric railways.

Oregon.—There was a slight increase in track mileage, and an increase of 5.8 per cent in the number of passengers carried. Gross railway operating revenues amounted to $7,400,750 in 1922 as compared with $4,999,601 in 1917, a gain of 48 per cent, and operating expenses increased 74.1 per cent.

	1922	1917	Per Cent of Increase 1917–1922
Number of operating companies	9	8	.....
Miles of single track operated†	605.16	596.23	1.5
Number of cars, all types	1,422	1,431	*0.6
Electric locomotives	19	22	.....
Number of persons employed	3,585	3,057	17.3
Salaries and wages	$5,610,433	$2,976,798	88.5
Primary horsepower, total	115,000	113,950	0.9
Kilowatt capacity of generators	85,630	64,880	32.0
Current generated, kilowatt-hours	323,645,100	218,086,315	48.4
Current purchased, kilowatt-hours	15,991,264	15,066,427	6.1
Passengers carried	97,246,645	91,926,694	5.8
Revenue car mileage	21,341,238	22,528,731	*5.3
Railway operations, revenues	$7,400,750	$4,999,601	48.0
Railway operations, expenses	$6,062,257	$3,481,723	74.1
Net revenues, railway operations	$1,338,493	$1,517,878	*11.8
Auxiliary operations, revenues**	$3,883,726	$2,102,832	84.7
Auxiliary operations, expenses	$1,490,986	$759,168	96.4
Net revenues, auxiliary operations	$2,392,740	$1,343,664	78.1
Net operating revenues	$3,731,233	$2,861,542	30.4
Taxes assignable to railway operations	$1,043,736	$693,211	50.6
Operating income	$2,687,497	$2,168,331	23.9
Non-operating income	$317,600	$184,711	71.9
Gross income	$3,005,097	$2,353,042	27.7
Interest and other deductions from gross income	$3,248,744	$2,981,620	9.0
Deficit	$243,647	$628,578	*61.2

* Includes 0.50 miles in 1922 and 0.09 miles in 1917 lying outside the state, but owned by companies within the state, and excludes 7.35 miles in 1922 and 6.99 miles in 1917 operated in the state, but owned by companies outside the state.

** Chiefly revenues from electric light and power departments of electric railways.

Maine.—The figures show a slight decrease in track mileage and a reduction of 10.1 per cent in the number of passengers carried. On the other hand railway operating revenues increased, owing chiefly to advances in fare rates, from $3,510,034 in 1917 to $4,836,396 in 1922, or 37.8 per cent, and net income showed a gain of 112.1 per cent.

	1922	1917	Per Cent of increase 1917–1922
Number of operating companies	15	16	.....
Miles of single track†	571.56	577.00	*0.9
Number of cars, all types	672	820	*18.0
Electric locomotives	8	7	.....
Number of persons employed	1,789	1,903	*6.0
Salaries and wages	$2,615,625	$1,665,721	57.0
Primary horsepower, total	56,556	45,548	24.2
Kilowatt capacity of generators	30,660	22,814	34.4
Current generated, kilowatt-hours	75,180,990	61,596,706	22.1
Current purchased, kilowatt-hours	47,887,491	40,673,687	17.7
Passengers carried	55,575,075	61,789,846	*10.1
Revenue car mileage	11,026,566	12,255,066	*10.0
Railway operations, revenues	$4,836,396	$3,510,034	37.8
Railway operations, expenses	$3,724,767	$2,618,746	42.2
Net revenue, railway operations	$1,111,629	$891,288	24.7
Auxiliary operations, revenues	$1,815,178	$1,271,187	42.8
Auxiliary operations, expenses	$776,900	$501,475	54.9
Net revenue, auxiliary operations	$1,038,278	$769,712	34.9
Net operating revenue	$2,149,907	$1,661,000	29.4
Taxes assignable to railway operations	$417,362	$198,524	110.2
Operating income	$1,732,545	$1,462,476	18.5
Nonoperating income	$215,496	$143,450	50.2
Gross income	$1,948,041	$1,605,926	21.3
Deductions from gross income	$1,140,658	$1,225,209	*6.9
Net income	$807,383	$380,717	112.1

†Includes in both years 5.48 miles of track lying outside of the state, but owned by companies within the state.

Vermont—The figures show not only a decrease of 8.1 per cent in track mileage, but also a loss of 20.5 per cent in the number of passengers carried. Gross railway operating revenues amounted to $602,196 in 1922, an increase of less than 1 per cent, as compared with 1917, while railway operating expenses increased 7.3 per cent, and net income 1.3 per cent.

	1922	1917	Per Cent of Increase, 1917–1922
Number of operating companies	†8	9	.....
Miles of single track operated‡	99.20	107.95	*8.1
Number of cars, all types	87	156	*44.2
Electric locomotives	5	.....	.....
Number of employees	268	311	*13.8
Salaries and wages	$294,712	$259,205	13.7
Primary horsepower, total	2,800	8,394	*66.6
Kilowatt capacity of generators	2,150	7,277	*72.2
Current generated, kilowatt-hours	3,449,600	11,601,930	*70.3
Current purchased, kilowatt-hours	11,879,978	10,152,558	17.0
Passengers carried	7,372,195	9,268,385	*20.5
Revenue mileage	1,405,742	1,865,039	*24.6
Railway operations, revenues	$602,196	$596,983	0.9
Railway operations, expenses	$525,166	$489,663	7.3
Net revenues, railway operations	$77,030	$107,320	*28.2
Auxiliary operations, revenues**	$286,387	$229,586	24.7
Auxiliary operations, expenses	$189,896	$109,783	73.0
Net revenues, auxiliary operations	$96,491	$119,803	*19.5
Net operating revenues	$173,521	$227,123	*23.6
Taxes assignable to railway operations	$30,680	$34,684	*11.5
Operating income	$142,841	$192,439	*25.8
Non-operating income	$53,633	$48,489	10.6
Gross income	$196,474	$240,928	*18.5
Interest and other deductions from gross income	$160,116	$205,040	*21.9
Net income	$36,358	$35,888	1.3

† One company with 13.22 miles of track suspended operations prior to 1922.

‡ Includes 2.25 miles in 1922, and 2.86 miles in 1917 operated outside the state but owned by companies within the state, and excludes 20.45 miles in 1922 and 20.46 miles in 1917 operated in the state but owned by companies outside the state.

** Chiefly revenues from electric light and power departments of electric railways.

Massachusetts.—Track mileage decreased 12 per cent. This decrease is due to track reported as abandoned or idle in 1922. A decrease of 13.2 per cent is also shown in the number of passengers carried. Gross railway operating revenues amounted to $60,942,009 in 1922, an increase of 34.7 per cent as compared with 1917; operating expenses increased 30.3 per cent while net income made a gain of 222.8 per cent.

	1922	1917	Per Cent of increase, 1917–1922†
Number of operating companies	**31	39	.....
Miles of single track operated††	2,688.37	3,055.88	*12.0
Number of cars, all types	6,273	9,515	*34.1
Number of electric locomotives	5	6	.....
Number of persons employed	17,530	21,330	*17.8
Salaries and wages	$27,938,108	$21,236,219	31.6
Primary horsepower, total	303,863	333,390	*8.9
Kilowatt capacity of generators	224,539	233,619	*3.9
Current generated, kilowatt-hours	396,515,810	537,040,967	*26.2
Current purchased, kilowatt-hours	111,050,581	97,326,716	14.1
Passengers carried	§1,058,708,495	1,219,706,121	*13.2
Revenue car mileage	105,161,956	137,559,415	*23.6
Railway operations, revenues	¶$60,942,009	¶$45,239,116	34.7
Railway operations, expenses	$44,431,004	$34,097,107	30.3
Net operating revenues	$16,511,005	$11,142,009	48.2
Taxes assignable to railway operations	$2,636,552	$2,210,133	19.3
Operating income	$13,874,453	$8,931,876	55.3
Non-operating income	$770,176	$211,547	264.1
Gross income	$14,644,629	$9,143,423	60.2
Interest and other deductions from gross income	$9,845,285	$7,656,659	28.6
Net income	$4,799,344	$1,486,764	222.8

** Reduction due to companies which have discontinued operations.

†† Excludes 70.29 miles in 1922 and 110.93 miles in 1917 lying outside the state, but owned by companies within the state.

§ In addition there were 639,217 passengers carried by twelve motor buses operated by electric railway companies.

¶ Includes revenues from sale of electric current to the amount of $533,016 in 1922 and $578,283 in 1917.

*Indicates decrease.

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Association News & Discussions

Committee Appointments for 1923-1924, American and Affiliated Associations

THE committee appointments of the American Electric Railway Association and affiliated associations have been completed by President Britton I. Budd and the other presidents. The list printed herewith includes only the men who have accepted, and there will be a few additions to some of the committees as final acceptances are received.

American Association

FINANCE

J. H. Pardee, president The J. G. White Management Corporation, New York, N. Y., chairman.
R. P. Stevens, New York, N. Y.
J. G. Barry, Schenectady, N. Y.

POLICY

J. N. Shannahan, president Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., chairman.
J. P. Barnes, Louisville, Ky.
H. G. Bradlee, Boston, Mass.
C. D. Emmons, Baltimore, Md.
J. H. Hanna, Washington, D. C.
W. H. Sawyer, East St. Louis, Ill.
Paul Shoup, San Francisco, Cal.
H. D. Shute, East Pittsburgh, Pa.
L. S. Storrs, New Haven, Conn.
Robert I. Todd, Indianapolis, Ind.

SUBJECTS AND MEETINGS

F. R. Coates, Henry L. Doherty & Company, New York, N. Y., chairman.
Harry L. Brown, New York, N. Y.
Joseph K. Choate, New York, N. Y.
Harlow C. Clark, Newark, N. J.
F. W. Doolittle, New York, N. Y.
E. C. Faber, New York, N. Y.
George H. Harries, Chicago, Ill.
Cornell S. Hawley, Albany, N. Y.
W. H. Hyland, Gloversville, N. Y.
H. A. Johnson, Chicago, Ill.
C. W. Kellogg, Boston, Mass.
J. K. Punderford, New Haven, Conn.
A. S. Richey, Worcester, Mass.

PUBLICITY

W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill., chairman.
P. S. Arkwright, Atlanta, Ga.
Frank L. Blanchard, New York.
John S. Bleecker, Springfield, Ohio.
Frank R. Coates, New York, N. Y.
P. H. Gadsden, Philadelphia, Pa.
L. E. Gould, Chicago, Ill.
Luke Grant, Chicago, Ill.
J. P. Griffin, Dallas, Tex.
H. M. Lytle, Chicago, Ill.
J. C. McQuiston, East Pittsburgh.
Martin P. Rice, Schenectady, N. Y.
L. S. Storrs, New Haven, Conn.
E. M. Walker, Schenectady, N. Y.

PUBLICATIONS

L. S. Storrs, president The Connecticut Company, New Haven, Conn., chairman.
J. P. Barnes, Louisville, Ky.
F. G. Buffe, Kansas City, Mo.
Harlow C. Clark, Newark, N. J.
E. C. Faber, New York, N. Y.
M. B. Lambert, East Pittsburgh, Pa.
J. N. McDonald, New York, N. Y.
M. McCants, San Francisco, Cal.
E. M. Walker, Schenectady, N. Y.

COMPANY AND ASSOCIATE MEMBERSHIP

R. P. Stevens, president Republic Railway & Light Company, New York, N. Y., chairman.
R. F. Carbutt, New York, N. Y.
John A. Dewhurst, Philadelphia, Pa.
Albert Flor, New York, N. Y.
H. B. Flowers, New Orleans, La.
L. E. Gould, Chicago, Ill.
C. W. Kellogg, Boston, Mass.
T. A. Kenney, New York, N. Y.
George R. Lyman, New York, N. Y.
C. E. Morgan, Brooklyn, N. Y.
R. Shaddelee, Grand Rapids, Mich.
K. A. Simmon, East Pittsburgh, Pa.
E. M. Walker, Schenectady, N. Y.
E. P. Waller, Schenectady, N. Y.

COMMUNITY SECTION, COMPANY SECTION AND INDIVIDUAL MEMBERSHIP

C. E. Morgan, vice-president and general manager Brooklyn City Railroad, Brooklyn, N. Y., chairman.
C. P. Billings, Pittsburgh, Pa.
L. C. Datz, Memphis, Tenn.
C. R. Ellicott, New York, N. Y.
W. H. Hyland, Gloversville, N. Y.
H. A. Johnson, Chicago, Ill.
J. K. Punderford, New Haven, Conn.
Martin Schreiber, Camden, N. J.
J. E. Wayne, York, Pa.
E. M. White, Binghamton, N. Y.

CO-OPERATION WITH STATE AND SECTIONAL ASSOCIATIONS

J. P. Barnes, president, Louisville Railway, Louisville, Ky., chairman.
John S. Bleecker, Springfield, Ohio.
F. G. Buffe, Kansas City, Mo.
F. C. Chambers, Des Moines, Iowa.
J. C. Chestnut, McAlester, Okla.
J. F. Collins, Jackson, Mich.
F. B. Culley, Augusta, Ga.
P. H. Gadsden, Philadelphia, Pa.
L. H. Palmer, Baltimore, Md.
C. E. Morgan, Brooklyn, N. Y.
A. B. Paterson, New Orleans, La.
A. M. Patten, Topeka, Kan.
T. H. Tutwiler, Memphis, Tenn.
C. V. Wood, Springfield, Mass.

CO-OPERATION WITH MANUFACTURERS

E. F. Wickwire, secretary the Ohio Brass Company, Mansfield, Ohio, chairman.
George O. A. Barnes, New York, N. Y.
W. C. Bell, Richmond, Va.
W. D. Blatz, Bridgeport, Conn.
W. H. Boyce, New Brighton, Pa.
F. R. Coates, New York, N. Y.
C. R. Ellicott, New York, N. Y.
C. D. Emmons, Baltimore, Md.
Edwin C. Faber, New York, N. Y.
H. H. Lloyd, Indianapolis, Ind.
J. C. McQuiston, East Pittsburgh.
E. B. Meissner, St. Louis, Mo.
George R. Rowland, New York, N. Y.
W. S. Stackpole, Newark, N. J.
E. M. Walker, Schenectady, N. Y.
E. P. Waller, Schenectady, N. Y.
James Ashton Greig, Chicago, Ill.

EDUCATION

Edward Dana, general manager Boston Elevated Railway, Boston, Mass., chairman.
Edward J. Blair, Chicago, Ill.
C. F. Crane, Harrisburg, Pa.
C. B. Fairchild, Philadelphia, Pa.
R. M. Howard, Winona, Minn.
Myles B. Lambert, East Pittsburgh.
M. McCants, San Francisco, Cal.
James McFall, Pittsburgh, Pa.
C. E. Morgan, Brooklyn, N. Y.
H. H. Norris, New York, N. Y.
J. V. Sullivan, Chicago, Ill.

MAIL PAY

L. H. Palmer, general manager United Railways & Electric Company, Baltimore, Md., chairman.
Gordon Campbell, York, Pa.
G. K. Jeffries, Indianapolis, Ind.
R. A. Leussler, Omaha, Neb.
Samuel Riddle, Louisville, Ky.
W. S. Rodger, Highland Park, Mich.
H. B. Weatherwax, Albany, N. Y.

COMMITTEE TO CO-OPERATE WITH THE NATIONAL SAFETY COUNCIL

J. P. Barnes, president Louisville Railway, Louisville, Ky., chairman.
H. O. Allison, New Brighton, Pa.
Charles W. Chase, Gary, Ind.

UNIFORM REGULATORY LAWS

A. W. Brady, president, Union Traction Company of Indiana, Anderson, Ind., chairman.
Wm. Chamberlain, Cedar Rapids, Iowa.
E. J. Dickson, Providence, R. I.
George E. Hamilton, Washington, D. C.
R. D. Hood, Haverhill, Mass.
T. W. Passailaigue, Charleston, S. C.
Alfred Sweeney, Lewiston, Me.

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C. L. S. Tingley, Philadelphia, Pa.
H. B. Weatherwax, Albany, N. Y.

GENERAL ARRANGEMENTS MIDYEAR DINNER

W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill., chairman.
E. B. Meissner, St. Louis, Mo., vice-chairman.
James P. Barnes, Louisville, Ky.
F. G. Buffe, Kansas City, Mo.
Edward Dana, Boston, Mass.
C. R. Ellicott, New York, N. Y.
H. B. Flowers, New Orleans, La.
L. E. Gould, Chicago, Ill.
J. H. Hanna, Washington, D. C.
H. J. Kenfield, Chicago, Ill.
M. B. Lambert, East Pittsburgh, Pa.
R. V. Prather, Springfield, Ill.
Harry Reid, Indianapolis, Ind.
E. P. Waller, Schenectady, N. Y.

NATIONAL RELATIONS

Charles L. Henry, president Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., chairman.
W. A. Baehr, Chicago, Ill.
H. G. Bradlee, Boston, Mass.
Ralph R. Bradley, Chicago, Ill.
Arthur W. Brady, Anderson, Ind.
C. D. Cass, Waterloo, Iowa.
C. R. Ellicott, New York, N. Y.
P. H. Gadsden, Philadelphia, Pa.
C. E. Groesbeck, New York, N. Y.
J. H. Hanna, Washington, D. C.
W. H. Sawyer, East St. Louis, Ill.

INDETERMINATE FRANCHISE

Edwin Gruhl, vice-president and general manager, North American Company, New York, N. Y., chairman.
Walter A. Draper, Cincinnati, Ohio.
Edwin Duffey, Cortland, N. Y.
H. L. Geisse, Wausau, Wis.
F. C. Hamilton, New York, N. Y.
R. B. Stearns, Boston, Mass.

INSURANCE

John T. Staub, treasurer United Railways & Electric Company, Baltimore, Md., chairman.
O. H. Bernd, Des Moines, Iowa.
Granville H. Bourne, New York, N. Y.
N. H. Daniels, Boston, Mass.
B. J. Denman, Davenport, Iowa.
Charles E. Fahrney, Ottumwa, Iowa.
F. M. Hamilton, Chicago, Ill.
A. D. Knox, New Haven, Conn.
John H. Moran, Boston, Mass.
C. E. Morgan, Brooklyn, N. Y.
Charles B. Scott, Chicago, Ill.
Paul E. Wilson, Cleveland, Ohio.

RELATIONSHIP WITH THE MOTOR VEHICLE INDUSTRY

L. S. Storrs, president, The Connecticut Company, New Haven, Conn., chairman.
J. G. Barry, Schenectady, N. Y.
A. W. Brady, Anderson, Ind.
F. R. Coates, Toledo, Ohio.
C. D. Emmons, Baltimore, Md.
R. P. Stevens, New York, N. Y.

RAPID TRANSIT

Wm. S. Menden, president Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., chairman.
B. J. Fallon, Chicago, Ill.
R. F. Kelker, Jr., Chicago, Ill.
L. H. Palmer, Baltimore, Md.
F. R. Phillips, Pittsburgh, Pa.

SPECIAL TAXES

W. H. Maltbie, special counsel United Railways & Electric Company, Baltimore, Md., chairman.
F. C. Chambers, Des Moines, Iowa.
A. T. Davison, New York, N. Y.
Edwin Gruhl, New York, N. Y.
A. G. Neal, Washington, D. C.
H. B. Sawyer, Boston, Mass.

VALUATION

F. W. Doolittle, vice-president The North American Company, New York, N. Y., chairman.
F. C. Hamilton, New York, N. Y., vice-chairman.
J. P. Barnes, Louisville, Ky.
E. J. Bechtel, New York, N. Y.
H. M. Brinckerhoff, New York, N. Y.
H. A. Clark, New York, N. Y.
Thomas Conway, Jr., Philadelphia.
W. Findlay Downs, Philadelphia, Pa.
J. A. Emery, New York, N. Y.
C. W. Gillespie, New York, N. Y.
J. B. Klumpp, Philadelphia, Pa.
W. H. Maltbie, Baltimore, Md.
L. R. Nash, Boston, Mass.
A. S. Richey, Worcester, Mass.
W. H. Sawyer, East St. Louis, Ill.
Frank Silliman, Jr., New York, N. Y.
W. B. Tuttle, San Antonio, Tex.
E. D. Uhlendorf, Chicago, Ill.

CHARLES A. COFFIN FOUNDATION AWARD

Britton I. Budd, president Chicago Elevated Railroads, Chicago, Ill., and president American Electric Railway Association, chairman.
J. N. Shannahan, Hampton, Va.
James H. McGraw, New York, N. Y.

COMMITTEE ON UNIFICATION AND COORDINATION OF ALL FORMS OF LOCAL TRANSPORTATION

G. A. Richardson, vice-president Chicago Surface Lines, Chicago, Ill., chairman.
H. C. Abell, New York, N. Y.
C. P. Billings, Pittsburgh, Pa.
F. R. Coates, New York, N. Y.
C. D. Emmons, Baltimore, Md.
W. F. Ham, Washington, D. C.
A. D. Mackie, Springfield, Ill.
A. T. Perkins, St. Louis, Mo.
L. S. Storrs, New Haven, Conn.

REPRESENTATIVES OF THE ASSOCIATION ON OTHER NATIONAL ORGANIZATIONS

National Transportation Institute:
J. H. Hanna, vice-president The Capital Traction Company, Washington, D. C.

Committee on Customer Ownership of the National Electric Light Association:
R. P. Stevens, president Republic Railway & Light Company, New York, N. Y.

National Councillor of the United States Chamber of Commerce:
J. N. Shannahan, president Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.

Substitute National Councillor:
J. H. Hanna, vice-president Capital Traction Company, Washington, D. C.

National Industrial Conference Board:
L. S. Storrs, president The Connecticut Company, New Haven, Conn.
J. H. Pardee, president The J. G. White Management Corporation, New York, N. Y.

American Committee on Electrolysis:
W. J. Harvie, vice-president Auburn & Syracuse Electric Railway, Auburn, N. Y.

National Committee for National Defense:
Edward J. Blair, assistant to the president, Chicago Elevated Railroads, Chicago, Ill.

National Joint Committee of Public Utility Associations:
Randall Morgan, vice-president United Gas Improvement Company, Philadelphia, Pa., chairman.
Britton I. Budd, Chicago, Ill.
J. K. Choate, New York, N. Y.
F. R. Coates, New York, N. Y.
E. C. Faber, New York, N. Y.
P. H. Gadsden, Philadelphia, Pa.
L. S. Storrs, New Haven, Conn.
Robert I. Todd, Indianapolis, Ind.
J. W. Welsh, New York, N. Y.

Accountants' Association

STANDARD CLASSIFICATION OF ACCOUNTS

Robert N. Wallis, treasurer Fitchburg & Leominster Street Railway, Fitchburg, Mass., chairman.
M. W. Glover, Pittsburgh, Pa.
W. F. Ham, Washington, D. C.
H. L. Wilson, Boston, Mass.
Percy S. Young, Newark, N. J.

COMMITTEE REPRESENTING THE ACCOUNTANTS' ASSOCIATION AT CONVENTION OF RAILWAY AND UTILITIES COMMISSIONERS

Wallace L. Davis, auditor Lehigh Valley Transit Company, Allentown, Pa., chairman.
B. W. Fernald, Oakland, Cal.
C. S. Mitchell, Pittsburgh, Pa.

RELATIONS WITH OTHER ASSOCIATIONS

M. W. Glover, general auditor West Penn Railways, Pittsburgh, Pa., chairman.
I. A. May, New Haven, Conn.
L. T. Hixson, Indianapolis, Ind.
F. H. Sillick, New York, N. Y.

Claims Association

ACCIDENT PREVENTION

H. O. Allison, safety engineer Beaver Valley Traction Company, New Brighton, Pa., chairman.
E. L. Lindemuth, Wilkes-Barre, Pa.
F. W. Melford, Richmond, Va.
Allison J. Van Brunt, Newark, N. J.

EMPLOYMENT

W. B. Getchell, claim agent Central Maine Power Company, Augusta, Me., chairman.
Bert C. Wood, Youngstown, O.

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CLAIMS DEPARTMENT ASPECTS OF MOTOR BUS OPERATION

G. T. Hellmuth, claims attorney Chicago, North Shore & Milwaukee Railroad, Chicago, Ill., chairman.
D. M. Finch, Des Moines, Ia.
Carl L. Young, Milwaukee, Wis.

RESOLUTIONS

W. M. Tichenor, claim agent Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., chairman.
W. H. Renaud, Jr., New Orleans, La.

SUBJECTS

L. F. Wynne, general claim agent Georgia Railway & Power Company, Atlanta, Ga., chairman.
John J. Reynolds, Boston, Mass.

MEDICAL AND SURGICAL COMMITTEE

Dr. Hart E. Fisher, chief surgeon Chicago Elevated Railroads, Chicago, Ill., chairman.

Engineering Association

STANDARDS

Charles R. Harte, construction engineer the Connecticut Company, New Haven, Conn., chairman.
H. L. Ambrose, Schenectady, N. Y.
C. C. Beck, Mansfield, Ohio.
J. A. Brooks, Philadelphia, Pa.
L. C. Datz, Memphis, Tenn.
W. G. Gove, Brooklyn, N. Y.
C. G. Keen, Philadelphia, Pa.
C. S. Kimball, Washington, D. C.
John Lindall, Boston, Mass.
F. R. Phillips, Pittsburgh, Pa.
N. W. Storer, East Pittsburgh, Pa.
N. B. Trist, Pittsburgh, Pa.
C. H. Clark, Cleveland, Ohio.

BUILDINGS AND STRUCTURES

N. E. Drexler, chief engineer Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., chairman.
B. R. Brown, Dallas, Tex.
E. D. Eckroad, Akron, Ohio.
John R. McKay, Fort Wayne, Ind.
Judson Zimmer, Gloversville, N. Y.
C. H. Clark, Cleveland, Ohio, sponsor.

REVISION OF CAR AND CARHOUSE WIRING RULES

H. H. Adams, superintendent shops and equipment, Chicago Surface Lines, Chicago, Ill., chairman.
A. T. Clark, Baltimore, Md.
C. G. Keen, Philadelphia, Pa.
John Lindall, Boston, Mass.
P. V. C. See, Akron, Ohio.

ENGINEERING-ACCOUNTING (JOINT COMMITTEE)

L. R. Brown, office and field engineer New York State Railways, Rochester, N. Y., co-chairman for Engineering Association.
Clifford A. Elliott, Los Angeles, Cal.
Herbert Jackson, Washington, D. C.
Charles R. Harte, New Haven, Conn., sponsor.

EQUIPMENT

F. H. Miller, vice-president Louisville Railway, Louisville, Ky., chairman.
Walter S. Adams, Philadelphia, Pa.
W. W. Brown, Brooklyn, N. Y.
R. S. Bull, Pittsburgh, Pa.
A. T. Clark, Baltimore, Md.
J. M. Hipple, East Pittsburgh, Pa.
J. H. Lucas, Milwaukee, Wis.
A. D. McWhorter, Memphis, Tenn.
J. F. Miller, Pittsburgh, Pa.
M. O'Brien, St. Louis, Mo.
E. D. Priest, Schenectady, N. Y.
E. S. Sawtelle, Cincinnati, Ohio.
P. V. C. See, Akron, Ohio.
Ralston B. Smyth, Boston, Mass.
C. W. Squier, New York, N. Y.
W. G. Stuck, Lexington, Ky.
J. M. Yount, San Francisco, Cal.
Joseph C. McCune, New York, N. Y.
J. L. Gould, New York, N. Y.
Daniel Durie, Connellsville, Pa., sponsor.

HEAVY ELECTRIC TRACTION

John C. Davidson, engineer electric traction, Norfolk & Western Railway, Bluefield, W. Va., chairman.
A. H. Armstrong, Schenectady, N. Y.
J. M. Bosenbury, Peoria, Ill.
H. F. Brown, New Haven, Conn.
Morris Buck, New York, N. Y.
H. W. Cope, East Pittsburgh, Pa.
A. H. Daus, Chicago, Ill.
J. H. Davis, Baltimore, Md.
J. V. B. Duer, Altoona, Pa.
Norman Litchfield, New York, N. Y.
John J. Sinclair, Brooklyn, N. Y.
L. S. Wells, New York, N. Y.
Charles R. Harte, New Haven, Conn., sponsor.

INDIVIDUAL MEMBERSHIP

L. C. Datz, chief engineer Memphis Power & Light Company, Memphis, Tenn., chairman.

POWER GENERATION AND CONVERSION

L. D. Bale, superintendent of substations, Cleveland Railway, Cleveland, Ohio, chairman.
W. E. Bryan, St. Louis, Mo., vice-chairman.
H. E. Davis, Utica, N. Y.
F. C. Hanker, East Pittsburgh, Pa.
G. H. Kelsay, Cleveland, Ohio.
H. A. Kidder, New York, N. Y.
F. W. Peters, Schenectady, N. Y.
G. W. Saathoff, New York, N. Y.
L. J. Turley, Los Angeles, Cal.
R. L. Weber, Kansas City, Mo.
E. H. Scofield, Minneapolis, Minn., sponsor.

POWER TRANSMISSION AND DISTRIBUTION

Charles H. Jones, electrical engineer Chicago Elevated Railroads, Chicago, Ill., chairman.
J. Walter Allen, Boston, Mass.
S. H. Anderson, Los Angeles, Cal.
Leslie E. Delf, Fort Worth, Tex.
Ralph W. Eaton, Providence, R. I.
D. D. Ewing, Lafayette, Ind.
Charles Gilman, New York, N. Y.
C. L. Hancock New York, N. Y.
H. D. Hawks, Chicago, Ill.
C. J. Hixson, Schenectady, N. Y.
Adrian Hughes, Jr., Baltimore, Md.
John Leisenring, Springfield, Ill.
F. M. McVittie, Rochester, N. Y.
J. F. Neild, Toronto, Ont.
H. A. Pharo, Pittsburgh, Pa.
Walter J. Quinn, New York, N. Y.
W. Schaake, East Pittsburgh, Pa.
A. Schlesinger, Indianapolis, Ind.
J. M. Waldron, New York, N. Y.
F. J. White, New York, N. Y.
M. B. Rosevear, Newark, N. J., sponsor.

PURCHASES AND STORES

Jackson P. Dick, purchasing agent, Georgia Railway & Power Company, Atlanta, Ga., chairman.
W. N. Ford, Memphis, Tenn., vice-chairman.
William C. Bell, Richmond, Va.
J. F. Fleming, Washington, D. C.
C. A. Harris, Pittsburgh, Pa.
A. A. Ordway, Boston, Mass.
W. S. Stackpole, Newark, N. J.
W. H. Staub, Baltimore, Md.
C. Thorburn, Los Angeles, Cal.
R. H. Dalgleish, Washington, D. C., sponsor.

UNIFICATION OF CAR DESIGN

H. H. Adams, superintendent of shops and equipment Chicago Surface Lines, Chicago, Ill., chairman.
J. A. Brooks, Philadelphia, Pa.
Charles Gordon, Chicago, Ill.
W. F. Graves, Charleston, W. Va.
J. W. Hulme, New York, N. Y.
G. L. Kippenberger, St. Louis, Mo.
John Lindall, Boston, Mass.
Victor Willoughby, New York, N. Y.
R. H. Dalgleish, Washington, D. C.

WAY MATTERS

H. H. George, engineer maintenance of way Public Service Railway, Newark, N. J., chairman.
E. M. T. Ryder, New York, N. Y., vice-chairman.
C. A. Alden, Steelton, Pa.
V. Angerer, Easton, Pa.
S. Clay Baker, East St. Louis, Ill.
W. R. Dunham, Detroit, Mich.
E. B. Entwisle, Johnstown, Pa.
G. C. Estill, New Orleans, La.
R. B. Fisher, Harvey, Ill.
Chester F. Gailor, New York, N. Y.
A. E. Harvey, Kansas City, Mo.
J. H. Haylow, Memphis, Tenn.
J. S. Hyatt, Highwood, Ill.
B. P. Legare, San Francisco, Cal.
A. T. Spencer, Toronto, Ont.
Francis Tingley, Upper Darby, Pa.
J. B. Tinnon, Joliet, Ill.
Claude L. Van Auken, Chicago, Ill.
W. W. Wysor, Baltimore, Md.
R. C. Cram, Brooklyn, N. Y., sponsor.

WOOD PRESERVATION

A. P. Way, electrical engineer American Electric Power Company, Philadelphia, Pa., chairman.
C. A. Smith, Atlanta, Ga., vice-chairman.
M. J. Curtin, Boston, Mass.
J. L. Fritsch, Pittsburgh, Pa.
W. H. Fulweiler, Philadelphia, Pa.

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Ernest F. Hartman, New York, N. Y.
W. L. Harwood, Springfield, Mass.
E. L. Morier, New York, N. Y.
M. B. Rosevear, Newark, N. J., sponsor.

AIR RESERVOIR SPECIFICATIONS

R. H. Dalgleish, chief engineer the Capital Traction Company, Washington, D. C., chairman.
C. A. Ives, Erie, Pa.
J. A. Leeper, Pittsburgh, Pa.
J. S. McWhirter, New York, N. Y.

AUTOMATIC SUBSTATIONS

W. E. Bryan, superintendent of power the United Railways of St. Louis, St. Louis, Mo., chairman.
C. H. Jones, Chicago, Ill., vice-chairman.
L. D. Bale, Cleveland, Ohio.
C. A. Butcher, East Pittsburgh, Pa.
Adrian Hughes, Jr., Baltimore, Md.
F. W. Peters, Schenectady, N. Y.
Ralph H. Rice, Chicago, Ill.
E. H. Scofield, Minneapolis, Minn., sponsor.

UNIT METHOD OF VOTING ON STANDARDS

C. S. Kimball, engineer way and structures, Washington Railway & Electric Company, Washington, D. C., chairman.
H. H. Adams, Chicago, Ill.
C. H. Clark, Cleveland, Ohio.
W. J. Harvie, Auburn, N. Y.

Transportation and Traffic Association

ACCIDENT PREVENTION

Charles W. Chase, president Gary Street Railway, Gary, Ind., chairman.
M. B. Bridges, Chicago, Ill.
C. H. Evenson, Chicago, Ill.
James Harmon, Indianapolis, Ind.
S. B. Ireland, St. Joseph, Mo.
A. W. Koehler, Rochester, N. Y.
D. E. Parsons, East St. Louis, Ill.
W. R. Phipps, Meridian, Miss.
R. M. Reade, Quebec, Que.
E. M. Walker, Schenectady, N. Y., sponsor.

DEVELOPMENT OF NEW BUSINESS

F. W. Shappert, traffic manager Chicago, North Shore & Milwaukee Railroad, Chicago, Ill., chairman.
Frank L. Butler, Atlanta, Ga.
John A. Dewhurst, Philadelphia, Pa.
S. W. Greenland, Fort Wayne, Ind.
James P. Griffin, Dallas, Tex.
H. G. Monger, Milwaukee, Wis.
F. D. Norveil, Anderson, Ind.
C. D. Smith, New Brighton, Pa.
Bert Weedon, Indianapolis, Ind.
W. H. Harton, Covington, Ky.
Robert P. Woods, Kansas City, Mo.
Samuel Riddle, Louisville, Ky., sponsor.

RELIEF OF TRAFFIC CONGESTION

Paul E. Wilson, secretary Cleveland Railway, Cleveland, Ohio, chairman.
G. B. Anderson, Los Angeles, Cal.
H. O. Butler, St. Louis, Mo.
D. L. Fennell, Kansas City, Mo.
M. McCants, San Francisco, Cal.
W. H. Maltbie, Baltimore, Md.
James Smith, Boston, Mass.
W. E. Thompson, New York, N. Y.
J. V. Sullivan, Chicago, Ill., sponsor.

TRACKLESS VEHICLE OPERATION

W. J. Flickinger, assistant to the president The Connecticut Company, New Haven, Conn., chairman.
B. W. Arnold, Oshkosh, Wis.
V. E. Keenan, Providence, R. I.
J. B. Stewart, Jr., Youngstown, Ohio.
Edward Dana, Boston, Mass., sponsor.

Mail Pay Hearing

TESTIMONY was taken last week in the railway mail pay case before Examiner Mullen of the Interstate Commerce Commission, I. C. C. Docket No. 10227, consuming four full days, Nov. 19 to 22. Joseph Stewart, special assistant to the Attorney General was in charge of the commission for the Post Office Department, and W. H. Maltbie, counsel for the committee on mail pay, American Electric Railway Association was in charge of the case for the railways.

C. W. Cornell of counsel for the Pacific Electric Railway Company, and F. E. Loucks, a special accountant for that company were in attendance and presented some evidence for their road. The witnesses put on by the mail pay committee were Prof. A. S. Richey, Worcester, Mass., Dr. Thomas Conway, Jr., Philadelphia, and Joseph A. Stoll, superintendent traffic, A. T. Clark, superintendent rolling stock and shops, and John B. Duvall, assistant superintendent of transportation of the United Railways and Electric Company of Baltimore.

After finishing the four-day session during which some fifty exhibits had been filed, the examiner set March 1 as the final date for filing of briefs. After the briefs have been filed, the commission, it is expected, will set a date for oral argument and will thereafter take the case under advisement for a decision.

Companies Which Made Presentations for Coffin Prize

LETTERS of acknowledgment and commendation are being sent by the Executive Committee to the railway companies which made presentations to the Charles A. Coffin prize committee of the American Electric Railway Association, in accord with the resolution passed at the meeting of the executive committee on Nov. 16. The companies which submitted briefs follow in alphabetical order:

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.
Colorado Springs & Interurban Railway, Colorado Springs, Col.
East St. Louis & Suburban Railway and East St. Louis Railway, East St. Louis, Ill.
El Paso Electric Railway, El Paso, Tex.
Holyoke Street Railway, Holyoke, Mass.
Interstate Public Service Company, Indianapolis, Ind.
Kansas City Railways, Kansas City, Mo.
Kentucky Traction & Terminal Company, Lexington, Ky.
Los Angeles Railway, Los Angeles, Cal.
Milwaukee Electric Railway & Light Company, Milwaukee, Wis.
Monongahela-West Penn Public Service Company, Fairmont, W. Va.
Northern Texas Traction Company, Fort Worth, Tex.
San Diego Electric Railway, San Diego, Cal.
San Francisco-Oakland Terminal Railways, Oakland, Cal.
Spokane United Railways, Spokane, Wash.
Union Street Railway, New Bedford, Mass.
Washington Railway & Electric Company, Washington, D. C.

News of Other Associations

Program Announced for New England Club Meeting

THE December meeting of the New England Street Railway Club will be held at the Copley Plaza Hotel, Boston, Mass., on Thursday, Dec. 6. The afternoon meeting, called to order at 3 o'clock, will be devoted to a series of fifteen-minute papers on the following subjects: "Snow Handling Equipment" (with moving pictures), by Charles F. Reuter, engineer Eastern Tractors Company; "Results Obtained in Track Work by the Use of Mechanical Devices," by F. B. Walker, engineer Eastern Massachusetts Street Railway; "Electric Freight Haulage," by P. H. Stoffel, Westinghouse Electric & Manufacturing Company.

The evening meeting will be devoted to a talk, illustrated by slide and moving pictures on "Maine, the Sportsman's Paradise," by Eugene S. Jones, photographer of the Boston & Maine Railroad. A dinner will be served at 6.15.

C.E.R.A. Annual Meeting in Indianapolis Jan. 24 and 25

THE Annual Meeting of the Central Electric Railway Association will be held at Hotel Lincoln, Indianapolis, Ind., Thursday and Friday, Jan. 24 and 25, 1924. There will be a dinner on the evening of Jan. 24.

Relief from Paving Burden Urged

THERE is no longer any good reason why a railway should pay for installation of original pavements or for complete repavements, declared R. C. Cram in a paper read before the

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National Municipal Research Council held at the City Club, Washington, D. C., on Nov. 16. This is so because the presence of tracks has nothing to do with the question of the need for street pavements. The only requirement as to railway pavements may be one relating to the extent the railways, through operation of cars, may cause deterioration in the pavement, and this should be limited strictly to repairs needed in consequence of the existence and use of the tracks.

Some interesting data were presented by Mr. Cram tending to show that paving maintenance costs are substantially the same as on any part of a railway street. These data seem to support the view that railway streets, being main arteries of travel, receive greater traffic. It should logically be expected that main traveled streets will require more extensive paving repairs than streets of lesser importance.

Dean Cooley Honored

UNIVERSITY presidents, judges, engineers and men prominent in political life, gathered at a dinner in Detroit on November 23, paid tribute to Mortimer E. Cooley, dean of the engineering schools of the University of Michigan and retiring president of the Federated American Engineering Societies. Dean Cooley, at the end of nearly half a century of effort, was extolled as an engineer and educator of distinguished public service.

The dinner was given under the auspices of the Detroit Engineering Society and the local section of the national engineering societies.

Those at the speakers' table included Supreme Court Justice Robert F. Thompson, Canandaigua, N. Y.; Ira N. Hollis, president of Worcester Polytechnic Institute and classmate of Dean Cooley at the United States Naval Academy; Admiral John K. Robinson, representing Secretary of the Navy Edwin Denby; Dr. Marion L. Burton, president of the University of Michigan; Philip N. Moore, St. Louis, vice-president of the Federated American Engineering Societies; F. Paul Anderson, dean of engineering of the University of Kentucky; Chase S. Osborn, L. W. Wallace, executive secretary of the Federated American Engineering Societies, Washington; Truman H. Newberry, Walter S. Russel, Charles F. Loweth, president of the American Society of Civil Engineers; N. S. Shaw, president of Michigan Agricultural College; and John L. Herrington, president of the American Society of Mechanical Engineers.

Several speakers brought out reminiscences of Dean Cooley's days at Annapolis and later as a naval officer. Others dwelt upon his services to education and to engineering, praising "his high character, his big-heartedness and geniality, his noble aspirations and his love for his fellowmen." President Burton paid a tribute to the work of Dean Cooley in his long connection with the University of Michigan.

Dean Cooley has been granted leave of absence for the second semester of the present academic year by the University of Michigan. He will spend this period on a farm recently purchased by him near Canandaigua, N. Y. His successor as president of the F. A. E. S. will be elected at the annual meeting of the American Engineering Council early in January.

Kentucky Utilities Association to Meet at Louisville

THE annual meeting of the Kentucky Association of Public Utilities will be held at Louisville on Dec. 13 and 14. The session will open with a dinner for the delegates on Thursday evening, with the technical sessions on Friday.

Aims and Plan of the National Transportation Institute

THE National Transportation Institute is a comparatively new national organization, whose object is to change the attitude of the public at large toward transportation in general. It comprises all industry and is governed by a board of directors made up by groups, such as agricultural, railway, public utility, etc., consisting of fifty-two directors of whom twenty-six have been elected at this time. It is a continuing board with certain expirations each year, so that the chance for control by any group is thought to be remote. Membership in the institute may be had by practically any company or organization at $100 per membership, and any organization may take out as many memberships as it desires, having one vote for each membership.

The institute consists of a research council and a publicity bureau. The research council will comprise a group of men particularly fitted by experience to develop the facts about the various transportation agencies—steam railroads, electric railroads, motor buses, water transportation, etc. The members of the council are to be selected by the process of the president nominating three men, from among whom the directors will elect one. This again is designed to avoid any possible control of the organization by one group.

The representatives of the institute have conceived the need for this organization because there is at present no comprehensive study of transportation going on by a disinterested impartial body. The absence of this has afforded opportunity for radical elements to attack the railways and make extensive use of false information. The key to the institute plan is the research council, which is to be composed of men of accepted reputation who will be given a certain amount of money and set aside where they will be free from responsibility to any organization or group. They will get the facts and then these facts will be put out to the public through the publicity bureau.

It is expected that the most effective work of the institute will come later when it has sufficiently progressed in its organization and finances to permit of the employment of men to give their entire time to speaking on transportation problems. The idea is that there may ultimately be the equivalent of one speaker for every state. It is thought also that addresses of this kind will produce much publicity in the newspapers. Further, the newspapers, knowing that they can apply to the Institute for information upon which they can depend as accurate and impartial, will have no reason to publish misinformation.

Another phase of the work is educational in nature. It is claimed that the proportion of children who never go so far in their schooling as high school is so great that as they grow up they numerically control the popular vote. This great body of children at present receives practically nothing in the way of information as to the influence of transportation, coal, or any of the other essentials on their lives. The Institute plans to bring to the school children the effect of various businesses on the child's life.

The institute is now publishing a twelve-page leaflet monthly, but plans ultimately to have a magazine of considerable importance as a medium for putting out the results of its efforts. It is planned also to use motion picture lectures, in which it can bring out what transportation, or the lack of it, means to a country.

The Institute has no relation with the United States Chamber of Commerce or any other body. It is an independent body in which it is considered essential that all business interests participate. On the question of municipal or government ownership, the policy of the institute is not stated, as the idea of creating the institute as an entirely impartial body precluded any predetermination of policy on any matter. If the reports of the research council were not unanimously concurred in by the council, there is nothing in the present organization of the body to prevent both the majority and minority reports being made public, although it would obviously be the endeavor to reach unanimous agreement.

This is the first time that all business interests have joined together in a movement of this kind. The institute earnestly desires that the electric railways support and take part in its activities. The American Electric Railway Association has not as yet determined what its action shall be with respect to endorsement of the Institute, but has the matter under advisement at the present time.

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Maintenance of Equipment

Signal System Shows Steam Pressure

THE Wilmington, N. C., power plant of the Tidewater Power Company has a signal system in the generator and boiler rooms which shows the steam pressure carried in the main header. The scheme was developed by George Avant, combustion engineer for the company, and has been in successful operation for over two years. The Tidewater Power Company operates an interurban line between Wilmington and Wrightsville Beach.

Four different colored lights are arranged on a small board suspended half way between the floor and ceiling, so that they may be seen from any point in the generator room. The circuits for the lights are opened and closed by three steam gages, which were fitted with contacts so as to make electrical connections whenever the steam pressure reaches specific values. If the steam pressure falls below 140 lb., a white light will burn and continue to burn until the pressure rises above this value.

All lights are out between pressures of 140 lb. and 150 lb. At the latter pressure a red lamp is lighted, and at 155 lb. a blue lamp comes on in addition to the red lamp, and if the pressure rises to 158 lb. a green lamp also lights and a Klaxon horn is sounded. As the safety valves are set for 163 lb., this arrangement gives ample warning and helps to provide even boiler operation. A similar set of signals is installed in the boiler room.

Blueprints of Repair Parts Save Mistakes

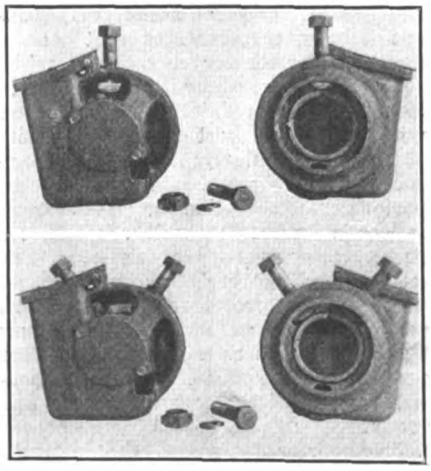
BY O. A. NORENE
Assistant Master Mechanic Omaha & Council Bluffs Street Railway

A BOOK of blueprints of standard repair parts is furnished to the store department and the shop and carhouse foremen of the Omaha & Council Bluffs Street Railway. These prints show standard elliptic and coil springs, brake levers and pins, brake slack adjusters and brake riggings, sizes and types of motor bolts, etc., for different types of equipments; also spring tension on different types of brush-holders and sizes and types of carbons used on different types of motors. By referring to these prints no excuse can be given if wrong material is used.

Through-Bolt Housings Save Motor Trouble

BY JAMES A. DUFFY
Superintendent of Equipment Monongahela-West Penn Public Service Company

WE HAVE had on our property for a number of years several Westinghouse No. 306 motors. These are of the split-frame type, with housings or heads that originally were held to the upper half of the motor frame casting by two radial tap bolts. This arrangement holds the armature to the upper half of the shell when the lower half is swung down or removed for making repairs to the motor under the car. In addition these bolts help to keep the housing in place.



Application of Through Bolts to Motor Housings. Above, With One Vertical Bolt; Below, With Two Radial Bolts

It was our experience that these housings would work loose in service and tend to wear at the seats, and at the same time the threaded holes in the housings would become badly worn. In many instances the threads in the housings were entirely worn out and the bolts would not hold, thus making it necessary to replace these worn housings by new ones.

In making replacements on some of these housings, a new through-bolt type of housing has been adopted. This was developed for these motors by the Westinghouse company. The results have been very satisfactory. The new housing has two bolts, each of which screws into a nut and clamps the housing to the motor shell through a draft on the nut. This type of housing is shown in the illustrations.

They are made for us from either malleable iron or cast steel, so that they are strong and durable.

The through bolts holding them in place are heat treated, which makes them strong and fatigue resisting. If the bolts wear at the threads they can be replaced readily by new ones at a small expense. If the threads rust, the nut can be cut off and the bolt is easily removed.

There are no threads in the housings to become worn out, so that a better fit is obtained throughout the life of the motor.

These housings can be obtained ¼ in. oversize on the diameter. This is of particular advantage for fitting in frames that have worn. These housings have three bolt holes so that they can be used not only on the No. 306 motor, which has two radial bolts, but on the old No. 101 motor using a single vertical bolt.

Since using these through-bolt type housings, we have eliminated all housing trouble. We have never had a through bolt get loose. In fact, it was one of the improvements that almost eliminated all motor troubles on the No. 306 motor on this property.

Brass Foundry Aids Repairs

THE Illinois Traction System has a brass foundry in connection with its Decatur shops and four men turn out from twelve to fourteen tons of brass castings per month. This is found of great assistance in producing such parts as brush-holders, grab-handle sockets, sash locks, window lifts and other car fixtures which are needed immediately and which would be given six months delivery or longer if bought in the open market.

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Safety in the Wood Shop

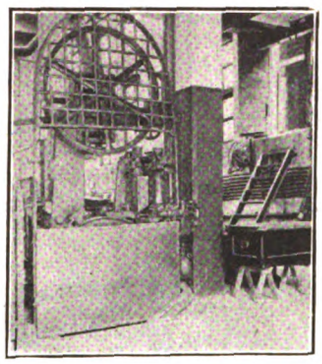
THE ACCOMPANYING group of pictures shows the woodworking mill of the Nashville Railway & Light Company. This shop is particularly interesting for the precautions taken to safeguard employees from accidental contact with moving parts of machines, and to provide for their comfort. The equipment of the shops consists of the following machines: A 16-in. four-side molder, 9-in. four-side molder, blind slat molder, two-drum sander, band re-saw, band saw, plunger mortiser, column mortiser, 24-in. planer, 9-in. surfacer, double head shaper, and crossarm boxer.

Referring to the illustrations, No. 3 is a general view of the woodworking equipment. The band saw shown in No. 1 has the moving wheel well incased with a slat protection made of iron strips, which are riveted together. This gives an open construction, and at the same time fully protects the moving parts. An effective method of mounting guards and gages for a shaper is shown in No. 2. The exhaust piping for removing various cuttings is also to be seen in the background.

A surfacer with safety head and a grated protection that swings around to protect the cutting parts is shown in No. 4. The cutting tool is in a sort of pocket, so as to prevent accidents. The 24-in. planer shown in No. 5 has the belt well shrouded, and the protection of moving parts, together with the piping for cuttings shown in No. 6, which is a molding machine, is particularly interesting. The small pulley shown in the center of this machine has a right and left-hand thread so as to keep the belt from dropping. A crossarm borer is shown in No. 7, with all moving parts protected.

Light Track Construction in Texas*

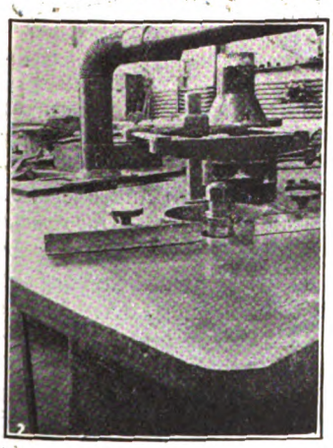
THE standard type of paved trackwork adopted by the El Paso Electric Railway consists of 90-lb. A.R.A. rail, oak ties, spaced 24 in. on centers, 12 in. of crushed stone or gravel ballast, with a two-course concrete pavement of 7½ in. total thickness. This has proved to be both the best and cheapest construction so far developed in Texas, according to the statement and is original with this company. Full advantage has been taken of the soil and climatic conditions peculiar to this section, in adopting an even lighter standard construction for paved tracks where Birney cars only are used. A.S.C.E. rail of 75-lb. section is laid on 6-in. x 8-in. x 7-ft. ties, with 6 in. of ballast under the ties, and a 6-in. concrete pavement. This has proved entirely satisfactory, both as a track structure and a durable street surface.

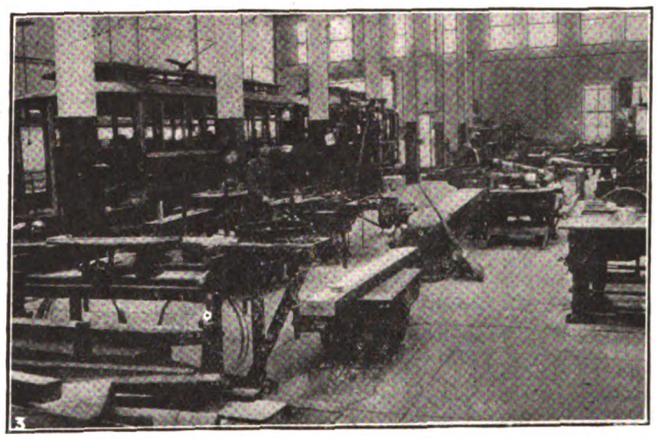


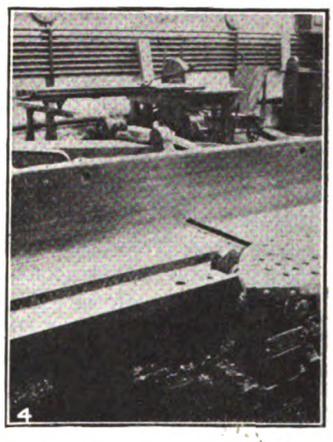
Track of this character has been built in 1923 for $7.20 per foot, according to the company, while the 90-lb. construction cost about $9. The latter is stated to be at least $2 per foot cheaper than monolithic concrete with grooved rail and brick or asphalt pavement.

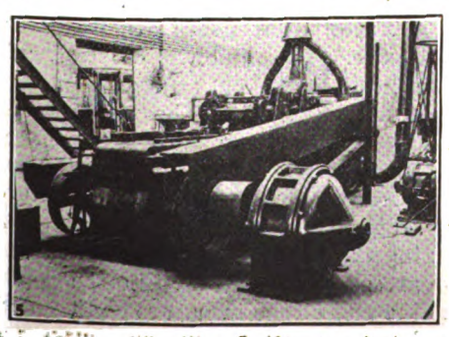
A further development in the track construction has been the use of steel ties laid on ballast, in conjunction with concrete pavement. Track of this type has been built that will undoubtedly compare favorably in ability to stand up under heavy traffic with any other in the country. It is somewhat more costly than wood tie construction, but should be even more durable.

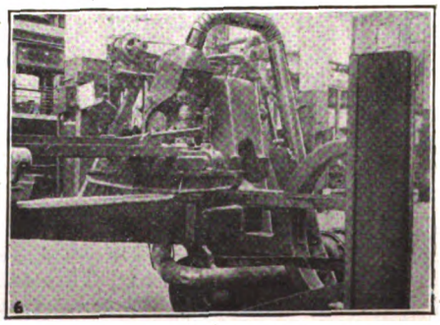
*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association.

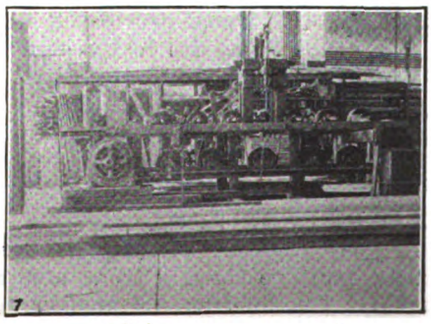












Safety Protection for Woodworking Tools in the Shops of the Nashville Railway & Light Company

No. 1. Slot work protection made of iron strips for wheel of band saw.
No. 2. Shaper with guards and gages in position.
No. 3. General view of woodworking equipment.
No. 4. Safety head attached to surfacer.
No. 5. Method of shrouding planer belt.
No. 6. Molding machine with moving parts protected.
No. 7. Method of protecting moving parts on a crossarm borer.

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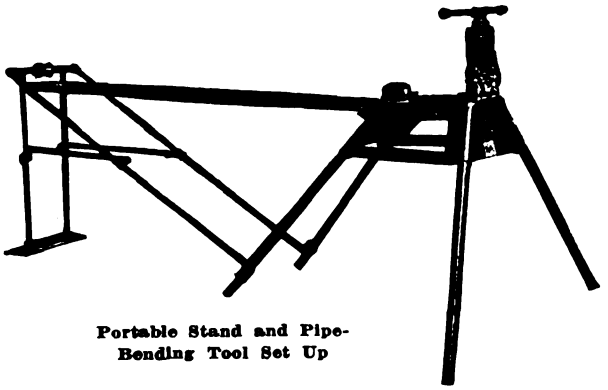
New Equipment Available

Portable Vise and Pipe Bending Stand

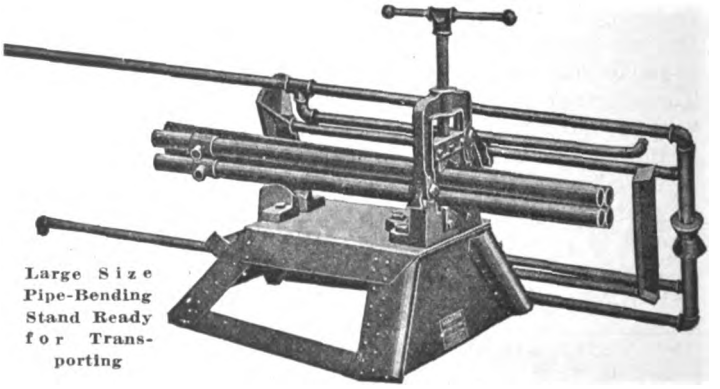
A PORTABLE vise stand and pipe bender has just been developed by H. P. Martin & Sons, Owensboro, Ky. This stand is made of No. 16 sheet iron riveted and braced at the corners with angle irons, which also serve as pockets for four supporting legs. The legs are made of steel tubing and extend outward sufficiently to brace the stand against upsetting, tilting or skidding. The stand is supplied with either a hinge or chain vise, as desired. The vise is fixed rigidly to the top of the frame at one end in such a position that short nipples can be threaded without injury to the workman's hand. A guide and rest for the pipe while it is being cut or threaded is provided at the end of the frame opposite to that on which the vise is installed. This assists in keeping bends free from kinks and also in locating the bends accurately.

The stand can be dismantled by pulling the legs out of their sockets and fastening them in the vise. Convenient handles are provided for carrying. As the sides of the frame are open with a brace across the bottom, the frame provides a convenient rest for pipe tools where oil from the stocks will drain off without running down the handle. The equipment weighs 60 lb. and can be assembled or dismantled in half a minute. It occupies a space of 6 ft. x 8 ft.

The outfits are built in two sizes, one for pipe ranging from ⅛ in. to 2½ in. in diameter and another for heavier pipes up to 4½ in. diameter. The larger size is provided with a roller on the rear support to keep correct alignment and to enable one man to move the full length of pipe forward or backward without unnecessary labor. The weight of the 4½-in. size machine is 172 lb., with a hinge vise and 156 lb. with a chain vise.



Portable Stand and Pipe-Bending Tool Set Up



Large Size Pipe-Bending Stand Ready for Transporting

Headlight with Special Metal Reflector

A HEADLIGHT with special case and sealed silver-plated reflectors has been developed by the Pyle National Company, Chicago, Ill., for use on electric locomotives or interurban cars. The parabolic reflector is 18 in. x 9 in. and is spun from heavy-gage sheet copper. The inside surface is prepared for the quadruple silver plating by grinding and polishing operations.

The case is of No. 16 gage copper-bearing steel and is protected on the outside by two coats of flexible black baking enamel, and on the inside by the application of an aluminizing preparation. A machine finished, cast aluminum-alloy door frame forms the front of the case and a slot hinged door ring, which is also machine-finished aluminum alloy casting, is sealed against a heavy gasket by the tightening of five wing nuts on hinged bolts. The front glass is made of clear convex heat-resisting glass and is held and sealed against the door-ring gasket by means of bronze fasteners.

Lamp replacements are made by loosening the bronze ring nuts and swinging the door open. This construction makes the fitting of front glasses convenient and avoids the necessity of breaking electrical connections, or disturbing the focal adjustments for renewing lamps. The headlight cases are made in four different styles.

Convenient Size Electric Drill

AN ELECTRIC drill for holes up to ⅜ in. in diameter has just been placed on the market by the Argyle Railway Supply Company, Chicago, Ill. The drill weighs about 5 lb. and is operated by a special Westinghouse motor with a full load speed of 850 r.p.m. The motor can be operated on either direct or alternating current. The handle grip of the drill is kept cool by a ventilation system which brings cool air into the back of the handle. Incoming air is distributed to all parts of the motor.

A special switch for operating the electric drill has been developed by the Cutler-Hammer Manufacturing Company, so that the drill runs only when the operator is actually gripping it. The position and operation of the switch is natural, and can be released readily without shifting the hand. The drill chuck bearings and two armature bearings have bronze bushings and spring oilers which retain a considerable amount of lubricant. The thrust in drilling is taken up on a ball bearing which works between two hardened ground steel surfaces. The gears are packed in grease. The pinion is of steel with helical teeth, cut directly on the armature shaft. The chuck is of the Goodell-Pratt keyless type, requiring no tools for opening or closing. To prevent the armature from turning, when opening or closing the chuck it is only necessary to press the spring stop into the slot in the end of the armature shaft. This locks the shaft and the chuck may then be turned without difficulty.

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The News of the Industry

Subway Financing Sought

Detroit Commission Prepared to Present Plans at Special Session of Michigan Legislature

The Detroit Rapid Transit Commission will seek the aid of the state Legislature at a special session to be convened in December, to secure the passage of an amendment to the rapid transit act adopted last spring by the Legislature to pave the way for financing the construction of a system consisting of subways or elevated railways.

The commission's plans for financing rapid transit construction in Detroit are embodied in a tentative amendment drafted by P. J. M. Hally, special counsel for the Rapid Transit Commission. It is pointed out that funds for rapid transit construction could be secured:

1. By levying a special ad valorem tax on the total wealth of the city.
2. By assessing benefits of rapid transit on the local area benefited in such manner and in such proportion of the cost of rapid transit construction as the legislative body of the city may determine.
3. By issuing bonds against the rapid transit property.
4. By combining the foregoing.

It is the desire of the commission to lay the rapid transit plan before the electors at the election next April. If the amended bill is passed by the Legislature it is the intention of the commission to seek its submission to the voters, together with a "definition of a general plan of assessment" at a special election to be called, probably in February. Then the comprehensive plan for rapid transit which is being worked out by the engineers for the commission would be presented to the voters in the spring.

Engineer Outlines Work

The work to date as outlined by Major John P. Hollihan, engineer engaged in studies and surveys for the rapid transit system, includes the determination of a satisfactory plan of financing a rapid transit system, without using the faith and credit of the city. In this work it was necessary to go thoroughly into assessed values of property throughout the city; and to estimate the probable increase in values that would accrue to property directly benefited.

The engineers of the commission have conferred with the City Plan Commission on the thoroughfare plan covering the proposed metropolitan area, with a view to enabling the commission to present a final plan for the joint consideration of the department of public works, department of parks and boulevards, the street railway department and the rapid transit commission. These bodies should, in the opinion of Mayor Doremus, determine the thoroughfares required to relieve the present motor vehicle traffic inside the city limits and indicate for the consideration of the adjoining municipalities and counties, the probable future requirements of Detroit as the city expands. The commission is also conferring with the Detroit Bureau of Governmental Research on the proposed metropolitan area. The work of the commission is being carried on with the aid of an appropriation of $70,000 by the City Council.

Municipal Ownership Recommended for Phoenix

A special citizens' committee has recommended to the City Commission of Phoenix, Ariz., that the system of the Phoenix Railway be municipally owned. It is proposed to purchase the system from General M. H. Sherman, Los Angeles, Cal., its owner, in thirty annual payments of $12,000, without interest, the gross sum being about equal to the valuation placed on the railway by the State. If the plan for the purchase is carried out as proposed the road would be leased to the Central Arizona Light & Power Company for operation by it for twenty years. Meanwhile the city would be called upon to spend $400,000 to rehabilitate the system and to provide $190,000 for paving between the tracks. Most of the money so required would be raised by the sale of bonds. It is said that the railway in Phoenix is operated at a loss of about $15,000 annually, due principally to the operation of an interurban line between Phoenix and Glendale district.

The report of the committee grew out of the controversy between the company and the city over franchise matters and the alleged inability of the company to meet the terms with regard to paving included in the original grant to the railway.

One Day Off Compulsory.—One day off in eight without pay except in emergency cases will be mandatory upon employees of the Seattle Municipal Railway beginning Jan. 1, 1924. A resolution to this effect has been unanimously passed by the City Council, but Mayor Brown intimated that he would veto the measure, declaring that it would be impossible for the railway to put the regulation in effect by the date named. The ordinance means the hiring of between seventy and eighty men, and D. W. Henderson, superintendent of railways, states that it will be impossible to train that number in the time given.

Non-Union Pledge Void

Circuit Court Rules Against Law Forbidding Employers to Exact Non-Union Pledges

The California state law forbidding employers to exact pledges from employees not to join labor unions has been held void. Decision to this effect was handed down by the United States Circuit Court of Appeals on Nov. 13 in a case affecting the Pacific Electric Railway. The opinion of the Circuit Court affirms the decision handed down by the United States District Court of Los Angeles, which enjoined labor unions from organizing the non-union men of the Pacific Electric Railway.

The injunction is made permanent. It is directed against the Brotherhood of Railway Trainmen and the Brotherhood of Locomotive Engineers. It said:

> Activities without lawful excuse, engaged in by the unions, were: Unionizing the employees of the railway and the drawing of them into a controversy in which they had no substantial cause for complaint; calling strikes after organizing 1,200 of the 1,500 employees; striking when the country was at war in the face of the Presidential proclamation that there should be no strikes or lockouts during the war, and striking while the complaints of the employees were being submitted by the railway to a representative of the United States Department of Labor.

The court held these activities interrupted the railway company's business in intrastate and interstate commerce to its irreparable damage.

On Aug. 16, 1919, certain employees of the Pacific Electric Railway elected to strike. It was alleged that the men had been influenced in this decision by certain officials of the Brotherhood of Railway Trainmen and Brotherhood of Locomotive Engineers.

The results of the strike, engaged in by a portion of the company's employees, were reviewed in this paper for Sept. 6, 1919.

In July, 1918, a similar strike was attempted, but this strike, undertaken during the war, was quickly ended by the railway securing in the Federal courts an injunction against certain officials of the trainmen's unions restricting interference between the Pacific Electric Railway and its employees.

Since obtaining this injunction during the first strike in July, 1918, it was possible to obtain an order from the courts in August, 1919, during the second strike making the restraining order effective during the second strike.

In March, 1922, the Pacific Electric Railway sought to have the Federal court make this injunction against strikers permanent. This move was reviewed in the ELECTRIC RAILWAY JOURNAL of March 18, 1922, page 489. Another reference to the matter was published on page 721, Oct. 28, 1922.

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More Passengers But Less Revenue with Five-Cent Fare

Definite Conclusions Impossible from Results of First Month's Operation of New Fare System on Public Service Railway—Bus Competition Continues to Be the Crux of the Problem

ALTHOUGH the total number of passengers carried by the Public Service Railway of New Jersey during the month of October, 1923, was approximately 400,000 more than the number carried during October, 1922, the total revenue was smaller and a deficit of $382,753 resulted. Except for a changed rate of fare the operation of the railway was about the same as in the corresponding month of the previous year, with only a nominal increase in the number of car-miles and car-hours.

The compilation of the figures for the first month's operation under the new fare system was made public on Nov. 26. Passenger revenue for October, 1923, was 36.59 cents per car-mile as against 45.24 cents per car-mile a year ago, and $3.43 per car-hour this year as against $4.27 in October, 1922. The total operating revenue was $1,836,185, from which operating expenses of $1,577,748 were deducted, giving an operating ratio of 85.93 per cent instead of 67.68 per cent. The gross income for the month of October, 1923, was $55,737 as against $505,777 in 1922.

FIRST MONTH OF 5-CENT FARE ON PUBLIC SERVICE RAILWAY COMPARED WITH CORRESPONDING MONTH OF PREVIOUS YEAR

	October, 1923	October, 1922
Total operating revenue....	$1,836,185	$2,190,098
Total operating expenses....	1,577,784	1,482,321
Operating ratio, per cent...	85.93	67.68
Gross income.....	$55,737	$505,777
Total income deductions..	438,490	446,541
Net income or *deficit*...	*$382,753*	$59,235
Revenue passengers carried	33,508,564	27,187,790
Transfer passengers carried	139,740	6,060,930
Total passengers carried....	33,648,304	33,248,720

Operating expenses increased greatly due almost entirely to higher wages which were granted the company's employees as a result of the settlement of last summer's strike. The expenses for way and structures were less this year than last; the expenditures for equipment were slightly higher; power expenses were markedly less and other items showed very little change except that for conducting transportation, which was more than $100,000 higher.

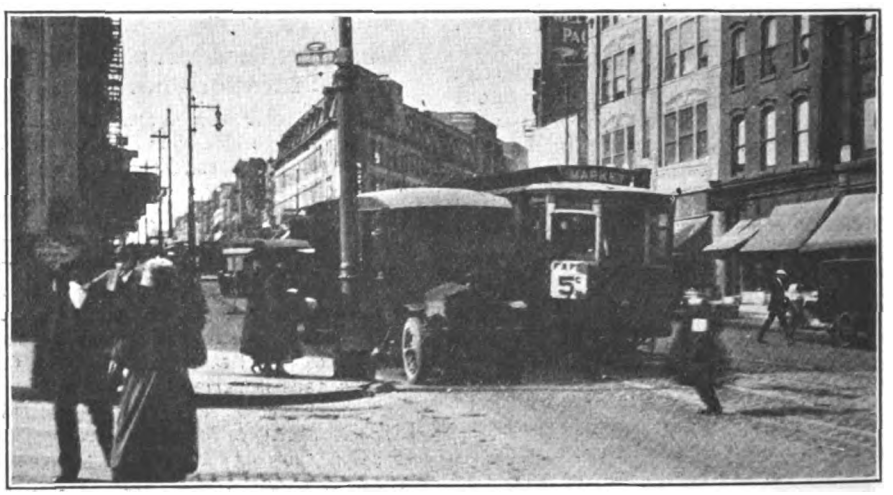
Number of Revenue Fares Increase

The number of revenue fares for the first month of the new system was much greater than in previous months, being 33,508,564 as against 27,187,790 in October, 1922. This large increase, however, is offset by the loss in transfer passengers which decreased from more than 6,000,000 to only about 140,000. Thus, the total number of passengers carried was 33,648,304, a slight increase over the number carried during October a year ago which was 33,248,720.

It is impossible to tell exactly what this means in the way of increased riding because a single individual who rides in two zones and pays two fares is listed as two passengers under the existing system of compiling the figures. While this was true also of the figures for October, 1922, there were then few two-zone riders compared with the number of such riders under the present system.

It would appear that the railway traffic is still suffering somewhat from the effects of the seven-weeks shutdown this summer. At least the bus traffic in some places is heavier than before the strike. In the Newark area, for example, the number of passengers carried by buses in October of this year was 8,066,263 as against 7,062,333 a year ago. An influential factor in the situation has been the exceptionally fine weather which has prevailed all during the summer and fall, and this has undoubtedly had a tendency to favor the bus business.

Under the circumstances it would be premature to draw any definite conclusions from the figures of the first month's operation. It is said that the railway income is steadily increasing and this tendency may be expected to become more pronounced as winter approaches and bad weather sets in. However, the average fare per revenue passenger has been reduced from 7.83 cents to only 5.31 cents which means that there must be a very large increase in riding before the railway revenue will equal what it used to be under the old fare. This outcome appears to be doubtful as long as the destructive bus competition continues on the same streets with the railway.

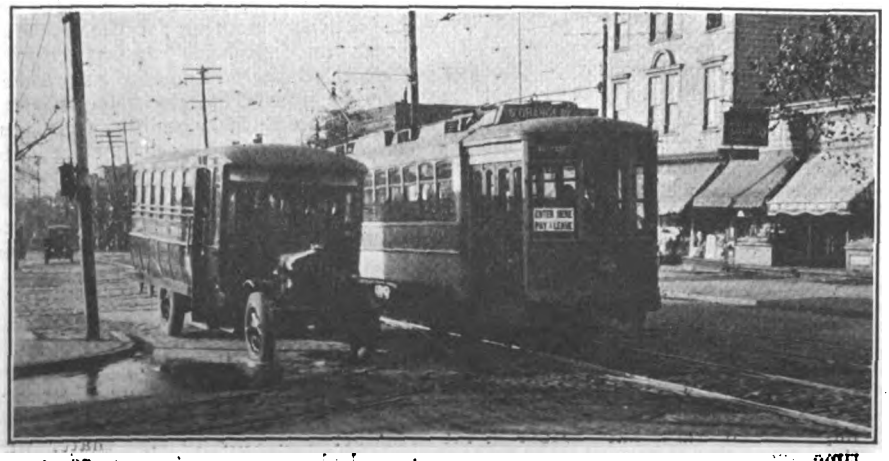


Bus Blocks Entrance to Trolley—A Familiar Scene

Camden Buses Bought by Railway

In the Camden district the company has already taken steps to get control of the situation by buying up a large number of buses. With these vehicles in the hands of the railway it is planned to co-ordinate the bus and street car services.

Elsewhere the railway has undertaken plans to reduce the cost of operation. It has been announced that one-man cars will replace the present two-man cars on several lines in Newark and it is expected that the same plan will be tried by the company on other lines.



Bus and Trolley Give Similar Service at Same Time on Same Street

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Legislation Needed to Further Electrification in New York

A plan for the solution of the west side traffic problem by the construction of an elevated freight railroad was presented on Nov. 26 by the New York Central Railroad at a joint hearing of the Transit Commission and the Public Service Commission.

The hearing was upon the company's application to the Public Service Commission for an order specifying the method of the electrification of its west side line in conformity with the Kaufmann law, passed by the last Legislature, and an application to the Transit Commission for a change of grade on all streets crossing the west side tracks, under the general law placing one-half of the expense upon the railroad, one-fourth on the state and one-fourth on the city.

The plan presented by the railroad provides for the construction of an elevated railroad most of the way from Spring Street to the Harlem River, eliminating all grade crossings. The total cost is estimated at between $60,000,000 and $70,000,000, which the railroad would pay except the cost of eliminating the grade crossings, estimated at from $15,000,000 to $25,000,000, which would be divided by the company, state and city.

Ira A. Place, vice-president of the New York Central, in charge of its law department, said that while the two questions of elimination of grade crossings and electrification were legally separated, they should be considered together.

George McAneny, chairman of the Transit Commission, expressed belief that legislation would be needed to accomplish any result. Mr. McAneny explained that a law was passed in 1911 permitted the city to reach an agreement with the railroad on a plan and that a law of 1917 permitted the commission to prepare a plan for submission to the railroad with the railroad paying the cost. Mr. McAneny said that, in any event, appeal would have to be made to the Legislature to get an appropriation under the general change of grade law for the relocation of the tracks. An adjournment was taken to Dec. 6.

Pacific Electric Railway Employees to Be Provided with Insurance

Employees of the Pacific Electric Railway, Los Angeles, are to participate in the group insurance plan recently announced by the Southern Pacific Company for all its employees. More than 7,000 employees of the Pacific Electric System will enjoy the benefits by the ruling of the Southern Pacific Company that subsidiary company employees are entitled to the insurance provisions made.

Employees in the service six months receive $250 insurance free of cost.

The plan becomes effective when 75 per cent of eligible employees of the company subscribes for the insurance, but not before Jan. 1, 1924.

The policy taken out by the Southern Pacific Company is estimated to exceed $100,000,000. The insurance plan affects 90,000 employees of the Southern Pacific interests. The policy is to be written by the Metropolitan Insurance Company.

Target of Opinions in Massachusetts—One-Man Cars

The one-man car is still being assailed in Massachusetts. William Walsh of the Massachusetts branch of the American Federation of Labor and a former business agent of the Boston Street Carmen's union has asserted that he has asked for and received promise of support of the Boston Central Labor Union in the initiative and referendum movement to eliminate the one-man cars in the State. Petitions asking for the initiative and referendum are being circulated. An attack on the one-man car is planned in Boston where a group of men headed by an attorney has announced intention to petition the Legislature to prohibit the use of the one-man cars. The Attorney General has approved the form of the petition, which provides that if the proposed law is defeated by the Legislature it shall go to the people for referendum vote.

Chairman Jackson of the Boston Elevated Railway trustees has notified Mayor Curley of that city that one-man cars have come to stay. They are used only on routes, Mr. Jackson said, where cars run by two men would be unprofitable. The one-man controversy in Massachusetts has been referred to previously in the ELECTRIC RAILWAY JOURNAL.

Arbitration Next Step in Springfield

Arbitration will be necessary before the new contract between the employees of the Worcester Consolidated Street Railway, the Springfield Street Railway and the officials of the trolley lines are drawn. The present contract expires Dec. 31. In accordance with the terms of the present contract the employees and employers have exchanged proposals for the new contract, but both sides have made demands which have put them far from agreement. Bentley W. Warren, Boston, representing the company, and James H. Vahey, representing the men, have had several conferences since the union committee and trolley officials met in an effort to reach some basis that would permit resumption of negotiations for an agreement, but without making progress. In the arbitration proceedings Mr. Warren will be the companies' representative and Mr. Vahey will act for the carmen. They will select the third man.

The major demands of the trolley men are for an eight-hour day, an increase in the maximum pay for uniformed men from 58 cents to 80 cents an hour and for operators of one-man cars an increase from 66 to 95 cents an hour with a 30 per cent increase for all miscellaneous employees.

The company has proposed maintaining the present schedule of wages if certain bonuses are eliminated, but suggests that if the bonuses are retained the pay of uniformed men should be reduced 5 cents an hour. President Clark V. Wood has also told the men that the increase they ask with the eight-hour day would add $750,000 to the annual payroll and that the company cannot do this on the present revenue with a 10-cent fare, and could not do it with an increased fare because the decrease in riding would keep the income down.

Peter Witt for Municipal Ownership.—Councilman-elect Peter Witt, former street railway commissioner at Cleveland, urges that the city take over the property of the Cleveland Railway at its estimated value of $35,000,000. Mr. Witt says it can be done "without costing the taxpayers a penny." As he sees it the money now paid by car riders in the shape of taxes totals $1,378,933 a year and is constantly increasing. Mr. Witt says the money thus saved, which now goes to Washington, Columbus and townships in the county outside of the city, will more than pay for the present outstanding obligations of the Cleveland Railway in less than twenty-five years.

Must Remove Snow.—The Boston & Worcester, Milford & Uxbridge and Springfield Street Railways will be obliged to remove all snow piled by their plows onto walks previously cleared by householders, according to a recent decision of the Massachusetts Department of Public Utilities. They must also remove snow which the plows throw in the highways cleared by the various towns and cities of Massachusetts through which they operate lines.

Pay Increases for More Detroit Men.—The October payroll of the Department of Street Railways at Detroit was increased approximately $10,000 due to advances in pay granted by the Street Railway Commission to employees of the system other than platform men.

Houston Company States Its Case.—"That Houston May Fulfill Her Destiny" is the title of an instructive pamphlet issued for the patrons of the Houston Electric Company. The company, in publishing the pamphlet, states that it wants its patrons to know what it is doing and has done during the past three years to furnish transportation in its city. It gives, in detail, the various construction and improvement undertakings and the money that was involved in each improvement. But the company urges upon people the need for greater improvement as the expansion is pressing down heavily on them; that millions of dollars more will be necessary during the next few years, and asks for the support and confidence of the people to insure the success of the transportation system.

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Financial and Corporate

Committee Reports at Montreal

Favorable Findings Presented by Shareholders Who Inquired Into Affairs of Holding Company

The committee that was appointed by shareholders of the Montreal Tramways & Power Company, Montreal, Que., to look into the affairs of that corporation has made a report. The *Canadian Financial Post* says that the report is on the whole favorable to the present directors and management, but that there may be a renewal of the fight for control that was waged during the summer.

Data Furnished Stockholders

The report provides shareholders with data concerning the profits and losses of the company since formation eleven years ago. This is the first time shareholders had any information concerning the company's operations between 1912 and 1920.

The committee's statement indicates that the total income for the years from 1912 to 1922 was $5,978,062, and the total expenditures during the period were $7,752,699. This made a deficit of $1,774,636 for the company as of the period ended Nov. 30, 1922.

The company had losses in six years and profits in five of the eleven years under review and the record for each year was as follows:

Year	Income	Expenditure
1912	$282,500	$690,184
1913	503,047	457,913
1914	513,544	442,953
1915	543,082	846,046
1916	558,669	493,762
1917	560,898	863,190
1918	475,471	534,360
1919	463,760	1,409,514
1920	814,224	719,513
1921	587,054	717,724
1922	675,811	577,536

This succession of losses is blamed upon the fact that it was a very serious task to finance the company owing to opposition encountered at the start, and later to conditions created by the war. This was responsible for high cost of short date financing and high premiums on United States funds. Under more favorable conditions, says the report, this expense would have been curtailed, and sources of revenue increased considerably by a fuller development of the assets of the company.

Option Agreement to Be Exercised

The report also deals with the point that has been criticized by shareholders, namely, the transfer of 59,500 common shares of the Canadian Light & Power Company to the Montreal Public Service Corporation. These shares were handed over as collateral, when Montreal Public Service made a bond issue of $2,550,000 in 1919. There was an agreement to be made that Tramways & Power Company was to have the right to repurchase these securities together with $1,700,000 of Canadian Light & Power Company 5 per cent bonds, due 1949, for the sum of $2,050,000. The committee was informed by officers of the company that the transaction was treated as a temporary sale to meet the suggestions of the solicitors, but the intent between the parties was that the securities were pledged with right of redemption. The report recommends that the agreement of option be executed without further delay.

The Montreal Tramways & Power Company owns a majority of the ordinary stock of the Montreal Tramway and the stock of the Canadian Light & Power Company.

Order Entered to Dismantle Famous Colorado Line

The famous Colorado Springs & Cripple Creek District Railway, once referred to by Theodore Roosevelt as offering "the one-day trip that bankrupts the English language," has finally been declared dead *de jure*, it having died *de facto* a considerable time ago.

In May, 1919, the United States District Court appointed a receiver for the property on application of trustees for the bondholders. In May, 1920, the same court authorized the receiver to discontinue operation of the line except as to a small portion thereof. The Public Utilities Commission of Colorado thereupon filed petition for modification or vacating of the last mentioned order contending that since the property was located wholly within the State of Colorado the question of its operation or discontinuance was with the state commission. In October, 1922, the receiver sold the property at foreclosure and the purchaser proceeded to begin to dismantle and junk the line. Interested citizens petitioned the state commission to take jurisdiction on its own motion and protect their rights.

After a hearing the commission ruled that a foreclosure sale transferred property subject to all duties and responsibilities under which the original owner held the property; that the purchaser at foreclosure was without right to abandon public service except by permission of the lawful authority having fully jurisdiction thereof.

At the close of the hearing an agreement entered into by all parties sanctioned an order to permit the dismantling except as to certain portions, which order was entered.

The road consisted of 75 miles of track.

$8,100,000 Value Fixed at Norfolk

Sum Decided Upon by State Commission $2,000,000 Less Than Company's Claim

The valuation of the Norfolk railway properties of the Virginia Railway & Power Company was fixed on Nov. 24 by the State Corporation Commission as $8,100,000. This is less by more than $2,000,000 than the sum claimed by the company and more by about the same amount than the valuation asserted by the city of Norfolk. The company's 7-cent fare, granted some time ago by the commission, will be continued in force, for the commission has pointed out that even at the valuation claimed by the city, the earnings of the company at 7 cents are not more than 4 per cent on the valuation.

The company claimed a valuation of $10,639,084 and the city contended for $6,152,532.

The commission states in its decision that in the five months from June until October during which the 7-cent fare, with four tokens for a quarter, was existent, the company's net earnings applicable to return after payment of taxes, depreciation and renewal reserve, were $181,070, as compared with $165,660 for the corresponding period of last year. The commission gives it as its opinion that the 7-cent fare should stand.

Major Alexander Forward, commissioner in charge of transportation problems, rendered the opinion.

The commission decided to include in the company's valuation the summer resort owned by it at Norfolk and rented for a sum which is less than enough to pay the carrying charges. The decision holds that if it were not for the summer resort there would be insufficient permanent travel from the limited number of residents on the Ocean View line to warrant its continuance, but that the city undoubtedly would not want the line discontinued and that in view of these considerations the property should be allowed as a part of the valuation.

From the company's valuation the commission has deducted $1,091,000 for accrued depreciation. The claim of the city on account of this item was $1,960,735. Minor deductions were made for other items.

Receiver Appointed for Washington-Virginia Line

On petition of five Philadelphia trust companies acting in behalf of bondholders, the Washington-Virginia Railway was declared insolvent by the Circuit Court of Fairfax County, Va., on Nov. 23. At the request of the petitioners, Arthur L. Reynolds, manager of the company, was appointed receiver. The company operates several interurban lines between Washington and near-by points in Virginia, among them the line to Mount Vernon. Insolvency

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was admitted by the company in its answer to the petition. An intervening petition, filed by Mattie M. Newcomer, a stockholder, was rejected by Judge Samuel G. Brent.

New Plan Submitted for Service Between Kewanee and Galva

Kewanee, Ill., has not given up its effort to get back its city line and the interurban line from Kewanee to Galva. Despite the fact that the first plan to sell $100,000 in stock to refinance the Galesburg & Kewanee Electric Railway failed, merchants, manufacturers and city officials have devised another plan, the adoption of which will make possible the resumption of service at an early date.

Opinion is unanimous that the loss of the lines would be a severe handicap to the community. At an enthusiastic meeting of the business interests B. F. Parker, vice-president of the Kewanee Boiler Company, and general chairman of the Pittsburgh-plus commission, presented a plan which was adopted.

This plan included an offering to the public of a $75,000 issue, secured by first mortgage on all the property of the company including the $60,000 in new equipment; $45,000 of capital stock unsecured; provision for the sale of certain pieces of real estate owned by the company and some of the old equipment such as cars to the amount of about $20,000. This would leave a total of $12,000, according to the arrangements, necessary to refinance the proposition, including the purchase of new cars and other equipment. The original figure estimated as necessary to cover everything was $140,000. The new figure, $120,000, would be covered by the bond issue of $75,000 and the stock issue of $45,000. The new arrangement also calls for the selling of a block of tickets, good within a year, to the largest possible number. It is said that many persons who could not take a $50 bond might be willing to expend $15 or $25 for tickets. This would bring money in for immediate use and would help the company in many ways. The difficulties in Kewanee have been referred to previously in these pages.

Minority Report by Pittsburgh Receiver

Charles A. Fagan, one of the receivers of the Pittsburgh Railways, acting independently of his colleagues, W. D. George and S. L. Tone, has filed an exception to the plans for the reorganization of the company to follow the lifting of the receivership. In a petition filed by his attorneys in the United States Court Mr. Fagan declares that the company is still "manifestly insolvent."

In his attitude on this matter Mr. Fagan takes direct issue with former Judge Henry G. Wasson, who as special master, delegated by the court to take testimony and advise it as to whether the reorganization was possible, recommended the reorganization.

Mr. Fagan says that he disagrees with the master's conclusions in view of the present insolvency of the company, the absence of any offer to cure the insolvency, the failure to provide for the refunding or extension of bonded indebtedness now in default, and the failure to adduce sufficient evidence to prove that the corporation can operate at a profit and make ends meet in the next several years.

According to Mr. Fagan the general tenor of the master's report is to the effect that if the receivership should be terminated at the present time there would be ample cash and other assets on hand to meet all the current obligations as they mature and leave a substantial amount for working capital. In Mr. Fagan's opinion this is a conclusion unwarranted by the evidence.

Further Progress Reported in Kansas City Reorganization

The committee representing the bondholders of the Kansas City Railways reached a new agreement on Nov. 24 with the lawyers who represent the holders of personal injury judgments by which these claimants will receive 50 cents on a dollar in cash and the remainder of their claims in first mortgage bonds of the new company to be organized after the receivership has been lifted. The total of the outstanding accident claims is more than $2,000,000.

To protect the worth of the bonds which the judgment holders will receive it has been agreed that the total initial bond issue against the reorganized property shall not exceed $20,000,000. Provision is also made to reimburse the bondholders' protective committee for $500,000 advanced to pay state taxes prior to the receivership.

The agreement stipulates that the parties shall collaborate to obtain an equitable adjustment of all the matters involved in the reorganization.

Judge Stone of the Federal court expressed himself as pleased at the progress made and said that on the determination of the priority of claims against the railways will depend the progress of negotiations for the reorganization of the property. The hearing set for Nov. 26 was postponed until Dec. 27. If further progress toward arranging the reorganization is reported on Dec. 27 Judge Stone said that he will continue the hearing until Jan. 7.

An order issued by the court to pay a group of claims against the old receivership was rescinded by Judge Stone, pending publication of a notice to claimants.

Should a foreclosure be necessary the bonds would be issued by the reorganized company, but if the present company were to continue, then the old bonds must be retired and new ones issued by it.

Holders of the second mortgage bonds and the notes are so widely scattered with respect to their residence that fully a month will be required to consult all creditors. If these holds can be induced to accept the plan as now proposed, then a hearing on the priority of claims will be avoided.

Receivership of Brooklyn Line Expected to Be Lifted Soon

The Brooklyn, Queens County & Suburban Railroad, Brooklyn, N. Y., is expected soon to emerge from the hands of the receiver as the result of an agreement reached between the Brooklyn City Railroad and the reorganization committee of the Brooklyn-Manhattan Transit Corporation.

Until the present, the Brooklyn, Queens County & Suburban Company has not been considered in the reorganization plan of the Brooklyn-Manhattan on account of the claims against this road by the Brooklyn City Railroad. At the time of the major reorganization it was impossible to make an adjustment with the Brooklyn City Railroad so that the Queens County line remained in the hands of the receiver. Lindley M. Garrison was appointed July 14, 1919.

The plan for the reorganization of the property does not contemplate any foreclosure sale.

The agreement that has just been reached between the Brooklyn City Railroad and the Brooklyn-Manhattan Transit Corporation has to do only with the bonds of the Queens County & Suburban Company. It does not apply in any way to the construction suit involving $10,000,000 between the two railway companies, which is still pending.

The Brooklyn, Queens County & Suburban Railroad has 64 miles of track. Its assets according to the 1922 report were $14,094,904.

McKinley-Studebaker Group Buys Into Kansas City Light

The Illinois Power & Light Corporation, which was formed a few months ago to consolidate the McKinley and Studebaker public utility properties, has acquired through purchase J. Ogden Armour's interest in the Kansas City Power Securities Company. E. H. Rollins & Sons, bankers, Chicago and New York, acted for the purchaser. The exact number of shares transferred has not been made public, but it can be stated that the transaction involves approximately 33 per cent of the Kansas City Power Securities Company's outstanding capitalization, which consists of 40,000 shares of common stock and 40,000 shares of preferred stock.

The Kansas City Power Securities Company, in which Mr. Armour was the most important individual stockholder, is a holding company owning the entire capital stock of the Kansas City Power & Light Company, which in turn has numerous subsidiaries. This transaction does not involve Mr. Armour's holdings in the Kansas City Railways. Since the reorganization of the utilities in Kansas City in 1916 the Kansas City Power Securities Company

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has had no control over the Kansas City Railways.

The purchase of the stock by the Illinois Power & Light Corporation has been approved by the Illinois Commerce Commission.

Auction Sales in New York

At the auction rooms of A. H. Muller & Sons there were sold on Nov. 28 the following securities:

4,201 shares Interborough Consolidated Corporation, preferred, $100 lot.
3,322 shares Interborough Consolidated Corporation, common, $160 lot.
100 shares of Interborough Consolidated Corporation, common, $2 lot.
200 shares Interborough Consolidated Corporation, preferred, $14 lot.
$6,250 Central New York Southern Railroad Corporation deposit receipt under subscription agreement, dated Oct. 2, 1913, $100 lot.

Net Income Shows Increase.—For the four months ended Oct. 31, 1923, the passenger revenue of the Brooklyn City Railroad, Brooklyn, N. Y., was $3,907,962, against $3,897,784 for the same four months a year ago. The net corporate income increased from $615,248 for the four months ended Oct. 31, 1922, to $644,544 for the same four months of the current year.

Valuations Fixed in Michigan.—The Michigan Public Utilities Commission has fixed the following valuations based on reproduction costs, less depreciation, on Michigan electric lines: Michigan Railroad, $9,418,140; Michigan United Railways, $10,139,542; Grand Rapids, Holland & Chicago, $2,462,396; Grand Rapids, Grand Haven & Muskegon, $2,562,489; Southern Michigan Railway, $1,618,645; Benton Harbor-St. Joe Railway & Light, $2,140,613. The total valuation aggregates $28,341,326.

"Be a Partner."—The Wisconsin Public Service Corporation has recently issued a handsomely colored booklet of fifteen pages entitled "Be a Partner." The booklet was issued in order that the widespread movement among public utility companies to provide home investors with sound investments and to perpetuate co-operative relations of the company with its customers and employees may gain greater headway.

Additional Bonds Sold.—The National City Company recently sold at 92¾ and interest an additional block of $380,000 general mortgage and refunding mortgage gold bonds of the Northern Ohio Traction & Light Company, Akron, Ohio. The bonds are known as series A, 6 per cent. They are dated March 1, 1922, and are due March 1, 1947.

Issue Covers Completed Improvements.—The $107,000 issue of bonds by the Fort Smith Light & Traction Company, Fort Smith, Ark., authorized by the State Commission, is not intended for new improvements to the system, but for work already completed. This issue was referred to in the Nov. 24 issue of the ELECTRIC RAILWAY JOURNAL.

Gold Notes Offered.—A syndicate is offering at 98½ and interest to yield more than 6.70 per cent $10,000,000 of convertible 6½ per cent gold notes of the Northern States Power Company, Fargo, N. D. The notes are dated Nov. 1, 1923, and are due Nov. 1, 1933. The proceeds from the sale of these notes will be used to redeem the entire issue of the company's ten-year notes due April 1, 1926, now outstanding in the amount of $7,805,000 and to reimburse the company in part for expenditures heretofore incurred for additions extensions and betterments to the properties of the system.

Dividends Resumed on Common Stock. — The Duluth-Superior Traction Company, Duluth, Minn., has resumed dividends on its common stock by the declaration of a quarterly dividend of $1 a share. This dividend and the regular quarterly dividend of $1 a share on the preferred stock are payable on Jan. 2 to stock of record of Dec. 15. The company paid the last quarterly dividend of $1 a share on Oct. 1, 1918, on the common stock. The gross revenues of the Duluth-Superior Traction Company for the nine months ended Sept. 30, 1923, amounted to $1,413,990 against $1,314,036. The net income after the consideration of fixed charges and taxes was $75,496 for the nine months of this year, against $52,963 for the nine months' period ended Sept. 30, 1922.

Booklet Describes Property. — The Byllesby Engineering & Management Corporation has prepared a twenty-page booklet entitled "Back of the Investment," illustrating the properties comprising the Northern States Power System, Minneapolis, Minn. Photographic views made from an airplane of the system is an added feature included in the booklet.

Figures Show Tax Distribution. — According to figures presented to the National Tax Association recently by John E. Walker, former tax adviser to the United States Treasury Department, more than 8 per cent of the total tax burden of the country in 1921 was collected from three agencies of transportation, the motor car, steam railroad and electric railways.

Surplus Falls Off.—The gross earnings of the Lake Shore Electric Railway, Cleveland, Ohio, from Jan. 1, 1923, to Sept. 31 were $2,084,953, against $1,866,401 for the same period a year ago. The surplus shows a falling off from $158,894 for the period from Jan. 1 to Sept. 31, 1922, to $138,807 for the same months of the current year.

Net Receipts.—$3,855.—The municipally owned Norton, Taunton & Attleboro Street Railway, Norton, Mass., shows for the nine months ending Sept. 30 gross earnings of $57,241 and operating expenses for the same period of $53,385, leaving net receipts of $3,855. Four $1,000 notes due the municipalities from the railway have been paid in this period, together with the interest accrued.

Additional Refunding Bonds Offered. —Tucker Anthony & Company, New York, N. Y., is heading a syndicate which is offering for subscription at 99½ and interest, to yield more than 6½ per cent, an additional issue of $1,039,500 of first mortgage and refunding lien sinking fund 6½ per cent gold bonds, Series A, of the Consolidated Power & Light Company, Huntington, W. Va. The bonds are dated March 1, 1923, and are due on March 1, 1943. The company owns and operates the entire electric power and light and electric railway business in Huntington, W. Va., Roanoke and Lynchburg, Va., and surrounding communities, as well as the gas business in Lynchburg, Va. The system also does the entire electric light and power and electric railway business in Ironton, Ohio, Ashland and Catlettsburg, Ky., and the intermediate territory.

Bonds Offered. — Halsey, Stuart & Co., New York, N. Y., are offering $1,500,000 of first lien and refunding convertible 6 per cent bonds, series A, of the Monongahela-West Penn Public Service Company. The bonds are offered at $96.25 and accrued interest to yield about 7 per cent.

Atlanta Lines Report Increase.—Cars of the Georgia Railway & Power Company, Atlanta, carried 228,110 more passengers during October, 1923, than during October, 1922. The increase in revenue amounted to $14,502. The total number of passengers transported in October this year was 6,724,071, with gross revenue of $456,744. Substantial increases have been shown nearly every month this year over the corresponding month of last year.

Assessments Completed.—A total valuation of $104,410,000, on which a tax of $2,171,140 will be paid, has been placed on the properties of the Wisconsin light, heat, power and electric railway companies by the Wisconsin Tax Commission, which has just completed its report. The assessment on the Milwaukee Electric Railway & Light Company is based on a value of $59,000,000.

Partial Abandonment Approved.—The Public Service Commission has approved a declaration of abandonment by the Southern New York Power & Railway Corporation of that part of its electric railway system in Oneonta, starting in Main Street and running through Broad to the east end, and from Chestnut and Main Streets east in Main Street and Broadway to Market Street. There was no opposition to the proposed abandonment.

Improvement in Net Earnings.—The gross earnings of the East Penn Electric Company for the year ended Aug. 31, 1923, were $2,798,350, against $2,262,135 for the same period a year ago. The net earnings were $1,006,129 and for the year ended August a year ago were $859,737.

Net Income Increases.—The gross earnings of the Twin City Rapid Transit Company, Minneapolis, Minn., were $10,210,795 for the nine months ended Sept. 30, 1923, against $10,251,795 for the same period a year ago. The net income after the consideration of fixed charges, etc., amounted to $1,151,755 against $1,044,509 for the nine months ended Sept. 30, 1922.

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Traffic and Transportation

Ten-Cent Fare Asked in Kingston

The Kingston Consolidated Railroad, Kingston, N. Y., has applied to the Public Service Commission for permission to charge a 10-cent cash fare in Kingston with a ticket fare of 8 cents. The present fare rate is 7 cents.

The railroad operated on a 5-cent fare until April 15, 1919, when a 6-cent fare was authorized. The company later sought to abandon certain parts of its lines in Kingston, but this step was put off and an agreement reached whereby a 7-cent fare was placed in operation on Dec. 23, 1920.

The company in its petition to the Public Service Commission states that in 1921 certain economies were put into effect which produced a saving over 1920 of $10,000. Since 1921 these savings have gradually diminished because of wage increases and other expenses, so that by 1924 the savings will be wiped out entirely.

The revenues received from its railroad at the present passenger rate are gradually diminishing, accounted for by the increased use of automobile and bus operations and other causes, so much so that the return upon the capital invested is not sufficient and will not allow the petitioner to add to and improve its railroad property or to keep pace with the growth and development necessary and meet the requirements of the territory served.

The company in a supporting petition shows that for the first nine months of 1923 its total revenue from street railroad transportation was $169,213. The total operating expenses were $129,026 and its taxes $11,367.

Fare Increase Sought by Texas Electric

The Texas Electric Railway, which owns and operates the lines in Sherman and Denison, Tex., has asked authority of the City Commissions in both cities to increase fares on the grounds that the present fares cannot permit the company to operate at a profit. Authority is sought to increase fares from 5 cents to 7 cents for regular cash fares and to sell four tickets for 25 cents, or a fare of 6¼ cents where tickets are purchased. The fare for children and students in schools would be 3½ cents. Jack Beall, president of the Texas Electric Railway, and James P. Griffin, vice-president and general passenger agent, both of Dallas, visited the two cities and placed the matter before the City Commissions.

Messrs. Beall and Griffin told the City Commissions that the gradual increase in the number and use of automobiles had brought about a gradual reduction in passenger revenues of the companies operating in Texas, and that the situation had reached a point where relief must be given if the traction companies are to maintain the high standard they have maintained in the past.

Applications for similar increases are pending in Waco and Corsicana.

Action Taken Against Jitneys

All jitneys are off Federal Street in Youngstown as a result of the Council's latest anti-jitney ordinance. The ordinance moving the jitneys west of the postoffice also was put into effect. The west-bound jitneys that formerly parked in West Federal Street now are stationed in Chestnut Street. City Solicitor Leighninger, at the order of the Council, is now drawing up an ordinance to be presented shortly that will prohibit the jitneys from entering the congested district.

Prior to this order the jitney controversy in Youngstown had been renewed when Safety Director Hamilton ordered the police to enforce sections of the jitney ordinance restricting the discharging of passengers in downtown streets. As a result J. H. Hogan, representing South Side jitney men, countered with a demand that the city cease discrimination in traffic enforcement, pointing out to Hamilton that the Pennsylvania-Ohio buses were violating traffic laws in parking in East Boardman Street. The jitney ordinance passed by the City Council on Oct. 8 provided among other restrictions that jitneys entering or leaving the city by Market Street should load and unload on Front Street between Market and Phelps. Mr. Hamilton said that he had ordered the police to enforce every traffic ordinance to the limit and that if the Pennsylvania-Ohio buses were still violating the law the drivers of them would be treated the same as others.

Six-Cent Fare in Cleveland

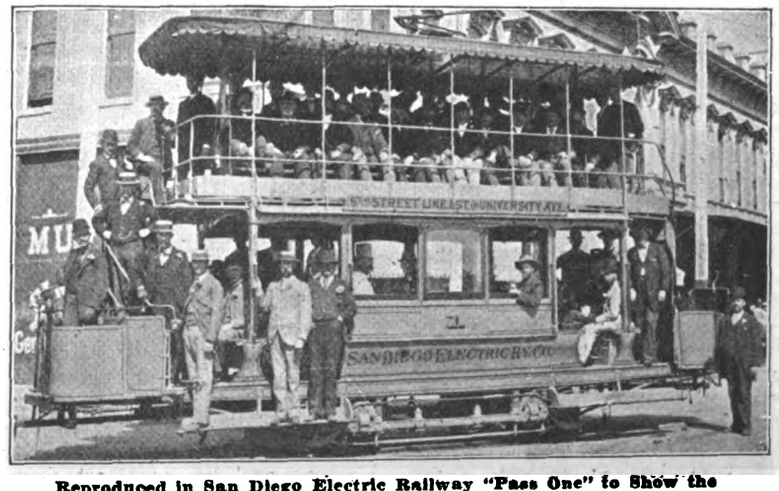
Car riders of the Cleveland Railway on Dec. 1 started to pay a 6-cent fare with a penny charge for transfer. Nine tickets were sold for 50 cents. This is the second street car fare raise in Cleveland within two months. The last raise went into effect on Sept. 1, when the sale of eleven tickets for 50 cents was discontinued.

The increased rate of fare is due to the fact that the company's interest fund now shows a deficit of $83,801.54. Originally placed at $500,000, the company's franchise provides that the fare goes up when this fund drops below $300,000 and the fare goes down when the fund goes above $700,000. The 6-cent fare is the highest permitted by the franchise.

The increased rate of fare is due to the big deficits that were accumulated during the period when Clevelanders were riding for a nickel, officials of the Cleveland Railway say.

Fare Increase Denied.—The Oklahoma Corporation Commission has denied the application of the Tulsa Street Railway to increase its fare from 7 cents to 8 cents. The Tulsa property has been struggling against jitney operation for several years and in order to meet this competition extended its service some months ago by putting on buses to be operated in connection with the city lines. In its application the company says that the operation of these buses contributed to a heavy loss sustained during the past year. The commission held that losses due to operation of motor buses in connection with a city street railway system would not be considered in determining the proper railway fare.

Will Seek Fare Adjustment.—University of Washington students, represented by a committee appointed by President Sam Mullins of the Associated Students, will appear before the City Council of Seattle shortly to ask for a 2½-cent carfare, with transfer privilege, the same as is accorded to high school students. The matter has already been taken up privately with several members of the City Council.



Reproduced in San Diego Electric Railway "Pass One" to Show the Contrast with Commodious Equipment of Present Day

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Abide by Ordinance.—Jitney operators of Shreveport, La., at first threatened to cease operating altogether as a result of a regulatory ordinance passed by the city. The ordinance requires the jitneys to operate continuously from 7 a.m. to 7 p.m. along certain specified routes and on a regular schedule. There are probably fifty jitneys operating in Shreveport and they haul an average of 5,000 passengers daily. After stopping their cars for a short time, the operators resumed service and are obeying the ordinance.

Bus Plan Approved.—The City Council of Toledo has approved the Community Traction Company's plan for motor bus operation. The ordinance which was recently sanctioned provides for the purchase of two modern buses on the Oak Street extension to replace the two machines now being operated in conjunction with the traction system, but on a rental basis. Another bus is being rented and operated on South Erie Street, and this, it is expected, will be replaced by a company-owned motor bus. Arrangements include financing by an addition to the preferred stock.

Accommodates School Children.—Unusual service is being given by the recently started Melrose addition feeder bus line of the Springfield Railway, Springfield, Ohio, in that the bus is diverted twice each day from its regular route in order to carry school children directly to and from the Highland School, about a mile distant. The plan was adopted after being suggested to residents by P. E. O'Brien, general manager of the railway. Twenty-six children are carried daily in the bus at a round trip fare of 3 cents each.

Opera Service on North Shore Line.—With the opening of the opera season recently by the Chicago Civic Opera Association, the Chicago, North Shore & Milwaukee Railroad started a special train service to accommodate opera patrons living in the near North Shore towns. This special train service consists of a dining car and coach. It leaves Great Lakes at 6:32 p.m. and arrives at Congress and Wabash, at the door of the Auditorium, Chicago, at 7:50 p.m. The "Civic Opera Special," as it is called, makes express stops in the intervening towns between Great Lakes, 34 miles north of Chicago, and Chicago.

Better Transportation This Winter.—H. G. Tulley, president of the International Railway, Buffalo, in referring to the new snow equipment for the coming winter said that in the winter of 1922-23 the cars were operated by new men who, while trained operators, were unfamiliar with the severe weather encountered in that part of the country. The organization was now a year old and, benefiting by the experience of last season, was expected to provide better winter transportation this year. It was pointed out by President Tulley that most of the cold weather delays are caused by stalled automobiles, trucks and other vehicles blocking the tracks, often interfering so greatly with the operation of plows and sweepers, as to permit the storm to gain headway and become unmanageable. City co-operation in keeping the tracks free from obstruction, and in strictly enforcing traffic regulations, would do much, Mr. Tulley said, to insure regularity of service and elimination of delays.

Safety Meetings Held.—The Los Angeles Railway has started a series of safety meetings in which officials of the company meet trainmen at the five carhouse divisions. One general topic is discussed at each division in five consecutive weeks. Attendance is voluntary on the part of trainmen, but attendance records are kept and are of use in selecting trainmen for the special Christmas bonus under the merit and bonus system of the company. In the first series of meetings C. M. McRoberts, general claim agent, and John C. Collins, supervisor of safety, have paved the way for future safety meetings by arousing the interest of trainmen in the cause.

Large Sum for Transporting Mail.—During the last fiscal year $604,915 was expended by the Post Office Department for the transportation of mail by electric railways. At the close of the fiscal year authorizations were in effect over 8,521 miles of electric railway. This included service on 317 routes. During the full twelve months 10,883,970 unit miles were traveled. The average cost per mile was 5.24. Compared with the previous fiscal year, the decrease in the number of routes was eleven. The length of routes increased 162 miles. The decrease in the annual travel was 48,799 unit miles. The increase in the expenditure was $12,142, and the increase in cost per unit mile traveled was 0.14 cents.

Working for More Pass Riders.—Sales of weekly passes by the Tacoma Railway & Power Company, Tacoma, Wash., for the week beginning Nov. 12, totaled 12,550, a new high record since the pass system was adopted in July, 1922. A recent innovation in its campaign to make the pass more popular was made by the company with appointment of C. J. Quill to the position of transportation salesman. He has been working among operators of the cars, and the system has already shown results. C. V. Allen, advertising manager, states that unless the pass sales can be brought up to 15,000 weekly the company will have to sell the passes for more than $1 each. The company has for its objective the 15,000 mark. At the present number, the passes are not paying, although 43 per cent more passengers are being carried than before the pass was adopted.

Complaint Sustained.—On the complaint of George Bullock, receiver of the Buffalo & Lake Erie Traction Company, the Public Service Commission has ordered R. H. Henneous to desist from operating a motor vehicle freight line between Erie and North East, Pa., until he receives a certificate of approval.

Legal Notes

ILLINOIS—*Policy of Public Utilities Act Stated.*

The policy of the Public Utilities Act is not to promote competition between common carriers as a means of providing service to the public, but that through regulation of an established carrier occupying a given field, and protecting it from competition, it may be able to serve the public more efficiently and at a more reasonable rate than would be the case if other competing lines were authorized to serve the public in the same territory. To warrant the Commerce Commission in granting a bus company authority to operate its lines and to serve the same public already served by an existing street railway system it must appear that the railway was not rendering adequate and convenient service, and that the operation of the bus lines would eliminate such inadequacy and inconvenience, the convenience and necessity of the public being a primary consideration. The fact that a bus company is limited to a 5-cent fare, and the street railway company serving the same district is charging a larger fare, does not of itself warrant an order by the Commerce Commission allowing the bus company to operate in such district; nor is the convenience or inconvenience of even a considerable number of individuals the test for an order of convenience and necessity. [West Suburban Transp. Co. vs. Chicago & W. T. Ry. Co., 140 Northeast Rep., 56.]

FEDERAL COURTS—*Eviction of Colored Interstate Passenger Justified Only By Proof of Existence of Reasonable Segregation Regulation.*

To justify the eviction of a colored interstate passenger for his refusal to occupy a seat in that part of an interurban electric car set apart for colored passengers, it is incumbent on the carrier to show that it had in force a regulation requiring the segregation on its trains of white and colored passengers and that such regulation was reasonable. Oral instructions by a carrier to its conductors to segregate interstate passengers by races is not a valid regulation binding on the passengers, since knowledge of such regulation should be brought home to the passenger at least constructively before he enters the car. [Washington, B. & A. Electric R. Co. vs. Waller, 289 Federal Rep., 598.]

NEW YORK—*Duties and Rights During a Strike Defined.*

An attempt of city officials to prevent a street railway company from taking out of its barns or operating any of its street cars during a strike of its employees, on the ground that it is to preserve law and order, will be enjoined. It is the duty of the police and department of public safety to preserve order and protect the property of citizens, individual and corporate, and it is their duty to protect a street railway

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company in running its cars during a strike of its employees. The right of any man to work, if he wants to, is as inalienable a right as the right of another to quit work, and no person has a right to prevent another from working when he wants to. [Schenectady Ry. Co. vs. Whitmayer, Mayor, et al., 199 New York Suppl., 827.]

FEDERAL COURTS: *Rights of Lessor, Lessee and Creditor.*

Where a receiver for a lessee defaults in rental under the lease, further operation of the railway property by the receiver is considered to be with the acquiescence of the lessor, and is for its account and at its risk. The relations between the two will not be affected by the fact that the officers are the same or the same person is the receiver, and a street railway company, which furnished power, maintenance and repairs to the lessee of another system, necessary to keep it in operation, has an equitable lien on the earnings of such system until it is paid, and a receiver for the lessee is justified in paying from earnings bills for power, etc., furnished prior to the receivership. While a materials creditor furnishing supplies necessary to the operation of the railway has an equitable lien therefore, on the current earnings, the receiver is obliged to pay for the same only to the extent of his ability. [Westinghouse E. & M. Co. vs. Brooklyn Rapid Transit Co., et al., 291 Federal Rep., 836.]

MICHIGAN—*Duty of Motorman to Slow Down When Signaled.*

Where a truck became stalled on the crossing of an interurban line at night and an attempt was made to stop an approaching interurban car by waving a lantern, because a curve hid a view of the obstruction from the motorman, it was his duty to slow down sufficiently that he could stop if exigencies required, though the light was white, and such as was sometimes used by intending passengers in attempting to stop the car at a place where it did not stop. Hence evidence of motorman's failure to slow down was a question for the jury as to negligence. [Vernick vs. Detroit, M. & T. S. L. Ry., 194 Northwest. Rep., 992.]

FEDERAL COURTS—*Proceeds of Tax Refund Not a Trust Under an Adjustment mortgage.*

Where a street railway company had issued adjustment mortgage bonds entitled to receive stipulated interest payments only from the net income of the company, with express provision it should be non-cumulative, a refund to the receiver of the company of excess taxes collected during three previous years, in none of which the full amount of interest on the bonds had been paid, was not a trust fund in the hands of the receiver for payment of additional interest for those years. [American Brake Shoe & Foundry Co. vs. New York Rys. Co., et al., 291 Federal Rep. 112.]

Personal Items

M. R. Boylan Acting General Manager

Public Service Railway Announces Changes in Personnel Affecting Department Heads

A number of changes have been announced in the personnel of the Public Service Railway, Newark, N. J., effective on Dec. 1. They follow:

M. R. Boylan, who has been general auditor, becomes acting general manager during the absence of R. E. Danforth, who starts Dec. 1 on a vacation of four months.

A. T. Warner, traffic engineer, becomes assistant to the acting general manager.

P. W. Pierson, executive assistant, becomes assistant to the acting general manager.

M. R. Boylan

L. P. Baurhenn, formerly assistant general superintendent, becomes general superintendent.

W. H. Shepard, for a long time assistant superintendent of time-tables, becomes assistant general superintendent.

Newton W. Bolen, general superintendent, becomes special representative of the company in Hudson County.

H. C. Donecker, assistant general manager, becomes assistant to Vice-President Edmund W. Wakelee.

Mr. Boylan is a native of New Jersey. His service with the Public Service Railway and its subsidiaries dates back to 1892. That is a long while. Matt Boylan just before that had qualified at school as a stenographer and secretary and it was in these capacities that he served in the office of C. B. Thurston, president of the Jersey City & Bergen Railroad, then a horse car line. During the next few years the Jersey City system was electrified and Mr. Boylan went from his clerical position through the transportation department, the shops and the power generating stations.

All this sounds natural enough in the line of progress, but not everybody grows, not everybody progresses. The advance of years has ripened his judgment and steeled his determination. Matt Boylan can decide things for himself. And having decided them he can see them through.

But to get back to Mr. Boylan's career with the railway. Things had been happening outside of the company while he was learning and earning, and the upshot of them was that the Jersey City & Bergen Railroad was absorbed by the Consolidated Traction Company and the latter leased to the North Jersey Street Railway. Some there are who would have seen their chances fade with a change of this kind, but to Mr. Boylan it meant greater opportunity with a greater corporation. It meant, too, that he had found himself. He had tried nearly all branches of railway work, and had come to the conclusion that his natural forte was figures. So in 1899 he became voucher clerk in the auditors office. After serving successively as bookkeeper, chief clerk and assistant auditor, he was in 1904 made general auditor of the Public Service Railway, which had acquired the North Jersey Street Railway the previous year. In 1910 he was elected first vice-president of the American Electric Railway Accountants' Association and in 1912 was made secretary-treasurer of the association. In 1916 he become president of the Accountants, serving through 1919.

Mr. Boylan's accession to the managerial staff is a natural one. He knows the company, he knows the men in the service, he knows the public with which the company deals, he is popular personally all over the territory served by the company, his training in accounting has taught him care and he will bring to the problems now before the railway a new and detached point of view.

Mr. Baurhenn, who becomes general superintendent, was formerly assistant general superintendent. Before that he was superintendent of the Bergen division. He joined the Public Service Railway when the company took over the New Jersey & Hudson River Railway & Ferry Company from Ford, Bacon & Davis.

The other men included in the changes have all been connected with the company for considerable periods. Mr. Bolen's term of service dates back to 1903. Before that he had been a division superintendent with the Brooklyn Rapid Transit Company. Mr. Donecker went to the Public Service Railway in 1913 from the post of secretary of the American Electric Rail-

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way Association. He has been engaged in street railway work since 1890, both in the operating and manufacturing ends.

Mr. Gaboury Appointed to Safety League

Arthur Gaboury, formerly superintendent of the Montreal Tramways, has been appointed general manager and secretary of the Province of Quebec Safety League. The appointment was announced following the meeting of the executive committee of that organization, held recently under the chairmanship of Zephirin Hebert, president. In appointing him, Mr. Hebert said that Mr. Gaboury had had considerable experience in connection with the safety movement in Montreal and that he considered Mr. Gaboury's selection a very fortunate one.

Mr. Gaboury has been identified with the Montreal Street Railway since 1894, and has been a prominent figure in the railway field ever since. Early in the current year he resigned as superintendent to become vice-president and managing director of the American Druggists Syndicate, Ltd., of Canada. Besides his railway affiliations Mr. Gaboury has given his services for the advancement of French activities, which in 1918 received public recognition from the French government in the form of a title of Officer of the Academy.

Bert C. Wood, for the past five years chief claim agent of the Youngstown Municipal Railway, has recently been appointed general claim agent of the Pennsylvania-Ohio Electric Company and the Youngstown Municipal Railway, Youngstown, Ohio. Mr. Wood has been connected with the above companies for the past fifteen years and previous to that time with the Youngstown Sheet & Tube Company.

F. A. Clark is back again as superintendent of power of the City Light & Traction Company, Sedalia, Mo. As was announced recently in the ELECTRIC RAILWAY JOURNAL he was transferred to Washington, Pa., to become a member of the organization which is constructing the new gas plant there. He chose, however, to return to Sedalia.

Matthew C. Carswell, with a record of almost fifty years service, recently resigned from the Interborough Rapid Transit Company, New York, N. Y. He held the position of master carpenter. Since he joined the elevated railway system on June 1, 1878, up to September of this year he served under four general managers, four chief engineers, two engineers maintenance of way and three master carpenters. In 1882 he became foreman carpenter, assistant master carpenter in 1904 and master carpenter in 1908. At a dinner in his honor on the evening of Oct. 17 Mr. Carswell was presented with a traveling bag which it was said "was too small to hold even a part of the affection and esteem his associates had for him."

W. F. Graves Leaves Montreal

He Was Chief Engineer of the Montreal Tramways for More than Nine Years

Willard F. Graves, whose resignation after nine years service as chief engineer of the Montreal Tramways was previously noted in the ELECTRIC RAILWAY JOURNAL, began his electric railway career as assistant engineer of construction on the South Side Elevated Railway in Chicago, now a part of the Chicago Elevated Railways System. With that company he had charge of the very extensive reconstruction work involved in building a third or express track from Twelfth Street to Forty-third Street, which included grade, line and station, revision of the old structure, as well as the new track. During the progress of this work the very heavy regular train service was handled by means of temporary tracks and structures.

W. F. Graves

After that work had been finished Mr. Graves was engaged as superintendent of track, in the reconstruction and maintenance of the tracks of the Chicago City Railway under the 1907 ordinances. During the three years of rehabilitation, as specified in the ordinances, practically the entire track system of 300 miles was rebuilt. This work necessitated at times the employment and organization of between 3,000 and 4,000 men.

From this position he was appointed chief engineer of the Montreal Tramways and engaged in the extensive reconstruction of this property, involving the addition and extension of power houses, substations, tracks, etc., including an extensive system of underground high tension conduits.

While acting as chief engineer of the Montreal property Mr. Graves was engaged to make a track valuation of the Detroit United Railway, and subsequently of the Halifax Tramways & Power Company, Halifax, N. S., and the Quebec Railway, Light, Heat & Power Company, Quebec.

He has been interested for many years in the activities of the American Electric Railway Engineering Association, as a member of the committee on way matters, acting as its chairman during the years 1921-1922 and 1922-1923, and representing the association on several sectional committees of the American Engineering Standards Committee. He is an associate member of the American Society of Civil Engineers, member of the American Railway Engineering Association, Engineering Institute of Canada and the executive committee of the committee on welded rail joints.

Hector Poli has been appointed master carpenter of the elevated lines of the Interborough Rapid Transit Company, New York, N. Y. In this capacity he succeeds Matthew C. Carswell, who resigned recently with a record of approximately fifty years. Mr. Poli entered the employ of the company in 1910 and was promoted to shop foreman in 1913. In 1922 he was made general foreman and became master carpenter on Oct. 1, 1923. In thirteen years he has risen from carpenter to master carpenter.

Obituary

Richard Hapgood

Richard Hapgood, one of the oldest street railway men in the United States in point of service, died recently at his home in Belmont, Mass. He retired in September, 1912, as roadmaster of the Boston Elevated Railway after sixty-four years service. He went to work in 1858 as stableman for the old Union Railway, the original horse car line between Cambridge and Boston. By 1872 he had risen to the position of superintendent of the road, which he held until 1855, when he resigned. A short time later Mr. Hapgood became roadmaster for the Consolidated Street Railway in Boston and later superintendent of the South Boston Railroad. When the latter merged with the West End Street Railway, he remained as superintendent of the South Boston division and was later made superintendent of the Cambridge division. In 1892 Mr. Hapgood became roadmaster of the West End Street Railway and remained in that position when the road was merged with the Boston Elevated Railway.

Henry Pearson, vice-president of the Wason Manufacturing Company, car builders, of Springfield, Mass., died suddenly of heart disease in the car shops Nov. 27 at the age of seventy-one years. Mr. Pearson went to the Wason Manufacturing Company from the Harris-Corliss Engine Works in Providence, R. I., in 1881 to take charge of the machine department. He rose to vice-president and general manager and then to president, holding that office four years, up to 1910, when the plant was taken over by the J. G. Brill Company.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

November Good Month in Copper Market

The copper market came to life during November and more of the metal was sold than for many months. Supplies were adequate to meet the demand, however, though at gradually advancing prices, about 13½ cents being asked at the end of the buying movement. Since then a recession has taken place, and at the end of the month the metal was obtainable at about 13 cents per lb. With the large production now being made in the United States, South America and Africa there seems to be little likelihood of any marked advance in prices, European financial conditions not being such that that continent can buy the copper in the large quantities that it might absorb. On the other hand, prices are now so low that many companies are doing little better than breaking even, so any further important decline may hardly be expected.

Look to the League for Business Hints

Edwin S. Webster, of Stone & Webster, who has just returned from a visit to the League of Nations headquarters, says that he was very much impressed by the amount of information possessed by the league regarding conditions in every country in the world. If one were going into business in any out-of-the-way country he would recommend getting in touch with the league to find out what that body had in the way of information.

Mr. Webster said that one could get accurate information which never before had been made available on almost any country on earth. This is probably a phase of the League of Nations on which many business men generally have not heretofore been well informed.

Winnipeg Property Protects Road at Crossings

The Winnipeg Electric Railway, Winnipeg, Man., has placed orders with the Union Switch & Signal Company for the necessary materials to protect its road against steam trains at four crossings: Notre Dame Avenue, where two of the crossings are involved, one where the Canadian Pacific crosses and the other where both the Midland and Canadian Pacific cross; Academy Road, where two crossings are protected, one crossed by the Midland and Canadian Pacific Railway, and the other by the Canadian National Railway. Light signals, with automatic control, are employed for this protection in all cases except on the Canadian Pacific Railway at Notre Dame Avenue, where automatics are now in service and style "S" semaphore signals will be used. The field installation will be made by the company's regular forces.

Bituminous Coal Production Increases

The output of bituminous coal in October totaled 49,171,000 tons, as compared with 46,175,000 in September and 45,173,000 for October, 1922. The production of anthracite aggregated 8,724,000 tons, as against 2,917,000 in September and 8,578,000 in October a year ago.

General Electric Buys New Property

The General Electric Company has purchased at Los Angeles, Cal., 5 acres of property on which is now located a two-story reinforced concrete building. This will immediately be modified and converted into a fully equipped service shop in which all kinds of electrical apparatus will be rebuilt and repaired. Later a large warehouse will be built on the property and eventually there will probably be a factory.

Japanese Interests and Westinghouse Combine

An arrangement has been made between the Westinghouse Electric International Company and Japanese electrical interests. The new company is known as the Mitsubishi Denki Kabushiki Kaisha, or, in English, the Mitsubishi Electric Manufacturing Company. It is thought that the capitalization will be 15,000,000 yen, or $7,500,000, although definite word on this point has not yet been received.

As a result of progress during recent years Japanese electrical development, including railroad electrification, the utilization of water power, the installation of large steam generating plants and the formation of superpower systems, compares favorably today with that in the United States.

As a consequence of this rapid development, electrical apparatus has become one of Japan's largest imports, and since Japan's principal exports, silk, copper and objects of art, can hardly be expanded by a corresponding degree, it was thought that there was some danger of a continuing unfavorable balance of trade. Hence it seemed wise to certain Japanese interests to stimulate the manufacture of electrical machinery and supplies in Japan.

In pursuance of this policy, the Mitsubishi interests, which are engaged in banking, shipbuilding and steel making, approached the Westinghouse company with a proposal for a co-operative agreement whereby the company was to supply technical skill and experience to a Japanese manufacturing company.

ELECTRIC RAILWAY MATERIAL PRICES—NOV. 27, 1923

Metals—New York

Copper, electrolytic, cents per lb.	13.05
Lead, cents per lb.	6.90
Nickel, cents per lb.	29.50
Zinc, cents per lb.	6.75
Tin, Straits, cents per lb	46.75
Aluminum, 98 to 99 per cent, cents per lb.	25.50
Babbitt metal, warehouse, cents per lb.:	
Fair grade	52.00
Commercial	25.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$4.65
Somerset mine run, Boston	2.375
Pittsburgh mine run, Pittsburgh	2.00
Franklin, Ill., screenings, Chicago	1.45
Central, Ill., screenings, Chicago	1.05
Kansas screenings, Kansas City	2.00

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	3.15
Tie plates (flat type), cents per lb.	2.575
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.125
Steel bars, cents per lb.	2.40
Ties, white oak, Chicago, 6 in.x8 in.x8½ ft.	$1.30

Hardware—Pittsburgh

Wire nails, base per keg	3.00
Sheet iron (28 gage), cents per lb.	3.75
Sheet iron, galvanized (28 gage), cents per lb.	4.85
Galvanized barbed wire, cents per lb.	3.80
Galvanized wire, ordinary, cents per lb.	3.35

Waste—New York

Waste, wool, cents per lb.	15–18
Waste, cotton (100 lb. bale), cents per lb.:	
White	13–15.50
Colored	10–15

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal.	$0.93
White lead (100 lb. keg), cents per lb.	11.375
Turpentine (bbl. lots), per gal.	$0.93
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4–6

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	15.75
Rubber-covered wire, No. 14, per 1,000 ft.	$6.50
Weatherproof wire base, cents per lb.	16.50

Paving Materials

Paving stone, granite, 4x8x4, f.o.b. Chicago, dressed, per sq.yd.	$3.60
Common, per sq.yd.	3.20
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.79
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	54.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.75
Cement, Chicago consumers' net prices, without bags	2.20
Gravel, ¾-in., cu.yd., f. o. b. N. Y.	1.75
Sand, cu.yd., N. Y.	1.25

Old Metals—New York and Chicago

Heavy copper, cents per lb.	10.75
Light copper, cents per lb.	9.25
Heavy brass, cents per lb.	6.00
Zinc, old scrap, cents per lb.	4.125
Yellow brass, cents per lb. (heavy)	5.75
Lead, cents per lb (heavy)	6.00
Steel car axles, Chicago, net ton	$16.75
Old car wheels, Chicago, gross ton	18.75
Rails (short), Chicago, gross ton	19.75
Rails, (relaying), Chicago, gross ton	33.50
Machine turnings, Chicago, net ton	6.25

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Rolling Stock

Michigan United Railways, Jackson, Mich., has sent out inquiries for bids on the construction of six new parlor chair cars which are to be arranged as complete units equipped with baggage and smoking compartments.

Birmingham Railway, Light & Power Company, Birmingham, Ala., has recently purchased four Reo buses to be delivered late in December. They will operate in sections formerly served by the jitneys.

Department of Street Railways, Detroit, recently placed an order for 100 cars. The original order for fifty Peter Witt type cars from the McGuire-Cummings Company was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 17. This order was later increased to 100 cars and fifty were to be built by the Osgood-Bradley Car Company. This explains the status of the car situation in Detroit which was mentioned in the Nov. 17 and Nov. 24 issues of the paper. The train of three cars which is being built by the Cincinnati Car Company will be delivered about Jan. 1, 1924. This train may be operated by one motorman and three conductors or may be operated by one motorman and one conductor. The one conductor will stand in the middle car, which will be used as an entrance car, and the two end cars will be used as exit cars, there being a passageway between the cars.

Track and Line

Charleston Consolidated Railway Gas & Electric Company, Charleston, S. C., is replacing the double track on King Street with a single-line track.

Grand River Valley Railway, Grand Junction, Col., will build a 3½-mile beet spur into the irrigated country north and west of Fruita, its present terminus. Ultimately the spur will be extended to approximately 12 miles.

Duluth Street Railway is planning to complete the extension to Kenwood next year. This line will be built to St. Marie Street some time next spring. General Manager Warren said that active work would be started as soon as the weather would permit.

United Traction Company, Albany, N. Y., will consider with city officials the proposition of improving Western Avenue from Manning Boulevard west to the Albany city line. It is planned to have the United Traction Company's track on the south side of Western Avenue west of the Manning Boulevard, removed to the center 33-ft. strip of the thoroughfare. The city will then improve the south side of the avenue, lay a new concrete pavement to correspond with the one on the north side and build new sidewalks. It is believed that the United Traction Company will deed to the city the land which is now unused and which constitutes the middle 33 feet of the avenue. If this happens the city will pay all, or a part of the cost of relaying the track.

Springfield, Mass.—The joint committee of Springfield and West Springfield, Mass., on a new bridge across the Connecticut River to replace the bridge burned last September has agreed upon plans for an open-deck steel bridge to cost $873,000, the structure to be 1,135 ft. long and 70 ft. wide, with 54-ft. roadway and 8-ft. sidewalk on each side. Estimates call for $56,000 for electric railway tracks, including metal to carry the wheel base, of which sum $25,000 is to be assessed on the Springfield Street Railway, this expenditure being in addition to the $873,000. A verbal agreement has been made between the street railway company and the city, by which the company would pay the city an annual rental estimated to amount to $1,500 yearly, payments being computed on the same basis as in the case of the Hampden County Memorial Bridge.

Mississippi Valley Electric Company, Iowa City, Iowa, is adding a short stretch of additional track to the Dodge Street line. The work will cost approximately $3,500.

Cincinnati, Ohio.—Extension of Cincinnati's rapid transit loop 4 miles was decided on at a recent meeting of the Board of Rapid Transit Commissioners, when a resolution was adopted to appropriate the property lying between Mitchell and Section Avenues, Norwood. Under the revised plans, the loop will terminate in Oakley, instead of in Avondale. The extension will follow the bed of the old canal and then proceed to Oakley by way of St. Bernard, Carthage and Norwood. Most of the work will be open construction, Frank Raschig, rapid transit engineer, announced, except where the route of the subway intersects railroads or streets. No additional bond issue is necessary for this phase of the work. The commission definitely stated that the money on hand would enable it to construct the subway as far as Oakley.

Power Houses, Shops and Buildings

Jamestown, N. Y.—Owing to the fact that cars of the Jamestown Street Railway, Chautauqua Traction Company and the Jamestown, Westfield & Northwestern Railway are now running entirely on Niagara power the old power house at Jamestown having been dismantled. The equipment to be sold includes nine boilers, four turbines, pumps, condensers, switchboards and other auxiliary machinery.

United Railways, St. Louis has recently added a new bay to the car-building department of the general shops. The addition is constructed along the most modern lines, having steel framing and brick walls, and is made fireproof by the installation of the best fire doors. The new bay has a capacity for holding twenty-four cars while under construction. Situated between the car-building shop and the truck and blacksmith shops is the transfer table. This device is operated when transferring cars from department to department while they are in various stages of construction.

Puget Sound Power & Light Company, Seattle, Wash., announces that tentative plans are under way for a terminal at the corner of Elk and Magnolia Streets in Bellingham to cost $200,000. The terminal is to serve the company's traction trains and stage lines terminating in Bellingham. The proposed structure will be three stories high, with full basement, 150x125 ft.

Trade Notes

The Texas Company, New York, N. Y., producers of Texaco Petroleum Products, has just renewed a contract for the supply of lubricants to the Boston Elevated Railway, Boston. This is the third consecutive year that the Texas Company has obtained this business, one of the largest electric railway lubrication contracts of the country.

Conveyors Corporation of America, Chicago, announces that Jay C. Lathrop, its Cincinnati district representative, has removed his office to 503 Neave Building, Cincinnati.

General Electric Company, Schenectady, N. Y., has appointed L. R. Brown manager of the transformer division of the new central station department. He was one of the company's first transformer specialists and has a wide personal acquaintance in the central station industry. In connection with the reorganization following this and other changes in the central station department, G. G. Jeter, H. F. McRell and Clinton Jones are to be sales managers in this division. Mr. Jeter will have charge of transformer accessories, advertising and publicity; Mr. Jones will have supervision of power transformers, and Mr. McRell, distribution transformers.

New Advertising Literature

The Johns-Pratt Company, Hartford, Conn., has issued the second edition booklet of the Noark universal service switches.

International Western Electric Company, New York, N. Y., has issued the latest edition of "Electrical Communication." It is a 150-page booklet containing such articles as Telephone Transmission Over Long Distances, Recent Developments in Telephone Equipment for Train Dispatching Circuit, Telephone Traffic Control for Tramways and other instructive reviews.

MacGovern & Company, Inc., New York, N. Y., has issued a twenty-four-page booklet dated November, 1923, and entitled "Power Machinery—Electrical, Hydraulic, Steam, Gas."

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New York, Saturday, December 8, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 23

The Editorial of the Day

"A PLAN (for the reduction of taxes) has been presented in detail in a statement by the Secretary of the Treasury which has my unqualified approval. . . . Diminishing charges against moderate incomes from investment will afford immense relief, while a revision of the surtaxes will not only provide additional money for capital investment, thus stimulating industry and employing more labor, but will not greatly reduce the revenue from that source, and may in the future actually increase it.

"Being opposed to war taxes in time of peace, I am not in favor of excess-profits taxes. A very great service could be rendered through immediate enactment of legislation relieving the people of some of the burden of taxation. . . .

"The taxes of the nation must be reduced as much as prudence will permit, and expenditures must be reduced accordingly. High taxes reach everywhere and burden everybody. They bear most heavily upon the poor. They diminish industry and commerce. They make agriculture unprofitable. They are a charge on every necessary of life. Of all services which Congress can render to the country, I have no hesitation in declaring this one to be paramount. To neglect it, to postpone it, to obstruct it by unsound proposals, is to become unworthy of public confidence and untrue to public trust. The country wants this measure to have the right of way over all others.

"Another reform which is urgent in our fiscal system is the abolition of the right to issue tax-exempt securities. The existing system not only permits a large amount of the wealth of the nation to escape its just burden but acts as a continual stimulant to municipal extravagance. This should be prohibited by constitutional amendment. All the wealth of the nation ought to contribute its fair share to the expenses of the nation."—THE PRESIDENT.

Shall we not actively support this program?

Valuation Differences in Terms of Fares or Economies

IT FREQUENTLY occurs that municipal authorities and railway officials are unable to agree on a valuation of the property for rate-making purposes, and all progress of a managerial nature is blocked pending settlement. The question is raised whether this failure to come to a settlement figure is not often quite unjustified in the light of what the difference would mean in terms of increased rate of fare, from the standpoint of the city, or as measured in terms of economies or better earnings that may be held in abeyance, from the standpoint of the company.

For example, in one city recently the company held out persistently for a value about $1,500,000 higher than the city would concede, the city's figure being about $6,500,000 total. Yet with this mooted valuation settled, the company would be in a position to make operating improvements, as recommended by an outside expert, resulting in more than $500,000 increase in the net, annually. This increase alone would carry at 7 per cent a capitalization of $7,000,000—as much as the entire value of the property. Under such circumstances, a million or so difference between the value asked and the value obtainable would hardly seem worthy of being permitted to delay the possible improvements.

Similarly, the importance of the controversial difference dwindles in many cases when translated into the rate of fare required to support the higher figure of value. A difference which in itself seems like a huge sum may make a fraction of a cent too small for cognizance in the rate of fare especially on a large system—an amount which might easily be wiped out (or doubled) in a year of good (or bad) operation.

This paper is strongly of the opinion that if about 25 per cent of what is spent on valuation studies and litigation were spent instead in operating studies, the industry would make much more rapid progress. What is needed is more talent directed to transportation efficiency, and greater use of the yardstick method and common sense valuation procedure.

Are Improved Transportation Conditions Approaching in New York?

IF THE early future is to see a greater spirit of co-operation toward the New York City traction properties by the present city administration it will be welcome news for every one, particularly the traveling public. That such a condition is among the possibilities is indicated by recent remarks of acting Mayor Hulbert to the effect that the City Board of Estimate is now "working with the Transit Commission in harmonious co-operation for some real results in the way of a solution of the traffic problem." After all, results are what count in the long run in political as well as in business circles. Ability to scold may bring popularity for a time, but even picturesque invective gets monotonous. Unless a politician can get the people what they want his power is sure to wane.

Just at present the people of New York need more and better transportation more than almost anything else, and the only way it can be had to any material degree is through the existing transportation companies. It is wonderful what they have been able to do in the circumstances, but it is obvious that with fewer obstructions and better credit they could accomplish much more. Not all of the difficulties have come, of course, from the city government, but with that sympathetic and anxious

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to help, a better condition is certainly possible. New subways are needed, but while these are in the building it is practicable to increase the present transportation facilities, both rapid transit and surface. With the Brooklyn system reorganized and the reorganization of the New York Railways nearing completion, all of the companies are in a position to do their share in supplying the public need.

Of course the question of return is fundamental. Without an adequate fare all the companies will be greatly handicapped. Nevertheless it should be remembered that while the carfare in New York nominally is 5 cents, virtually it is more than this on both surface and rapid transit lines. On the rapid transit lines passengers get benefit from the fact that no interest is being paid on the city investment under the dual contract, while on the surface lines the average length of ride for a single fare has been reduced by the dissolution of holding companies and the consequent charge of an extra fare, and also by the 2-cent transfer charge. It should also be remembered that the surface lines do not have to carry the long distance riders, as in most other cities, as these go to the rapid transit lines. Perhaps the greatest handicap of the surface lines is slow speed, caused by street congestion, because their average receipts per car-mile compare favorably in amount with those of surface lines in other cities. Here is one way in which the city can help through the passage of more stringent anti-parking ordinances.

If the time has come when the New York City fathers are beginning to realize that a constructive transportation policy is good politics, the public has much to be thankful for.

A Billion Passengers on the Buses

REFERRING to an editorial in last week's issue of this paper, several readers have promptly called attention to the fact that to say buses in 1922 carried only 11,000,000 passengers was wrong—and it was. The figure quoted from the compilation of the Census Bureau was for passengers carried by buses operated by electric railways only—a qualification which was not noted. For all buses, it is probable, based on rough estimates, as no accurate figures are compiled, that the total passengers carried in 1923 will be up toward a billion —something less than 8 per cent of the number of revenue passengers carried on the electric railways of the country during the twelve months ended June 30, 1922.

While this is very different from the obviously erroneous figure used last week, nevertheless, by correcting figures all the way through, the editorial might still be permitted to stand. Its object was to point out the relatively very much greater importance of the electric railway to the public than the bus. The correct figures still show this, though they give to the bus industry a far better position of importance.

It was not the desire of this paper to belittle the bus, for readers know how the JOURNAL has urged its use in its place by the electric railways. But it was thought worth while to show the relative positions of bus and railway. The bus, being new and introducing many new problems and much speculation as to the future of transportation, is really talked of and read of, rather naturally, out of proportion to its present importance as measured by the traffic handled.

Customer Ownership of Utility Securities—From the Customer's Standpoint

THE advantages of customer ownership of utility securities—from the utility standpoint—have been set forth at various utility conventions during the last few years. Naturally, they present the subject from the standpoint of the utility, particularly the improved public relations which it is hoped will be secured by the plan. The position is put forth that if a man—or woman—becomes a security holder in the local utility, the latter thereby obtains a friend, whose sympathy can be counted upon and whose self-interest will encourage him to defend the company against unreasonable demands and unjust attacks. Broadly speaking, this is the main argument put forward for the plan from the utility side. It is interesting to read in the last issue of *The Magazine of Wall Street* an article which brings out other phases of the subject, particularly from the customer's point of view. This perhaps is a phase not often considered.

The magazine article expresses approval of the plan, where the utility is fundamentally a sound one and the stock is worth the amount charged for it. In the first place, it gives opportunity to the local investor to put limited sums in high grade securities of a concern in his home town where he can watch his money, at least to some extent. In this way it will help to counteract the fake-security salesman, educate the community up to the exercise of judgment in the investment field and thus be of constructive benefit to the country as a whole. Referring to this advantage, the paper says: "If consumer financing had nothing whatever to commend it beyond the single capacity toward interesting the general public in high grade, rather than low grade securities, this feature alone would more than justify it and seal it with the stamp of universal approval."

The magazine points out, however, that customer financing doubles the company's responsibility to its customers. It is responsible to them not only for service, but becomes, in effect, a trustee of their invested funds. This emphasizes the need of keeping faith with the customer security holder, giving him a voice in the company councils and letting him know from time to time the exact financial condition of the company. The fact that by his dividends he can pay in whole or in part for his service does not discharge all of the debt which the company owes to the customer who purchases its stock. He could do that by investing the same amount of money in any responsible concern, paying equal dividends.

This trustee responsibility rests upon any company which actively exploits its securities, especially toward those who may be induced to become purchasers to an extent out of proportion to their means. Such holders are in a different position than business men who are accustomed to occasional losses, and the utility must guard very zealously its ability always to pay the promised dividends, lest there come a kind of public relations not sought.

When the principles recommended by D. L. Turner, page 963, for financing rapid transit are accepted, we may look for much needed new construction. His allotment of the cost would be fair and not burdensome to any one, in the light of the return on the individual investment, and it would enable such service to pay its own way on a fare comparable with street railway fares.

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Proposed Plan for Financing Detroit Rapid Transit Lines

Engineer's Report Favors Assessment of Construction Costs Against Taxpayers and Benefited Property Owners—Equipment Cost Only, or One-third of the Total, to Be Financed by Bond Issue—Combination Tunnel and Subway Proposed—Piecemeal Construction of Rapid Transit Has Serious Drawbacks

A NOVEL plan for financing new rapid transit lines is the outstanding feature of the report to the Rapid Transit Commission of Detroit by Daniel L. Turner, consulting engineer, and John P. Hallihan, engineer in charge. The report, whose legal features have the approval of P. J. M. Hally, special counsel for the commission, has been transmitted to Mayor Frank E. Doremus for his consideration.

According to the commission's letter of transmittal, the report proposes a pay-as-you-go plan that spreads the cost by assessment over the benefited property and the city at large, leaving only the equipment, which is about 32 per cent of the total investment, to be provided by a bond issue. In this way a large amount of interest will be saved, and the use of bonds based upon the faith and credit of the city will be practically eliminated.

No detailed plan of routes has been presented in the report of the engineers, as they state the location of lines will depend to a considerable extent on the choice of system, which in turn will be determined by the amount of money the city is willing to make available. A combination of subway and tunnel, termed a "tunnelway" by the engineers, is recommended as the most desirable construction if the city is willing to pay the price. A short abstract of the report follows:

A New Method of Financing Essential on Account of Cost

The cost of the proposed rapid transit system for Detroit is such as to indicate at the outset that the city must find some new method of financing a rapid transit program, otherwise it will be impracticable to go forward with it. Under the circumstances, therefore, it is essential that a financial plan should be evolved before a physical plan is announced. A plan of routes can serve no useful purpose, if the money to carry it out cannot be available. In fact, making public such a plan would cause a premature speculation in real estate along the proposed routes with no justification for it whatever.

The routes of the initial rapid transit system for Detroit are dependent, to some extent, upon the type of structure. An underground system may be constructed along any street without injuring it. Elevated lines should be confined to the outlying sections of the city, but if such construction must be carried through the business center, the principal thoroughfares should be avoided and less important streets traversed.

Developing rapid transit piecemeal is very objectionable from the community standpoint. A comprehensive system of rapid transit lines is essential. There should be crosstown lines and up and down town lines articulated together by transfer stations so as to provide for a convenient circulation and distribution of the traffic throughout the city, thus furnishing a large part of the city with a measure of rapid transit service at the outset, and thereby maintaining the equilibrium of the population distribution.

The building of a single rapid transit line at first, and then another single line, and so on, until finally a rapid transit system is produced, completely upsets the population equilibrium. The first line built acts as a magnet to the population and to business. Congestion of all kinds is produced and the line itself quickly becomes saturated with traffic. This causes an immediate demand for relief along the first line before new lines in new territory can be constructed. Traffic conditions then become so unbalanced at the start that it is difficult ever to catch up.

The initial rapid transit system must be constructed of either subways, tunnels or elevated lines, or a combination of them. Because it must traverse built-up sections of the city, other types, such as surface and depressed lines, cannot be utilized on account of the lack of a suitable right-of-way.

Subways are most popular with the public, as they do not disfigure the streets nor interfere with light, air and access to abutting property, are not open to the weather, and are conveniently accessible to passengers. Because they are shallow underground lines they cannot be constructed without taking up the street surface and rearranging the subsurface structures. Their chief disadvantage is their high cost of construction when compared with elevated lines.

Ordinarily, land tunnels must be located deep enough underground to permit their construction without disturbing the street surface, and stations are not conveniently accessible. Deep level lines have been employed chiefly in London, where the clay underlying the city is most favorable to their construction.

Except for the inaccessibility of the stations, tunnels have all the advantages of subways. If tunnel lines can be constructed as cheaply as subways and have their stations brought to the surface, there can be no difference of opinion as to their desirability, as the tunnel can be constructed with a minimum of interference with streets and with business.

Subsoil conditions in Detroit are almost ideal for tunneling, and the so-called Detroit clay permits a very low cost of construction. A type of underground line can be built that would include the desirable features of both tunnel and subway. This is the construction termed by the engineers a "tunnelway."

Tunnelways will be constructed just below the surface only at the stations, and the streets will be excavated up to the streets at such points. Between stations they will be constructed in tunnels, one for each track. This

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means that interference with business during the construction period will be reduced to about 30 per cent of what it would be if a subway were built. The stations will be located at the summits of the profile, so that the trains will have the assistance of the grades in starting and stopping.

At present prices of labor and material it would not be possible to construct and operate a tunnelway system at anything like a 5-cent fare. In this connection it should be pointed out that in New York 61 per cent of the entire rapid-transit system is elevated, or some 125 miles out of 200. Even the so-called subway division of the Interborough Rapid Transit Company—a city-owned subway system—includes elevated lines to the extent of 40 per cent, and the total city-owned systems in New York have 39 per cent of all lines elevated.

In Chicago there are no subway lines. In Philadelphia the entire existing rapid-transit system consists of less than 14 miles of line, and about 85 per cent of this is elevated. In Boston the rapid-transit system, as now operated, is about 16 miles long, and 63 per cent of it is elevated.

To obtain a cheap fare, when the rider must pay the entire cost, a cheap system is necessary. To have a tunnelway system supported by the car rider a 10-cent fare, or more, would be necessary for a number of years.

Tunnelways Cost About One-Third More than Elevated

Until the financial plan has been decided upon and the extent of the system determined, only costs per mile of route can be given. Detroit must pay the cost of both the construction and the equipment of the system. Such costs at present prices are approximately, for an elevated system, $3,500,000 per mile, and for a tunnelway system, $4,700,000 per mile, including all overhead charges.

The tunnelway system consists exclusively of tunnelway lines. The elevated system is mostly elevated, but includes a minimum amount of tunnelway line through the business center. Detroit can have a tunnelway system, says the report, if it wants to pay the price. Otherwise it must accept an elevated system, with all the disadvantages that such a system means to a city.

Rapid Transit Should Be Financed Under an Assessment Plan

The rapid transit cost should be divided and distributed according to the three benefits derived:

The general benefit to the city at large;

The special benefit that accrues to the property in the vicinity of the lines; and

The obvious benefit to the rider.

Based upon an analysis of the financial condition of the city by the Detroit Bureau of Governmental Research, and from other information available, it is doubtful if the city can now issue bonds in excess of $30,000,000 for all purposes, states the report. Because of the city's many needs only a very small part of this amount can be used for rapid transit purposes. Consequently, it is very plain that on the basis of the usual plan of utilizing city credit the city is in no position to embark on a rapid transit program requiring the expenditure of any substantial sum that a reasonably adequate rapid transit system would make necessary, even if the cheapest type of construction is adopted. The city cannot turn to private capital for assistance. This would require a reversal of the existing public policy and would make it difficult to unify the old system and the new.

All the money for construction must be available for use as required during the construction period. Any financial plan to be effective must accomplish this. The total rapid transit cost of one mile of tunnelway should be distributed in accordance with the foregoing benefits as follows:

	Cost per Mile of Double-Track Tunnelway	Per Cent of Total
By at-large assessment on the city, to cover benefits derived by the city at large, for one-fourth of the permanent way cost...	$800,000	17
By proximity assessment on the local district, to cover benefits that accrue to the property in the vicinity of the lines, for three-fourths of the permanent way cost.	2,400,000	51
By mortgage bonds, to cover the benefits to the rider, for cost of the equipment...	1,500,000	32
Total	$4,700,000	100

The permanent way consists of the structure, tracks and stations. The equipment consists of the power stations, transmission, signals, yards, shops and cars.

For the combination of tunnelway and elevated line, the city and benefited property owners would pay for permanent way and real estate $2,000,000 per mile, or 57 per cent of the total, while the amount raised by mortgage bonds for equipment would remain $1,500,000, or 43 per cent of the total cost.

Assessment Plan Is Now Used for Other Municipal Projects

There is nothing new in the principle of such an assessment plan. The city and benefited property pay for the streets by assessment. The sewers are paid for in the same way. In other places property benefited is also assessed to pay for the parks. And under the Ohio conservancy law the cost for works to prevent flood damages is assessed against the property protected. Assessment to pay for rapid transit does not differ in principle from any of these.

Financing a rapid transit system in this way will mean the adoption of a pay-as-you-go policy, or mean that the present generation will pay for the rapid transit facilities required now. This is as it should be. Future generations will have their rapid transit facilities to pay for in their time. Therefore as little of the cost as is possible should be passed on to the future.

The at-large assessment of the city is to be spread over the total assessed valuation of the city, including land, buildings and personal property, for one-fourth of the cost of constructing the permanent way, or for about 17 per cent of the total cost of the tunnelway, including construction and equipment. There will be no interest or sinking fund charges upon these assessment funds, because they have not been borrowed and therefore will not have to be paid back.

The assessment is to be collected in annual installments distributed equally over the seven-year construction period, and for the tunnelway system, per mile of route per year, will amount to about $114,300.

The at-large assessment for a tunnelway project would be only about 4.73 cents per $1,000 of total assessed valuation per year per mile of route, based on the 1923 valuation of Detroit and the inclosed and contiguous areas benefited, including Highland Park, Hamtramck and Springwells. For 10 miles of route the

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amount would be 47.3 cents per $1,000, and even for 50 miles of route the assessment would only be $2.37 per $1,000 per year.

This assessment is just like any other taxation, excepting that none of the funds raised by it will be used to pay interest on borrowed money, but instead, all of the funds will be converted directly into a self-supporting asset—in other words, into the city's rapid transit system, that in turn will immediately proceed to enhance the value of the property assessed.

The above figures do not include interest during construction on the permanent way cost, because under the assessment plan no money is borrowed for this purpose. If all the money for the project is raised in the usual way by bond borrowings, then these figures will be increased by $200,000 and $100,000 per mile, respectively. In other words the permanent way item of cost will be $3,400,000 per mile of two-track line instead of $3,200,000 for the tunnelway project, and $2,100,000 per mile instead of $2,000,000 for the combined project.

The proximity assessment on the local district is to be spread over the local districts traversed by the rapid transit lines for approximately one-half mile on each side of the lines. The assessment is to be made on the land value only in proportion to the benefits derived, and for three-fourths of the construction cost of the permanent way, or about one-half of the total cost of the project, including construction and equipment. This assessment also is to be collected in seven annual installments corresponding to the seven years of construction, and for the tunnelway system, per mile of route per year, will amount to about $343,000.

Not all the land will be benefited alike. The benefit at the stations and along the line will be greatest. It will decrease from this maximum to a minimum at about a half-mile distance from the line on each side. Therefore, the assessments will vary in a corresponding manner with respect to the proximity of the land to the stations and line. To simplify its application the assessment will be distributed over six zones at annual rates per square foot on the land only. The same relative rates will be applied at every station, whether it is located in the center of the city or on the outskirts of the city. The assessment rates are as follows:

Approximate Zone Limits from Stations in Feet	Annual Proximity Assessment Rates, Cents per Sq.Ft.
0-250	7
250-500	5
500-1,150	3.5
1,150-1,800	2.25
1,800-2,450	1.5
2,450-2,640	1

Consider as an example that the depth of the average lot is 120 ft. Assume that the lot is located at a station, thus coming in the 7-cent rate. Then the assessment would be $8.40 per front foot per year. If the lot were 100 ft. in depth, the assessment would be $7, and if it were 150 ft. deep, $10.50 per front foot per year. Again, assume the lot was located farthest away from the station, in the 1-cent zone, then the assessments would be $1, $1.20 and $1.50 per front foot per year for lots 100, 120 and 150 ft. deep respectively.

Just as in the case of the proposed assessment on the city at large, there will be no interest charges against local assessments. This money will not have to be paid back to any one. The funds will be immediately converted to the city's rapid transit system and begin at once still further to enhance the value of the property that has paid the assessment.

As illustrating the local benefits that result from furnishing rapid transit two cases were cited in the report that had been analyzed in detail by the New York City Club. As soon as the New York rapid transit program was announced and construction was begun the land started to increase in value.

Rapid Transit Greatly Enhances Property Values

In upper Manhattan, above One Hundred and Thirty-fifth Street, for a distance of about 4.4 miles the land affected rose from a total value of $47,306,000 in 1900, before the rapid transit line was constructed, to about $116,608,000 in 1907 after operation was under way. This represents an increase of 147 per cent during the seven-year period. It was estimated that the normal increase in values would have been about 43 per cent in the same time. The cost of constructing (not equipping) the rapid transit line traversing this district was only a little over $7,000,000, so the increase in values was about seven times the construction cost.

In the Bronx over a strip one-half mile wide each side of the line there was a similar total increase from an original value of $33,242,000 to about $78,047,000—an increase of about 134 per cent, as compared with a normal increase of about 40 per cent. This section of line cost some $5,700,000 to construct, so the enhancement here due to rapid transit was nearly five and one-half times the cost of the facility.

By means of rapid transit fund certificates, as an extension of payment for each of the seven annual proximity assessments, the landowner will be given the option of spreading each annual assessment in a number of payments over a period of years instead of paying the whole annual amount down at once, thereby making it easier for him to bear his share of the assessment.

The assessments of those who elect to make use of the rapid transit certificates will be combined into a single obligation and made the security for a district loan to be covered by series certificates of indebtedness, which will be marketed by the city in behalf of the property owners. Thus the city will at once realize on the annual assessment by transferring the combined obligations of such taxpayers to investors who will carry the load for a term extending beyond the annual payment period, thus permitting payment in smaller installments than are required by the immediate needs of the city.

This plan is an expedient to lighten the annual burden to the taxpayer, but it will cost him in the end more than if he paid the annual assessment in cash, by the amount of interest he will be required to pay in addition to the principal.

Mortgage bonds are to be issued covering the entire cost of the equipment and cars, or covering about one-third of the total cost of the project, including construction, equipment and cars. These mortgage bonds are to be authorized at the start and issued as needed. They represent the assessment against the rider for the benefits he is to derive from the rapid transit service.

The bonds, being borrowed money, will bear interest and sinking fund charges at the rate of 6 per cent. In this respect they differ from at-large and proximity assessments, which have no interest and sinking fund charges to bear. The interest charged on the bonds during the construction period is included in the amount of the bonds, but after operation begins interest and sinking fund charges are to be paid out of the operating revenues.

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In order that the financial plan may be accomplished and the rapid transit program carried out efficiently, the procedure should be as follows:

(a) The Legislature should be asked to amend the present law to permit the methods of assessment herein proposed.

(b) An amendment should also be enacted creating a rapid transit commission; setting up the machinery to guide and control its proceedings; and empowering it to obtain, hold and disburse all rapid transit funds.

(c) The people of Detroit should be offered an amendment to the charter adopting the law as enacted.

(d) Providing the charter amendment carries, the people of Detroit will then be asked to approve a plan of rapid transit routes.

Operating Aspects of Kansas City Safety Train*

One-Man, Two-Man Car, Three-Man Train Adds Greatly to Flexibility of Operation and Introduces Economies as Well as Providing Better Service —Company Enthusiastic About Results

THE safety train developed by the Kansas City Railway has now been in operation long enough to determine its advantages from both the service and economy standpoint. The company claims as the advantages for this one-man, two-man, three-man train that it provides economical base schedule operation, maximum rush-hour capacity, minimum traffic delay and congestion, improved distribution of car loading, great flexibility in operation, practical and satisfactory adjustment of the extra list and greatly improved service for the public, with substantial reduction in operating expense.

The mechanical features of the cars comprised in the safety train were covered in an article in the ELECTRIC RAILWAY JOURNAL for March 10, 1923, page 402. To summarize here, these cars embodied several new and original features, as follows:

1. The pioneer use of complete safety devices on double-truck cars with multiple-unit control.

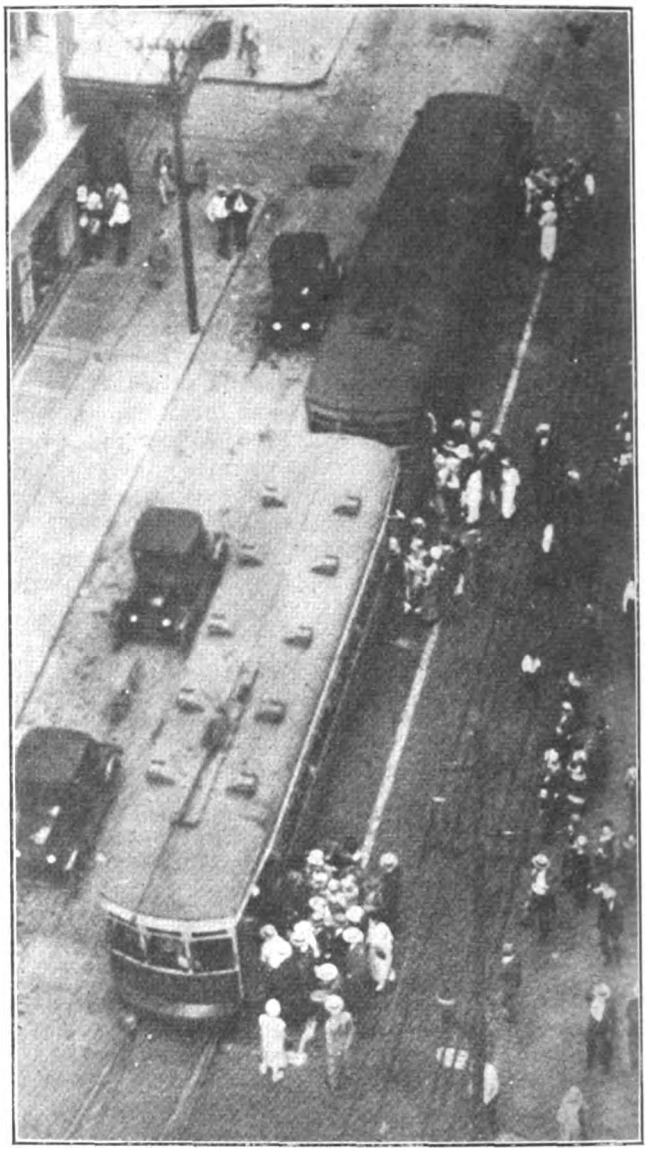
2. The first successful operation of 600-volt main power bus through the automatic coupler, this design including new drum switch design and blow-out coils and original safety features.

3. The original installation of automatic throw-over from trolley to battery supply for energizing the train control circuit, when it is desired to use the motors for regenerative braking in case the trolley pole should come off the wire.

4. An original platform arrangement designed to permit the cars to be used for either one-man or two-man operation, and including safety features developed originally for this company to permit the street fare collector scheme.

The company summarizes the results which have been achieved from their use as follows: A 50 per cent increase in number of non-rush hour seats; a 20 per cent increase in the number of rush-hour seats; 12.6 per cent increase in trip miles; 20.7 per cent decrease in platform expense despite a 5-cent an hour premium for one-man operation; 23.7 per cent decrease in man-hours and 16 per cent fewer total men required to operate the schedule.

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.



Passengers Boarding at the Four 57-In. Door Openings of a Kansas City Safety Train

The train is shown standing on a 10 per cent grade. The two center doors are handled by conductors on the cars and the doors at the extreme ends of the train are handled by street collectors.

These new cars of the Kansas City Railway are operated in the non-rush hours as single-car units in charge of one man, and the street collectors are not on duty. In the rush hours they are coupled together and operated as two-car trains with three men, supplemented by street collectors who take positions at the front door of the forward car and at the rear door of the second car at important loading points.

In addition to the multiple-unit control and the arrangement for one-man or two-man operation, the flexibility of the train is further enhanced by the fact that the cars may be coupled or uncoupled at any point on the system without adding or removing equipment. As single units, these cars can be operated by one man or two men, and when in trains they may be operated with two, three or four men, as desired. No special storage house or terminal track arrangement is necessary for handling these cars. They can be uncoupled at short loop points or at any point on a line and one car used to fill the space with a minimum of inconvenience to passengers.

The company considers that in using these single

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units with one man on a heavy line it is possible to furnish a more satisfactory service than with ordinary two-man operation, as part of the economy is shared with the public in reduced headway. In the non-rush hours the double-truck car with one man affords a comfortable riding unit, usually providing a seat for every passenger. In the rush hour trippers manned by two employees meet the base-schedule cars to which they are coupled, and this two-car unit with three men, aided by street collectors, goes through the rush period. The trippers with the two men then return to the carhouse, leaving the single one-man unit to continue on the base schedule.

Fare Collection Plan

The control of passenger movement and the system of collecting fares under different methods of operation have been satisfactorily worked out. A swinging gate on the platform can be locked open during two-man operation. For one-man operation it is arranged to swing only outward, thus separating incoming and outgoing passengers. When the operation is changed from one man to two man the fare box is moved from the front platform to the rear, and vice versa.

The scheme of using street collectors has been in use by the Kansas City Railway for some fifteen years, but it becomes of special importance and value in connection with the safety trains. Not only is the schedule speed increased by reducing the loading time, but carloads are equalized, giving more efficient use of the equipment. Sixty-three street collectors are used regularly by the company during the rush hours at heavy loading points in the business and industrial section, and on such special occasions as ball games, circuses, etc. Extra men are used for this duty.

Emphasis is made of the point that the street collectors are more than merely human fare-collecting devices. They are of material assistance in selling the service. Together with the three men on a train, they make five employees at heavy loading points who specially serve the public in the way of information and assistance, as well as expedite the service. The use of street collectors also brings about some reduction in the loss of fares.

Symbols Replace Dates on New Los Angeles Transfers

This New Scheme Eliminates the Waste Which Must Occur with Dated Transfers—Saving Thus Effected Would Be Very Important on Large System

A NEW type of transfer in which symbols replace printed dates has been introduced by the Los Angeles Railway. The change is said to have resulted in a considerable saving over the system formerly used as it eliminates the necessity for a surplus supply of transfers for each conductor.

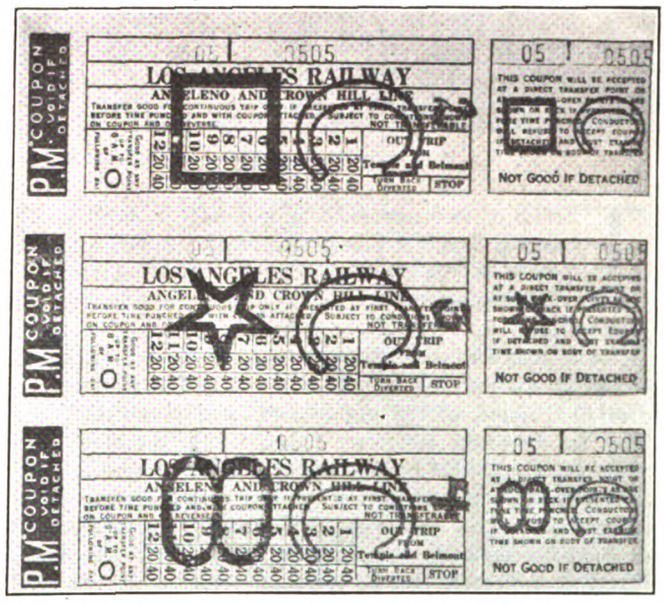
Fourteen different symbols are used to distinguish transfers in the new system, a few of which are illustrated herewith. These are used without any regular sequence, the transfer bureau deciding that a certain type shall be used for each day, but not divulging the information until the day of issue. For instance, if the transfer bureau decides that a star shall be the designating symbol for the fifth day of the month, the information will be transmitted to the various carhouses and a large metal sign carrying the designation, as illustrated, is conspicuously displayed to inform the trainmen. All transfers issued to conductors for that day will bear the design of the star. Since the passengers do not know in advance what design will be used, the chance of using old transfers is cut to a minimum.

A Metal Sign Bearing the Same Symbol as the Transfer Is Displayed to Inform the Conductors

Transfers formerly used by the company had the letter of the line, the day, month and date superimposed with the date figure in the largest type. In rush hours it was possible to pass a transfer of the corresponding day of a previous month.

Another innovation in the new transfer is that a p.m. coupon is provided, which cuts the number of transfer forms in two. Heretofore different transfers indicated "In" or "Out" trips, and different colored printing designated a.m. or p.m., making it necessary for a conductor to carry four sets of transfers.

With the change from dates to symbols, a considerable saving in printing is effected. Formerly all unused



Three of the Designs Used to Designate Dates on Los Angeles Transfer

transfers marked for a certain date had to be thrown away, whereas with the new system, unused transfers are saved and reissued the next time the particular symbol is chosen at the designating mark. Since about 330,000 transfers are used on an average day, a very considerable saving is effected.

Mason Starring, president United Railway Investment Company, and Moritz Rosenthal, director of the Market Street Railway, San Francisco, have gone to San Francisco for a conference with city officials on the proposed sale of the Market Street Railway to the city. This matter has been a subject of previous discussion. The question of the valuation at which the property will be taken over is, of course, the important question to be settled.

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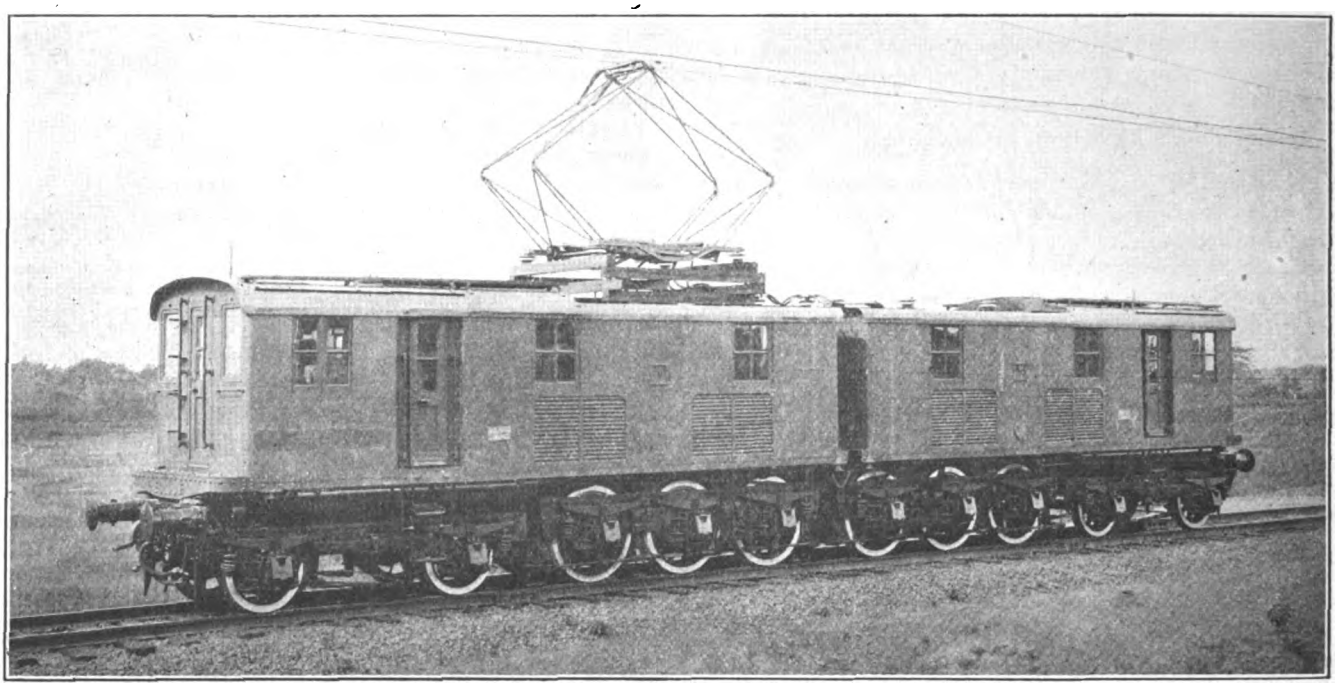
Electric Locomotives Tested at Erie

120-Ton Paris-Orleans Locomotive Designed for High-Speed Passenger Service in France Develops 105 M.p.H. in Preliminary Tests—Mexican Railway 150-Ton Freight Locomotive Has "Tug-of-War" with Mikado Type Steam Engine



This Paris-Orleans Locomotive Was Designed for Passenger Service at Speeds Up to 80 M.p.H.

TESTS of two new electric locomotives built by the General Electric Company and the American Locomotive Company for foreign roads attracted a number of engineers and railroad men to Erie, Pa., on Dec. 4 and 5. The locomotive built for the Paris-Orleans Railway was run over the test track at speeds between 62 and 81 m.p.h. In preliminary tests run Dec. 2 a speed of 105 m.p.h. had been reached. There was no apparent tendency toward objectionable movements which might have injurious effects upon the track. Records were also obtained by means of the otheograph, described in this paper Aug. 25, page 294, which would indicate freedom from nosing at high speeds. Examinations of the track showed complete absence of any detrimental effects.

There was also exhibited the new Mexican Railway freight locomotive, an exhibition run being staged on the tracks, together with a "tug-of-war" contest with a Mikado type steam locomotive, and a regenerative braking contest. During this test the electric locomotive, connected to send power back to the line, was hauled by the steam unit at a speed of about 14 m.p.h., the steam unit operating at full capacity. As high as 1,800 hp. was sent back into the system.

Some Details of the Paris-Orleans Locomotive

In order to determine the type of passenger locomotive to be used on the 1,500-volt electrified lines of the Paris-Orleans Railway, orders were placed with various manufacturers for sample locomotives having approximately 80 tons on drivers and designed for maximum speeds up to 130 km. (80.3 miles) per hour. The G.E. locomotive is of the gearless type, as shown in the illustration. Each main driving truck has three axles, each carrying the armature of a bipolar gearless motor. The truck frame consists of two steel plate side frames bolted to two end transoms and two intermediate transoms. The journals are of the collarless type, and the end thrust of the axle is taken up by a bronze and babbitt liner located on the outside of the wheel hub and running against a cast steel journal box.

The guiding trucks are also made up of steel plate side frames riveted and bolted to structural steel end frames and cross transoms. A longitudinal center member of structural steel supports a center plate for carrying a portion of the weight of the locomotive at the inner end of the truck. The outer end of this member carries the truck portion of the centering device, which forms a support for a portion of the weight of the superstructure.

A platform built up of structural steel longitudinal and cross members is bolted to each driving truck and supported near its outer end by the roller centering device resting on the guiding truck.

Each cab is of the box type containing a compartment at the outer end for the operator and the remainder for housing the apparatus. The outer end of the cab is tapered to a width of 8 ft. 7½ in., to conform to the specified clearance lines when passing around a minimum radius of 260 ft.

The driving motors are built for operation at 750 volts per commutator, with two motors in series. The field poles, field coils and brush-holders are mounted on the truck transoms, and the truck platform and cab

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structures form a part of the magnetic path. The nominal one-hour rating with all covers off and operated on tapped field (75 per cent) is 395 French hp.* at 675 volts and 408 French hp. at 750 volts. The continuous rating with blowers, based on a temperature rise of 120 deg. C., is 355 French hp. at 675 volts.

The under sides of the transom are covered with steel plates, and openings are provided for the forced ventilation. While the locomotive is not now equipped for regenerative electric braking, space is provided for the installation of equipment for this purpose if desired.

The control equipment is type PCL, electro-pneumatically operated, non-automatic, giving twenty-three resistance steps and eight running points with various groupings of the motors.

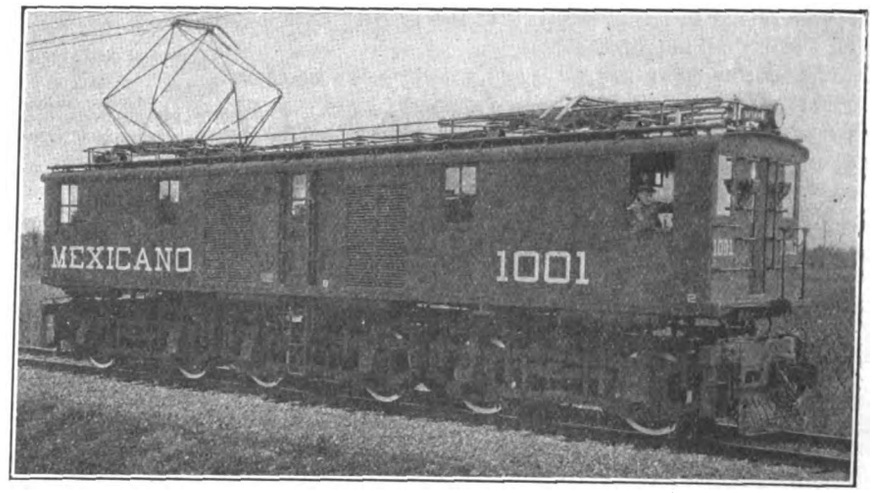
For speeds above the full field running connections, tapped field positions are provided. Two of these steps can be obtained in the series and series-parallel position and one in the full parallel position. Provision is made for disconnecting the motors on either half of the locomotive in emergency, so that the three remaining motors can be operated in series.

A master controller is located on the left-hand side of each operating cab, energizing the control circuits by means of current from a 72-volt storage battery.

Overload and short-circuit protection is secured by a high-speed circuit breaker which trips and inserts resistance in the circuit. After the resistance is inserted, a pair of line contactors then opens the circuit. This reduces the damage that can be done and protects the substation apparatus by quickly eliminating excessive power demands.

The auxiliary equipment includes air compressors, blowers and heaters which are operated through a separate circuit taking power from the 1,500-volt trolley. Forced ventilation for the traction motors is obtained by multivane type blowers, one of which is located directly above each motor. The three blowers on each driving truck are direct connected to an inclosed series-wound 1,500-volt motor, and the two motors may be connected in series to reduce power consumption when the locomotive is operated at light loads.

The air brake equipment is of the French Westinghouse type for double-end operation and for control of both locomotive and train. Compressed air is furnished by two CP 32-A 1,500-volt compressors having a total piston displacement (at the low pressure piston) of about 3,600 liters (127 cu.ft.) per minute when delivering air at a pressure of 10 kg. per square centimeter (142 lb. per square inch). The compressor is of a two-stage type with horizontal cylinders fitted with single-acting pistons.



The Locomotive for the Mexican Railway Is for Heavy Mountain Grade Service

WEIGHTS, RATINGS AND DIMENSIONS OF PARIS-ORLEANS ELECTRIC LOCOMOTIVES

Electrical data:	
Nominal voltage of system (d.c.)	1,500
Tractive effort at one-hour rating and 1,350 volts, kg.	6,630 (14,586 lb.)
Tractive effort at continuous rating and 1,350 volts, kg.	5,700 (12,450 lb.)
Tractive effort at 30 per cent tractive coefficient, kg.	21,800 (47,960 lb.)
Speed at one-hour rating and 1,350 volts, km.p.h.	96.5 (60 m.p.h.)
Speed at continuous rating and 1,350 volts, km.p.h.	101 (63 m.p.h.)
Number and type of motors	Six G. E. 101-A (750/1,500 volts)
Total horsepower of locomotive at one-hour rating	2,370*
Total horsepower of locomotive at continuous rating	2,130*
Mechanical data:	
Track gage, meters	1.45 (56½ in.)
Wheel arrangement	4 — 6 + 6 — 4
Diameter of drivers, mm.	1,200 (47.2 in.
Diameter of guiding wheels, mm.	915 (36 in.)
Total wheelbase, meters	16.32 (53 ft. 6 in.)
Maximum rigid wheelbase, meters	2.85 (9 ft. 3½ in.)
Width over all, meters	2.93 (9 ft. 6 in.)
Length over buffers, meters	19.02 (62 ft. 0 in.)
Height over trolley, locked down, meters	3.84 (12 ft. 6 in.)
Weights:	
Total weight on drivers, kg.	72,600 (159,720 lb.)
Weight per driving axle, kg.	12,100 (26,765 lb.)
Total weight on guiding axles, kg.	35,800 (79,200 lb.)
Weight per guiding axle, kg.	8,950 (19,690 lb.)
Electrical and air brake equipment, kg	46,400 (102,880 lb.)
Mechanical equipment, kg.	62,000 (138,600 lb.)
Total weight, kg.	108,400 (238,480 lb.)

*French horsepower of 736 watts.

THE MEXICAN LOCOMOTIVES ARE FOR FREIGHT SERVICE

The ten 150-ton, 3,000-volt locomotives to be used on the initial electrification of the Mexican Railway are of the geared type, and are designed for slow-speed freight service.

A single cab is mounted on two equalizer frames, which in turn are carried upon three two-axle articulated trucks. A motor is geared direct to each axle with twin spring gears.

The three trucks have steel side frames, to which the end frames carrying the draft gear and articulated joints are bolted. The superstructure is carried on center plates on the truck transom, bolted to the side frames at their midpoint, and the whole is carried on equalized semi-elliptic springs.

On each of the six axles there is a twin-geared G.E. 278-A railway motor with forced ventilation. These motors are designed to operate two in series on 3,000 volts. Each motor is supported on its axle by suspension bearings and on the transom by a spring nose support. An eighteen-tooth forged steel pinion is mounted on each end of the armature shaft and meshes with a ninety-tooth cushion type gear on the axle. This design permits a small movement of the rim about the gear center, thus tending to equalize the stresses in the gears and pinions and to minimize the shocks on the teeth.

The auxiliary machinery consists of a 3,000/1,500-volt dynamotor which has a 4-kw., 65-volt control generator mounted on a shaft extension, a 1,500-volt regenerative exciter set, two 1,500/3,000-volt motor-driven blowers and two 1,500/3,000-volt air compressors. The dynamotor provides 1,500-volt power for operation of the

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blowers, compressors and the regenerative exciter set. The control generator furnishes current at 65 volts for lights, headlights, foot warmers, control circuits and for charging the storage battery.

The two air compressors are of the two-stage horizontal-cylinder type and have a total piston displacement of 150 cu.ft. per minute when delivering air against 130-lb. pressure. They operate two in series on 3,000 volts.

The air brake is Westinghouse No. 14 EL, double-end, straight and automatic equipment, arranged for double-heading locomotives. Provision is made to prevent application of the air brakes on the locomotives during regenerative braking, while the brakes may be applied on the remainder of the train.

The locomotives are equipped with type PCL electro-pneumatic control for non-automatic, multiple-unit operation. The master controllers are arranged to give a total of thirty-one accelerating steps and nine running points, which for a tractive effort of 50,000 lb. and 2,700 volts on the contact line correspond to speeds of approximately 5.4, 6.0, 6.75, 11.4, 12.8, 14.2, 17.4, 19.6 and 21.6 m.p.h. This range of speeds is obtained by connecting the motors six in series, three in series in two parallel circuits, and two in series in three parallel circuits. One full-field point and two reduced-field points are included on each connection.

Regenerative Braking Is Provided to Control Speed on Down Grades

Regenerative braking on the down grades is accomplished by exciting the fields of the traction motors by the regenerative exciter. Fifteen regenerating steps are provided for on the master controllers for each of the three motor groupings.

The main motor circuits are protected by a quick-acting circuit breaker which serves as a line breaker, as well as to give overload protection. Current is collected through one or both of two pantograph trolleys, which have a range of 15 ft. 5 in. to 24 ft. above the rail. They are raised and held against the wire by air pressure and are retracted by gravity when the air pressure is released.

The cab is 47 ft. 6 in. long and 10 ft. wide. An apparatus compartment is in the middle of an engineman's cab 5 ft. long at each end. The rheostats extend each way from the center of the cab about one-half the length of the apparatus compartment. Their height is approximately 3 ft. Near each end is a ventilating flue to carry off the heat. The roof of the rheostat compartment is insulated against heat and is used as a shelf upon which the auxiliaries are mounted.

The control apparatus compartment on No. 1 end contains the main switch, quick-acting circuit breaker, lightning arrester, other protective apparatus and some of the accelerating contactors. The corresponding compartment on No. 2 end contains the cam switches for grouping the motors for the different motoring and regenerating combinations, the reverser, the motor cut-out switches and the remainder of the accelerating and field reducing contactors.

The Mexican Railway Company, Ltd., is one of the oldest railways operating in Mexico.. Its main line runs between Vera Cruz and the Gulf of Mexico and Mexico City. The section between Orizaba (about 70 miles inland from Vera Cruz) and Esperanza, a distance of 30 miles, is now being electrified. This section, known as the Maltrata incline, includes the most scenic country in Mexico.

Because of the mountainous country through which the railroad passes from the sea level at Vera Cruz to the great Mexican plateau, with a change in elevation of some 8,000 ft. in 100 miles, many severe grades and sharp curves are encountered. A difference of 4,000 ft. in elevation exists in the 30-mile section which is now being electrified.

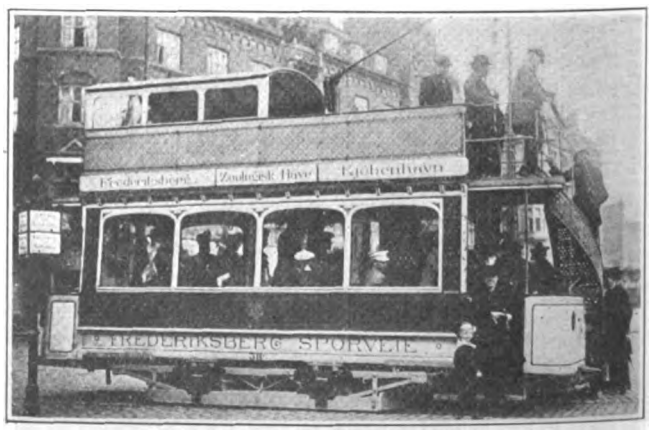
Freight trains weighing 700 tons will be taken up the grade with two electric locomotives, one at the head end and one at the rear. Trains of about the same weight will be brought down the grade with one locomotive by regenerative electric braking. Speeds both up and down grades for freight trains will average about 15 m.p.h.

All but an occasional passenger train can be taken over the grades by a single locomotive. As it is considered unsafe to run trains down the grades and around the sharp curves at more than 20 m.p.h., the same locomotive with the same gear ratio will be used for freight and passenger service. Speeds of passenger trains will average about 18 to 20 m.p.h. both up and down grades, although the locomotives can operate at a maximum speed of 33 m.p.h.

DIMENSIONS AND DATA OF ELECTRIC LOCOMOTIVES FOR THE MEXICAN RAILWAY

Electrical data:	
Nominal voltage of system, (d.c.)	3,000
Tractive effort at one-hour rating and 3,000 volts, with blowers, lb	54,300
Tractive effort at continuous rating, lb	46,200
Tractive effort at 30 per cent tractive coefficient, lb	92,400
Speed at one-hour rating and 3,000 volts, m.p.h.	20
Speed at continuous rating and 3,000 volts, m.p.h.	20.5
Total horsepower of locomotive at one-hour rating	2,700
Total horsepower of locomotive at continuous rating	2,500
Number of motors	6
Type of motors	G.E. 278-A (1,500–3,000 volts)
Gear ratio	90:18
Mechanical data:	
Track gage, inches	56½
Wheel arrangement	0–4–4–4–0
Diameter of drivers, inches	46
Number of driving axles	6
Total wheelbase	40 ft. 6 in.
Maximum rigid wheelbase	9 ft. 2 in.
Width over all	10 ft. 1½ in.
Height over trolley, locked down	15 ft. 2 in.
Length inside knuckles	52 ft. 11 in.
Weights:	Lb
Total weight on drivers	308,000
Weight per driving axle	51,300
Dead weight per axle	12,150
Electrical and air brake equipment	135,000
Mechanical equipment	173,000

A Street Car in Copenhagen, Denmark



How would people of the average American city like cars of this variety? Note three-way egress and half-covered upper deck with less than standing headroom under the roof.—Copyright, Gilliams Service.

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Platform Men Pass Civil Service Tests

San Francisco Requires Applicants for Position of Motorman and Conductor to Take Athletic Examination, Including Ladder Climbing, Horse Vaulting and High Jumping, as Well as an Examination on Relative Capacity and Knowledge of Duties —Each Examination Is Considered of Equal Importance

PROSPECTIVE motormen and conductors must pass an athletic test before being employed on the San Francisco Municipal Railway. They must be able to climb a ladder by their hands, dip on the parallel bars at least five times, vault the horse, and otherwise prove that they are in fit muscular condition, besides passing the more common medical examination for organic troubles and the usual test for eyesight and hearing. The specification for motormen and conductors on the San Francisco Municipal Railway has always called for a rather stiff physical examination, but the requirements have been made more strict recently, partly because the system has no age limit for new men and partly because all employees of the municipal railwav now, after the first six months of their employment, automatically become members of the retirement system of the city and county of San Francisco. This arrangement became effective on April 1, 1922.

All employees of the San Francisco Municipal Railway, except executives and one or two experts, come under the civil service regulations. Hence, candidates for the position of motormen and conductors have to be passed by the Civil Service Commission of San Francisco before they are eligible for appointment.

Civil Service Tests

The athletic test for motormen and conductors, already mentioned, has a relative weight for eligibility of 50 on a scale of 100, and a written examination, called a test for relative capacity and general knowledge of duties, also has a weight of 50 on the scale of 100. All of these three tests, except the test on general knowledge of duties, are the same for motormen and for conductors. Applicants must receive a rating of not less than 75 per cent on each of these tests or are rejected. The practice is to conduct first the athletic test. If that is passed successfully, applicants for positions as platform men will receive copies of the rules of the municipal railway to study for the test on general knowledge of duties.

The "athletic test" consists of the following:

1. *Ladder Work*—Hand over hand, up and down ten rungs; only one hand allowed on each rung; perfect mark, 10 credits.
2. *Lifting 50-lb. Dumbbell*—Five consecutive lifts with each hand. Lifts to be made from lowest reach of arm to highest reach, without aid of jerk or swing, while standing erect with feet close together; perfect mark, 10 credits.
3. *High Jump*—4 ft., 10 credits; 3 ft. 8 in., 8 credits; 3 ft. 4 in., 6 credits; use of springboard not permitted.
4. *Vaulting the Horse*—Perfect vault over horse, 4 ft. 6 in. high, without touching it with any part of body except the hands, 10 credits; good vault (feet slightly touching horse), 8 credits; fair vault (body slightly touching the horse), 6 credits; slide over horse, 0.
5. *Dipping on Parallel Bars*—Five dips at 2 credits each; dips must be made with legs straight and without assistance of kick or swing.
6. *Carrying 150-lb. Sack of Sand*—Sack must be lifted from floor, placed on shoulder and carried up and down six steps; mark 10 credits. No partial credits, and no more than two trials allowed.
7. *Running* (distance about 140 yards)—Eighteen seconds, 40 credits; nineteen seconds, 37½; twenty seconds, 35; twenty-one seconds, 32½; twenty-two seconds, 30; twenty-three seconds, 25; twenty-four seconds, 20; twenty-five seconds, 15; twenty-six seconds, 10; twenty-seven seconds, 5. Fifth seconds to be rated proportionately.

As explained, applicants must also pass a satisfactory medical examination before a physician appointed by the commission. Those unable to hear with each ear ordinary conversation at a distance of 20 ft. or unable to read with each eye without glasses at a distance of 20 ft. letters on Snellen's eye chart marked "30" will be rejected. Applicants for both motormen and conductor positions must also pass a test as to their color vision. They must be citizens of the United States, twenty-one years of age or over, and residents of San Francisco for at least one year preceding the examination. Under the city charter, war veterans are entitled to claim a preference of five credits, but to secure this credit they must file with the commission, with their application for the position, a certificate of honorable discharge or of honorable active service.

Written Tests on Intelligence

The written examinations on relative capacity and general knowledge of duties are conducted at certain times announced in advance by the Civil Service Commission. The regulations in regard to these examinations are printed and very definite. Thus, during the course of the examination no participant is permitted for any reason to leave his seat, unless he first turns in his examination papers, and he then will be considered as having withdrawn from the examination. Nothing is permitted on the desks of the competitors except the examination booklet and pens and ink and blotters furnished by the commission. Applicants may use their own fountain pens only if those pens are supplied with ink that dries black. Applicants are advised that no questions should be asked of the monitors in charge of the examination because none will be answered. If the applicant thinks he finds cases of ambiguity or oversight in the examination papers or instructions which are the fault of the commission, they will not be discussed during the examination. If the applicant wishes to bring them up, in explanation of his failure to do his work properly or for any other reason, he can make such complaint by writing to the commission within three days after the examination.

The practice in conducting the examination is that each applicant who has passed the athletic test and has applied for permission to take the written test will receive a credential. He keeps this credential until the written examination and it must be shown at the door of the examination room to secure admittance. The candidate is then assigned to a seat and places the credential before him on his desk, leaving it open and face up, so that it can be quickly inspected and collected by the monitor. After the credentials have been collected, the examination booklets are distributed face up.

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The written examination for a motorman or a conductor lasts about forty-five minutes. If a person wishes to take an examination for both positions, he is permitted to do so. This will take about fifteen minutes longer.

The time spent in these examinations is very definitely regulated by gong signals. At the first gong signal, the applicant is told to take up his pen and write his name and address on a blue gummed identification slip which he finds attached to the cover of his examination booklet. After writing his name on this sheet he is told to fold it over and paste it down by means of a gummed edge that is provided, and he is warned not to write anywhere else on the examination paper his name or other identification mark.

Altogether there are six tests, and the time for the beginning and ending of each is indicated by a gong signal. At the close of the forty-five minutes, the gong is rung three times. This means that all applicants for positions must stop writing and must rise and stand by their desks until the monitor collects the examination booklets. Then at four strokes of the gong applicants leave the hall.

Examination on Relative Capacity

There are five examinations on relative capacity, and, as explained, these are the same whether the candidate wants employment as a conductor or as a motorman. Each examination question is so drafted that the answer is very brief and can be written on a blank line next to the question. Figuring for the arithmetical test must be done on the back of the cover sheet of the booklet.

The first test in relative capacity is on some simple questions in arithmetic. A few typical questions taken from the examination sheet of Jan. 31, 1922, follow:

At 7½ cents each, how much will a dozen power fuses cost?

How many weeks will it take to pay for a $35 uniform at $10 down and $5 at the end of each week?

If a conductor starts on his run with $5.75 and collects seventeen 5-cent fares, how much will he then have?

How many 5-cent fares will it take to pay for the damage done in a collision with an automobile if the cost was $150?

The second examination is on "sentence meanings." There are twelve groups of four sentences each, and the applicant in this test is required to make a cross mark in the parentheses before the sentence which has most nearly the same meaning as the numbered sentence heading the group. The upper part of a recent examination sheet, with four typical questions, is reproduced below:

TEST 2 SENTENCE MEANING Relative Capacity

In each group of sentences below, make a cross (×) in the parentheses before the one sentence which has most nearly the same meaning as the first sentence (in capital letters). The first example is already marked correctly. Work until the gong rings and then start on Test 3. *Any example where more than one sentence is marked in any way will be counted as incorrectly answered.*

1. MAKE HAY WHILE THE SUN SHINES.
   (×) Take advantage of your opportunities.
   ( ) Don't work too hard.
   ( ) Don't stay up too late.
2. MANY ARE GOOD BECAUSE THEY CAN DO NO MISCHIEF.
   ( ) Evil sees as evil thinks.
   ( ) The good can do no wrong.
   ( ) The cat is honest when the meat is out of reach.
3. WHERE THE WILL IS READY THE FEET ARE LIGHT.
   ( ) Where there's a will there's a way.
   ( ) Expression is the dress of thought.
   ( ) A burden which one chooses is not felt.
4. FIGS DO NOT GROW ON THISTLES.
   ( ) Great oaks from little acorns grow.
   ( ) Good does not come from evil.
   ( ) Faint praise is often strong censure.

The third test is that of "reasoning by analogy." Here the applicant is required to check one of four words which most correctly completes a definite sentence. Here also an example is given as shown below, the proper word being underscored in the first example of the four quoted taken from the examination paper.

TEST 3 REASONING BY ANALOGY Relative Capacity

In each example below, draw a line under the only one of the four words in the column which is the right word to complete the sentence. The first example is already marked correctly, for roar is what a LION does just as bark is what a DOG does. Answer as many as you can before the gong rings; then begin on Test 4. *Any example where more than one word is underlined will be counted as incorrectly answered.*

DOG is to BARK as LION is to	FLOORWALKER is to STORE as POLICEMAN is to
zoo	uniform
roar	badge
animal	street
man	authority

STREET CAR is to WAGON as FAST is to	RULER is to LENGTH as CLOCK is to
wheel	strike
trolley	time
slow	second
horse	wood

CRIMINAL is to PRISON as PATIENT is to	FRAME is to PICTURE as LAKE is to
jail	island
hospital	water
court	drawing
medicine	river

STREET CAR is to PASSENGER as PATROL WAGON is to	DOG is to OLD as PUP is to
car barn	kitten
ticket	young
fare	small
prisoner	play

Test 4 is on "word knowledge." Here the applicant is required to draw a line under the one word which in each group means the opposite or most nearly the opposite of the top word in each group of five words. In the first example, "soft" is underlined because it means the opposite of "hard." Six examples are given from the examination paper.

TEST 4 WORD KNOWLEDGE Relative Capacity

In each of the lists below, draw a line under the one word which means the opposite or most nearly opposite of the top word in the list. The first one is already marked correctly—"soft" is underlined because it means the opposite of "hard." Answer in order as many as you can until the next gong signal, then start on Test 5. *Any example where more than one word is underlined will be counted as incorrectly answered.*

HARD	CLEAN	FROM	VALLEY	COMMON
hardy	lean	upon	mountain	cheap
soft	dirty	form	river	law
smooth	urge	by	mine	unusual
pliant	screen	to	gravel	costly

MARRY	FORGET	INNOCENT	REVEAL	MINUS
ceremony	idea	guilty	congeal	plus
divorce	memory	proof	conceal	minor
court	remember	convince	relate	minority
engage	vision	doubt	veal	bonus

CIVIL	MENTAL	CORRUPT	AMIABLE	BLISS
civic	brain	eruption	surly	lass
martial	nerve	honest	amenable	blithe
marital	thought	home	pliable	aged
revile	material	correct	liable	agony

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The fifth and last examination under relative capacity is on penmanship. Here the applicant is asked to copy line for line and word for word the way it is printed in the examination sheet the following pledge:

"I pledge allegiance to my flag, to the Republic for which it stands; one nation indivisible, with liberty and justice for all."

There are spaces where this pledge can be copied a number of times until the gong sounds for the next examination.

Knowledge of Duties

The final test is on knowledge of the duties of the position for which the man has applied. In each examination there are 100 questions relating to practical details of the services with which the applicant has presumably become familiar through a study of the rule book. These questions are arranged so that they can be answered very easily if the applicant knows the right answer. The heading of the examination blank for conductor with the first eight questions, two of which are answered as examples, as reproduced below, is followed by several questions in similar form from the examination paper for motormen.

Test 6 Knowledge of Duties CONDUCTORS

Some of the following statements are true and some are false. If the statement is true underline TRUE. If the statement is false, underline FALSE. Do as many examples as you can before the next gong signal; then stand up and remain silent in your place until the following gong signal. (*See front cover.*) *Any example where both true and false are underlined will be counted as incorrectly answered.* The first two statements are samples correctly underlined.

1.	TRUE	FALSE	The Bulletin Board must be examined daily for special bulletins posted thereon.
2.	TRUE	FALSE	Ignorance of rules will be accepted as an excuse for violation of same.
3.	TRUE	FALSE	Verbal orders of subordinate officials must be promptly obeyed.
4.	TRUE	FALSE	"Oversleeps" are not entered on the employee's record.
5.	TRUE	FALSE	The official badge, punch, and cap ornament will all be furnished by the Railway.
6.	TRUE	FALSE	The loss of rule book must be reported immediately to the Car Dispatcher, or person in charge of the office.
7.	TRUE	FALSE	The record kept of each employee should be filled out in careful detail and made as full as possible.
8.	TRUE	FALSE	The penalty for the fourth oversleep in a calendar month is ten days' suspension.

Test 6 Knowledge of Duties MOTORMEN

27.	TRUE	FALSE	Motormen will recognize buzzer signal both to stop or to start car.
28.	TRUE	FALSE	Except when regulated otherwise, cars must be brought to a full stop at street railway intersections.
29.	TRUE	FALSE	Except when regulated otherwise by special bulletin, cars will stop at the near side of all intersecting streets to receive and discharge passengers.
30.	TRUE	FALSE	When stopping at a painted stop mark the motorman must stop car with fender roll four feet behind such stop mark.
31.	TRUE	FALSE	The motorman must close front gates immediately after starting car.
32.	TRUE	FALSE	A motorman may start car on signal from conductor collecting at front gate.

No credit is allowed in the examination of either motormen or conductors for previous experience.

In spite of the rather rigorous type of examination required, it is interesting to note that a fairly large number of men are able to pass both athletic and written tests. Thus, in the last examination held, the physical test for motormen was taken by 695 applicants, of whom 620 passed. The same test for conductors was taken by 701 applicants, of whom 615 passed. The written test for motormen was taken by 574 persons, of whom 337 passed. The written test for conductors was taken by 575 persons, of whom 370 passed.

Tests for Inspectors

Inspectors on the San Francisco Municipal Railway are promoted from the ranks of the motormen and conductors. The examination for inspectors is somewhat similar to that required of motormen and conductors, except that no athletic test is required. There are the four examinations on relative capacity and the one on penmanship, quite similar to those already described for motormen and conductors, but the examination on knowledge of duties covers, of course, the duties of the office which the applicant is seeking. The questions are arranged, however, in a similar manner to those for motormen and conductors, so that the applicant may simply underscore one of two words to indicate his answer to the question. Typical questions from the examination for inspectors, car dispatchers, car starters and receivers are given below:

Test No. 6 Knowledge of Duties

Inspectors, Car Dispatchers, Car Starters and Receivers

TRUE	FALSE	It is the duty of the Receiver to see that the conductors take outfits for their runs at the time called for by the time schedules.
TRUE	FALSE	It is the duty of the Inspector to see that all conductors' outfits are properly accounted for and restored to their proper places.
TRUE	FALSE	Before cars are taken out of the barn in the morning the Car Starter must have posted all car numbers and car box numbers.
TRUE	FALSE	The Dispatcher must arrange the daily detail of crews.
TRUE	FALSE	The Receiver must provide emergency crews each day for the following day.
TRUE	FALSE	An employee shall not discuss with passengers the business of the railway in a manner detrimental to its welfare.
TRUE	FALSE	The Flood Building is at the corner of Powell and Market Streets.

It is interesting to note that out of the 208 applicants who took the last examination for inspectors, 156 passed. A general average of 75 per cent or better is required.

Wages Paid

The present scale for platform men, effective Sept. 16, 1923, is as follows: Conductors and motormen, 67½ cents per hour; bus operators (recruited from the ranks of conductors to operate one-man buses), 72½ cents per hour; motormen on work car and track grinding car, 72½ cents per hour.

All of these employees are allowed time and a half for overtime after eight hours and twenty minutes, and are required to lay off one day in seven. Eight hours is the basic day for all employees. Each employee has a vacation of twelve days a year with pay.

The municipal railway system has two grades of inspectors, first and second. This grading is somewhat arbitrary, as it is based on the duties performed and not on the percentage obtained in examination. Road

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or line inspectors constitute the first grade and starters and receivers the second grade. Dispatchers are taken from the ranks of the road inspectors.

RETIREMENT SYSTEM

The city of San Francisco has a retirement or pension system with death benefits for all city employees, and since April 1, 1922, the municipal railway employees have been included in this system. In fact, membership in this retiring fund is compulsory after six months of service for all municipal railway employees who receive salaries not to exceed $500 a month.

The amount of the payments made to the fund by the employees depends upon the age and salary earned, and an equal amount to the sum paid by the employee is contributed to the fund by the Municipal Railway. The cost to the municipal railway system for all employees, under the present wage scale, is approximately 9 cents per car-hour, made up of 6½ cents for the platform men and 2½ cents for other employees. Retirement is obligatory at the age of 70, but employees who have completed ten years of continuous service and have reached the age of 62, or those who have completed thirty years of service and have reached the age of 60, may retire any time after reaching these ages, if proper notice is given to the authorities.

The annuity received consists of the actuarial equivalent of the contributions made by the employee, plus those made by the municipal railway in his behalf, plus an additional pension, purchased by the contributions of the city and equal to 1⅓ per cent of his final compensation, multiplied by the number of his years of service, provided if he is 62 or more. If less than 62 and with thirty years' service, a slight modification of this method of calculating the pension is followed. Employees who withdraw from the service of the municipal system before becoming eligible to an annuity are entitled to their own accumulated contributions. There are also certain disability and death benefits.

The municipal railway has 1,070 employees, of whom 820 are platform men.

How Kentucky System Has Been Modernized*

Various Measures Taken in the Successful Elimination of Bus Competition by Means of Superior Service Are Summarized

THE developments that have been carried out in modernizing the plant and operation of the Kentucky Traction & Terminal Company, Lexington, Ky., have been covered step by step as they were accomplished in various issues of ELECTRIC RAILWAY JOURNAL. To bring these together in a summary, however, makes a story of accomplishment that is worth recording.

The Kentucky Traction & Terminal Company operates 70 miles of interurban lines and 21.5 miles of city lines in and around Lexington. It has completely reequipped its railroad system with a newly developed type of light-weight one-man double-truck passenger and freight cars, the former designed especially to give maximum comfort, speed and economy of operation. This complete replacement of rolling stock made it possible for the company to standardize on one type of motor and general equipment. The exchange of heavy equipment for light-weight cars has materially reduced the actual depreciation in the physical structures of track and roadway and has thereby reduced the future cash expenditures and prolonged the life of the investment.

For the public, the company has reduced all classes of transportation charges on the interurban system by 16⅔ per cent and has increased the service from a headway of one and one-half hours to a headway of one hour on all lines. It has given the public cars to ride in that it believes are as comfortable as a private automobile, and equal, if not superior, to any form of electric railway car now being operated. The public has responded with a generous measure of good will. The success of the company's modernization program, the attractiveness and comfort of the new cars and general progressive policy have made the company very popular.

The security holders have benefited because the management has converted the railway property from a situation where for the year prior to the conversion of the equipment an operating deficit existed into a property with an operating surplus over and above all charges. The property has thus been made self-supporting and the investment placed on a sound earning basis and one which the company believes can safely be maintained in the future against any form of competition.

From the standpoint of the car operator, the company's complete one-man operation has placed additional responsibility on the operator for which he is being paid a higher compensation. The company feels that it is making a better man out of him for himself and for the company as he is given a superior position.

The company has kept the public informed through consistent advertising, stating its activities and position in frank and definite manner. A recent advertisement stated the company's position as follows:

"During the past ten years it has always been our aim to keep abreast of advancing conditions and so to align our services that we may at all times be able to provide you with facilities commensurate with the population of those communities we serve. We shall continue to serve you to the best of our ability at rates equitable with the character and quality of good service rendered, and in line with principles of efficient business administration."

To carry out its construction program involving an expenditure of $375,000, which was a heavy commitment for this company in the face of a deficit from operation and organized bus competition, required courage, vision and conviction on the part of the company and its board of directors that the industry is permanent and can be placed on a sound earning basis if properly developed along lines that make the service of more than ordinary value to the public.

Some of the operating results accomplished are a reduction of 63 per cent in late trains, expressed in hours; a reduction of 41 per cent in the ton-miles of cars operated, despite the increase in service; a reduction of 18 per cent in the kilowatt-hours of energy consumed, although there was an increase of 8.4 per cent in cars operated. Revenue per car-mile has decreased from 45.6 cents to 37.1 cents, but operating expenses have also been reduced from 35.4 cents to 22.3 cents. The energy consumption per car-mile is now 2.92 kilowatts, as compared with 4.93 formerly.

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

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Association News & Discussions

One-Man Car Experience*

One-Man Operation Has Shown Considerable Economies on Beaver Valley Line—Favors Double-Truck Car to Birney Type—Troubles Experienced and Changes Made and Results Obtained Are Detailed

By W. H. Boyce,
General Manager Beaver Valley Traction Company,
New Brighton, Pa.

SO MUCH has been said and is known of the one-man car being a life-saver for the smaller properties that today it becomes a question not of whether a company can get along without switching from two-man to one-man operation, but whether or not it is not mismanagement for a company to operate two-man cars when one-man cars would fill all of the requirements.

Aside from the operating problems entailed by reason of cars of certain routes operating into congested portions of a comparatively few cities, and in the full knowledge that there are other conditions such as several dangerous railroad crossings on comparatively short routes, and kindred problems, yet in my opinion there is no reason why more or less one-man cars cannot or should not be operated on most all properties throughout the country.

Of course there are one-man cars, and then again there are one-man cars.

There is no doubt that the single-truck, slat-seated, one-man car will receive a black eye in any community where an attempt is made to substitute it for comfortable, good-appearing, double-truck cars, particularly if track conditions are not good. But a rebuilt double-truck car or a new double-truck car properly heated and fitted with upholstered, properly spaced seats, mounted on smoothly riding trucks, can in most, if not all, cases be made to supplant the existing two-man service, at the same time rendering a better, more economical service.

I have not visited every one-man property in the country, nor have I sent out questionnaires to the companies operating one-man cars; therefore, I feel that I should confine this paper to our experience with the one-man car on the property of the Beaver Valley Traction Company and the Pittsburgh & Beaver Street Railway Company.

It might be well to explain that our system is split up into 2-mile zones, that we have a base fare of 5 cents for each zone, and that one route has as many as seven zones. Cars that are operated through more than two zones are equipped with Shanklin zone fare machines, with the aid of which the operator issues a receipt to the passenger when he boards the car and deposits his fare in the locked fare box. The passenger retains this receipt until he reaches his destination, surrendering it to the operator as he leaves the car. In addition to operating the car, issuing and accepting zone checks as above described, the operator makes change, sells several kinds of weekly passes, issues transfers, and when we have our bargain sale of tickets twice annually he sells twenty-four tickets for $1.

With the exception of six two-man cars that are being used for tripper service only and which on account of their age and condition we do not deem it economy to rebuild, we are operating 100 per cent one-man cars. Of these, twenty are standard Birney safety cars, manufactured by the Osgood Bradley Car Company, ten of which were put into service in September, 1920, and the other ten were put into service on Aug. 5, 1921. Six of our one-man cars are 36,000-lb. Brill semi-convertible cars, which we have rebuilt for one-man operation and on which all safety features were installed. These cars were equipped with new spring-cushion, cane-upholstered seats; the motor frames, trucks and car bodies were thoroughly overhauled, and the bodies painted inside and out, the exterior having been changed from a dark red to a taxicab yellow. We also have six new double-truck, one-man, two-man cars which are just being put into service.

I wish to call to your attention the fact that these six new cars are equipped with a storage-battery emergency lighting system; aluminum stanchions; Golden Glow 94-watt headlights; Holophane shades; double air-operated doors; four air sanders; electrolytic lightning arresters mounted in cab; and the car bodies are mounted on Standard C.P.-35 trucks, which is the easiest riding truck that we have ever had on our property.

Although in some few cases our headway between cars was decreased with the installation of the one-man car, our hauling is so comparatively light through the day and after the rush hour in the evening that for the ordinary business offered the single-truck car provides sufficient capacity, and as a consequence in most all cases our two-man cars have been replaced with one-man cars, adequate tripper service being furnished to take care of the morning and evening rush-hour periods.

It is not very often that a street railway manager admits that he has made a mistake, but I will say to you very frankly that we made a serious mistake when we purchased twenty safety cars. On some of our lines we have an interval of twenty minutes between cars through the non-heavy hauling hours, during most of which time the single-truck car has sufficient capacity to handle the ordinary business offered, but if one of them happens along at the finish of a football or basketball game, a concert, a dance, a lodge meeting, at the time of a train or interurban connection, or what-not, there is ofttimes not sufficient capacity properly to accommodate the passengers presenting themselves for transportation.

These things do occasionally happen, regardless of the fact that we have tried our best to get the officers of lodges and management of theaters, etc., to advise us of any unusual number of people that gather in their places of business or amusement, so that we may furnish adequate car service to take care of them.

We have not found it necessary to slow down our schedules by reason of the adoption of the one-man car, but, as will be explained later, we have made some improvements that are partly responsible for this. There is and has been for a number of years a slow portion of the schedule which starts at 3:21 in the afternoon and continues until 8 o'clock at night to take care of the rush-hour load. The slowest that any of our cars are operated on this schedule is 9 m.p.h., and during the off-peak hours the rate is 12 m.p.h., with no lay-over on our heaviest hauling lines.

On the two-zone routes, the passenger pays-enter in the first zone and pays-leave in the second zone. This works out very satisfactorily.

We have had but little trouble in concluding a suitable agreement with the Amalgamated Association regarding the operation of these cars. We know that the majority of our car operators would rather operate one-man cars at 5 cents per hour increase in their wage than operate two-man cars. Last year at agreement time,

*Abstract of paper presented before Pennsylvania Street Railway Association at Harrisburg, Pa., Dec. 4, 1923.

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anticipating that we were going to a 100 per cent one-man operation, in addition to providing for paying one-man car operators 5 cents per hour in excess of the rate for two-man car operators, we gave the officials of the association a letter stating that so long as it became necessary for us to maintain crossing flagmen at certain points, we would put on these flagmen jobs trainmen who on account of age or other disability were not competent to operate one-man cars, and pay them at the former year's rate of pay, which is 7 cents less than the present two-man car rate, and of course 12 cents less than the present one-man car rate.

We had no difficulty with the councils or officials in the thirteen boroughs through which we operate when we installed the one-man car.

To make the operation of these cars easy and speedy for the trainmen, we have installed Nachod automatic block signals and electric track switches at all points where either can be used. To further aid the trainmen in making their schedule, we have installed at our heavy transfer points (where cars of three routes connect every ten minutes) an automatic signal system by means of which the operator of a car upon arriving at the transfer point knows that there is or is not a car of the connecting line within one-half mile of the transfer point. This has resulted in a considerable saving of time. Prior to the installation of these signals we had a rule requiring the operator of a car to wait at the transfer point for three minutes. If the approaching car was not in sight (the distance at which it became visible in either direction being about two squares), the operator was then permitted to proceed. Under the present arrangement, if after the operator has waited one and one-half minutes the block does not indicate that his connecting car is approaching he may proceed.

Reductions in Operating Expenses

Today we carry on our list sixty-five trainmen, thirty-nine of whom are scheduled for the operation of regular runs, and twenty-one for trippers. Four years ago we carried on our list 110 men, eighty-nine of whom were scheduled for regular runs, and ten for trippers; while twelve years ago we were compelled to carry on our list ninety-eight men, eighty-eight of whom were scheduled on regular runs. Today our receipts are running in the neighborhood of $630,455 per year; four years ago they were $599,559 per year, and twelve years ago they were $341,066 per year. In other words, today our receipts are more than twice what they were twelve years ago, and we employ thirty-three less trainmen, trippers and regular runs both being considered.

We do not believe it necessary to go into detail on the man-hours and car-hours, except to say that for the first ten months of this year, had we been operating two-man instead of 100 per cent one-man cars, our trainmen's wages on the present wage rate would have shown an increase of $85,000, and at that rate we would soon be in the hands of the sheriff.

As regards our car mileage and power costs, for the year prior to the installation of the one-man cars, 1919, our total car mileage was 1,522,752, while the power cost was $91,332. In September, 1920, we added ten one-man cars, and the total car mileage in 1920 was 1,544,335, and the power cost for that year was $78,910.19. In August, 1921 we added ten additional one-man cars, and our car mileage for that year was 1,691,383, the power cost for that year being $86,811. For the year 1922 the total car mileage was 1,677,457, and the power cost for that year was $69,798. For the first ten months of 1923 our total car mileage was 1,447,062, and the power cost was $59,321, for the Beaver Valley Traction Company and the Pittsburgh & Beaver Street Railway, which was $8,012 less than power for the corresponding ten months of the previous year. This is due to the fact that for the past several months we have been operating some of our eighteen-hour per day runs with one-man cars, while two-man cars were operated on them last year.

Nature of Mechanical Troubles Experienced

The mechanical troubles we have had with the single-truck one-man cars are as follows: The body pedestal springs have broken and we have been compelled to increase the size of the journal spring from ¾ in. to ⅞ in. and the body springs from ⅝ to ¾ in. Any further increase would make a rougher riding car. One broken truck frame near the yoke is the extent of our truck trouble. We have had difficulty with air line to braking cylinder cracking, due to movement or breathing of cylinder. On each car two to four main cross-members of the underframing have broken. We have increased the size of these I-beams from 5½ to 7½ lb. and we believe this will correct that trouble. All these troubles are due to overloading. Based upon our experience, we would recommend that the weight of the standard single-truck car be increased slightly, at least enough to take care of the strengthening of the I-beams and underframing. We would also recommend the use of a 16-ft. air compressor, two fare boxes for short fast-schedule runs, the installation of motormen's stools on converted cars, and in order to keep tobacco juice off the steps we would recommend the equipping of all cars with trapdoor cuspidor flush with floor, headlights of greater efficiency than those with which these cars are generally equipped, and proper curtain device to shut off the glare of the car lights from the operator's windows.

Changes Made

We removed the folding seats near the doors because passengers insisted upon sitting by the operator and blocking the doorway. To give much needed aisle space at the entrance we have changed the first seat inside the door from a cross to a longitudinal seat. The sand boxes were all moved forward one seat (28½ in.) to get away from wheel wash, which change has eliminated the trouble caused by sand pipe clogging.

We have had no trouble with the operation of these cars through snow except with the fender tripping device. During at least one snow storm it became necessary to tie up all fenders on account of the snow. We are now about to place hand straps in all our standard Birney cars.

On our converted cars we took out the Peter Smith heaters and put in 12,000-watt electric heaters in addition to a 1,000-watt heater placed in each cab; the heaters in the interior of the car are controlled by thermostats.

Based upon our experience, we believe that provided the weight of the double-truck car is not too great and that the body and trucks have not outlived their period of usefulness, it is far better for the comfort and convenience of the passenger to convert a good double-truck car to a one-man car than it is to purchase single-truck one-man cars. The total cost for converting our double-truck cars (which included new seats, electric heaters, all the Birney safety features, general overhauling, and painting) was $1,915 per car.

We find that most of the floors on the ten cars put into service in 1920 will have to be renewed during the year 1924. These are single floor cars.

In conclusion, we do not believe that the operator of a one-man car is overworked due to the performance of the functions of both motorman and conductor, but of course there is an increase in mental functions which should promote efficiency of the operator as regards safety and otherwise, for an idle man is an unsafe man.

We believe that in communities under, say, 75,000, the one-man car is the one thing that will help most to save the street railway facilities to the community served. In communities over 75,000 as a general proposition each one-man car substituted for a two-man car will add just that much to the welfare of the car rider and the employees in general and be indicative of good management. The saving effected might be applied to improvement of the conditions of track, overhead line, car equipment, or a wage increase or even a dividend.

We believe that if the cars are of the double-truck type, equipped with properly spaced upholstered seats, and if other consideration is given to the comfort of the passenger, and if the company's public relations are in good order, and if the trainmen and councils are properly sold on the idea of one-man operation and acquainted with the necessity thereof, there will be little if any complaint in any community where this operation is tried.

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Auto Buses and Street Railways*

Legal Status in Pennsylvania Defined—Policy of the Commission Is Toward Supplementary Rather than Competitive Service

BY J. F. SHRADER
Attorney American Electric Power Company

THE public utility laws of the several states vary so much in their phraseology, scope and purpose that the conclusions reached in one state are apt to have, from a legal aspect, little weight as authority in another state. For example, in a number of states, including Illinois, the very important competitive service to the street railway of the taxicab has been held to lie outside the regulatory powers delegated to their commissions. In Pennsylvania, as is well known, certificates of public convenience are required for call and demand automobile service, and our commission has placed restrictions upon such service under certain circumstances effectively eliminating competition with existing facilities.[1] This discussion will be confined to the policies and conclusions arrived at under existing laws of the Commonwealth of Pennsylvania.

Strictly speaking, every transportation facility which is capable of depriving a carrier of a fare is in competition with that carrier. Such competition extends conceivably from the roller skate to the airplane and includes the bicycle, the horse-drawn vehicle and privately owned and privately operated automobiles, as well as jitneys, taxicabs and motor buses. Transportation which is purely private, although competitive, cannot be governmentally restricted or controlled in the interests of rail carriers in the furtherance of public convenience and necessity. Chairman Ainey of our commission as early as 1916 announced, with possibly a word of warning, the principle which must control the commission, using this language:

> . . . losses which this or other railway companies may sustain cannot be weighed against the convenience of the public if at any time a better or more convenient form of transportation than that furnished by the street railway companies is offered.[2]

Thus the acceptability of the service to the riders, or a considerable number of them, is in the last analysis the governing factor and will eventually control the extent to which the existing carriers will be subject to competition, private and public. In the measure that the street railways may be able to influence this decision by superiority, convenience, completeness and cheapness of service, they will accomplish more toward elimination of competition than the government could possibly accomplish, because the railways can, while the government cannot, reach and affect strictly private transportation facilities.

The Public Service Commission of Pennsylvania has adopted a non-competitive policy which has been judicially approved. This, of course, only extends to the carriers within the jurisdiction of the commission. Broadly speaking, these are common carriers for profit as distinguished from purely private carriers who may operate either gratuitously or for profit. In order to understand to what extent this protective policy of the commission may be anticipated, it is necessary to know exactly where the commission and the courts have drawn the line between common carriers and private carriers. It will also enable those contemplating inauguration of auto bus service in conjunction with rail service to determine to what extent they may expect competition with the proposed bus service.

COMMON CARRIER DEFINED

The public service company law[3] defines the relevant terms thus:

> The term "Public Service Company" when used in this act includes all . . . street railway corporations . . . common carriers . . . and also all persons engaged for profit in the same kind of business.
>
> The term "common carrier" as used in this act includes any and all common carriers, whether corporations or persons, engaged for profit in the conveyance of passengers or property, or both, between points within this Commonwealth. . .

Our commission has held that the word "common carrier" as used in this law is used in its broad sense as comprehending all that comes under the common law definition, and is not restricted to such carriers only as are named in the statute.[4] The question as to whether a given service falls within or outside the classification of a common carrier is a question of fact for the commission in the first instance.[5]

The Supreme Court of Pennsylvania in 1909, prior to the adoption of the public service company law, defined a common carrier thus:

> Any one who holds himself out to the public as ready to undertake for hire or reward the transportation of goods from place to place, and so invites custom of the public, is, in the estimation of the law, a common carrier.[6]

A common carrier has also been briefly defined as "one who undertakes for hire to carry all persons indifferently who apply for passage." Whether a person is engaged in the business of a common carrier is not dependent upon the means employed for the carriage, fixed termini nor definite route. These are held to be but limitations which the carrier places upon himself beyond which he may not be compelled to go in the performance of the public service which he purposes to render.[7]

In approaching the question as to whether a particular service is or is not that of a common carrier, it has been held that it is immaterial what a man professes to do, or what he says he does not do, or what his charter authorizes him to do, but, rather, what does he do in fact.[8] He actually does at least two things; he holds himself out to the public as ready and willing to perform a transportation service, and he actually carries some one somewhere. Judicial decisions fix the former of these acts as the most important in determining the common carrier status. If he holds himself out as ready and willing to carry people indiscriminately as they apply, for hire, within the scope of his undertaking, either as to destination, numbers, route or method he has classified himself as a common carrier. After that he may actually confine his carriage, either voluntarily or by virtue of the exigencies of the situation, to particular classes of the public, such as employees of a particular industry, without affecting his status as a common carrier.[9]

This holding out or invitation of the patronage of the public may be done by public advertisement, signs upon vehicles, signs upon fences, cards for general circulation, or bills and tags used in the business.[10] It may be done by taking a stand in a public street or square and inviting the patronage of the public, either by sign upon the vehicles or by gesticulating to people as they pass by.[11] On the other hand, the keeper of a garage, who at his place of business hires motor cars upon individual bargains to those who come to him and apply, is not holding himself out indiscriminately in such a manner as to make him a common carrier.[12]

The law states that the carriage must be engaged in "for profit." "For profit" has been judicially construed as synonymous with "for reward" or "for hire." This excludes the case of all purely gratuitous carriage, or the case where the public is expressly excluded in the undertaking as well as in the fact of carriage. Thus it has been held that where a man confined his holding out and his actual service to five named persons, although he hauled them repeatedly and for hire, he was not a common carrier.[13] Likewise, upon this principle, I assume a vehicle jointly owned by a number of individuals and operated expressly and exclusively for the benefit of the owners, not for profit, and from which the public is actually excluded, would be held not to be a common carrier. The commission and the courts may be depended upon to discover and control any competitive service which, while in fact that of a common carrier, is conducted in a manner

*Abstract of paper presented at the annual convention of the Pennsylvania Street Railway Association, Harrisburg, Pa., Dec. 4, 1923.

[1]In re John Beville, P. U. R. 1923 C, page 294.

[2]Allegheny Valley Street Railway vs. Greco, P. U. R. 1917 A, page 723.

[3]Act of July 26, 1913, Pamphlet Laws, page 1374.

[4]Scranton Railway vs. Walsh, P. U. R. 1916 D, page 18.

[5]Allegheny V. R. Co. vs. Greco, P. U. R. 1917 A, page 723.

[6]Lloyd vs. Transfer Co., 223 Pa., 148.

[7]Railway Co. vs. Greco, *supra*.

[8]Taxicab Co. vs. Kutz, 241 U. S., 252.

[9]Howard vs. Public Service Commission, 77 Superior, 188.

[10]Lloyd vs. Haugh, *supra*.

[11]Railway Co. vs. Greco, *supra*.

[12]Piercely vs. P. S. C., 73 Superior, at page 214 (1919); Oppenheimer vs. Md. Casualty Co., 70 Superior, 382; Terminal Cab Co. vs. Dist. of C., 241 U. S., 252.

[13]Towers vs. Wildason (Md.), 109 Atl., 471.

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calculated to make it appear like that of a private carrier.

An attempt was made in this state by a carrier to evade classification as a common carrier by limiting his passengers to current members of a "Community Auto Club." The qualification for membership in this club was the payment of $1, upon the payment of which the members received seven tickets as a gift, each of which was good for one ride. After these seven tickets were used the members could continue to ride by the payment of 15 cents cash fare or the purchase of additional tickets at the rate of seven for $1. This carrier contended he was not subject to the jurisdiction of the Public Service Commission upon the ground that all his passengers were carried under a special arrangement upon individual bargain. The commission found this special arrangement to be in the nature of a subterfuge, designated the service as that of a common carrier and issued a cease and desist order.[14]

It would seem that the practice of an automobile operator of rendering a service of carriage without exacting or demanding any particular fare but depending upon such reward as the passengers may see fit to give him, and where he holds himself out as ready and willing to carry all who apply for transportation, should likewise be held to be a mere subterfuge and effort to make an undertaking actually engaged in for hire or for profit or reward appear to be a gratuitous service.

Convenience and Necessity Defined

The convenience and necessity of automobile carriage supplemental to the service of established rail carriers has, however, been repeatedly recognized by the Public Service Commission in this state and certificates for such service granted. We have endeavored to point out that above and beyond all power of the commission, although disposed to do so within proper limits, to restrict or control or direct the course of development of public carriage, there is the final factor of public demand which must prevail. This demand, sufficiently asserted, becomes a public necessity. It is not what the Legislature or the commission or the street railways or any individual thinks should be adequately sufficient service, but rather what a sufficient number of individuals in the community want and are willing to pay enough for to make operation possible that will finally determine the manner by and extent to which existing service facilities must be supplemented or extended. There is in every community in normal times a drift or trend of development and a shifting of population to new locations. Every new settlement must have its beginning and normally its growth is extended over a considerable period of time. There must be a period of time before it reaches a size which would warrant rail extensions when the residents, so far as the rail service is concerned, are actually inconvenienced in some degree in their transportation. The public demands supplemental service and in its present frame of mind finds auto-bus transportation satisfactory and convenient.

Supplementary or Competitive Service

The question arises whether the public convenience and necessity may be better served by permitting such supplemental service to be conducted by independent carriers or by carriers in some manner controlled by the street railway companies. The Public Utilities Commission of the District of Columbia in discussing this question has said:

> In our opinion, there is a legitimate field for bus service, but this does not lie in the multiplication of lines or of vehicles reaching the heart of the city. It lies rather in providing service in extension of the street car lines into territory so thinly settled as not to justify the large investment necessary for street railway service. The bus lines should be feeders. They should create business and not rob the street railways of the just reward due their heavy investments for the public benefit. An exception to this principle arises when the existing street railway service proves to be inadquate and, for reasons either physical or financial, additional street railway lines cannot be created. In such cases, even in thickly settled territory, the obvious recourse is to bus lines; but, in the absence of legal objections, the best interests of the public will be promoted by causing such lines to be owned and operated by the street railway companies and to co-ordinate them with the car lines so that transfer privileges and other desirable joint relations may result.[15]

The Pennsylvania Commission, in approving the application for incorporation of an auto bus company organized by an electric railway company and in issuing a certificate of public convenience for operation of such auto bus service in a field where at least forty-five jitney operators were operating under certificates, said:

> At best, and under the most exacting conditions of regulations, jitney service of the character of that rendered in Chester is transitory and unstable. Automobiles are usually employed which are not equipped as they should be for public conveyance; it is difficult to the point of impossibility to operate them with the regularity and safety or with the service efficiency of vehicles designed and constructed especially for public passenger service; and in many respects that are obvious passenger auto bus vehicles, properly equipped, are preferable and superior to the types of cars used as jitneys over city streets and public highways. The elements of greater responsibility for the rendition of adequate public service by an incorporated company, and of the permanence of such service, are also important factors.

And further:

> Such extensions as may be necessary adequately to provide for the requirements of the city and adjoining territory will have to be assumed by the operating company as part of its public obligation. Properly rendered, auto bus service as an addition and supplement to existing trolley facilities, and operating in conjunction therewith, should afford more adequate and reliable transportation facilities than the city of Chester has heretofore possessed.[16]

Subsequently the approval of the incorporation and beginning of the exercise of the right to operate auto buses in the same territory was sought by an independent applicant. The bus company, incorporated by the traction company, had not yet obtained the necessary license from the municipality, while the new applicant had such license. The Public Service Commission refused to approve the incorporation of the new company and stated:

> The commission is still of the opinion that the contemplated auto-bus service can best be rendered as a supplement to the existing trolley service, and can best be operated in conjunction with the trolley system.[17]

Our commission seems therefore to have adopted a policy favoring the operation of automobile service supplemental to trolley service by companies identified with the street railway companies. In addition to the likelihood that such operation will better serve the convenience and necessity of the public, from the viewpoint of the street railways themselves, distinct advantages would seem to result therefrom. Among other advantages which may suggest themselves to practical street railway men I would suggest the following:

1. It prevents outsiders from acquiring prior rights in territory naturally to be served by the street railway company. It is possible that such prior rights may at some future time arise to embarrass or impede the street railway company, either in the extension of its street railway lines or in the inauguration of supplemental motor bus service. The superiority of the motor bus over the transitory and unstable jitney is recognized, and this means that the motor bus will in all likelihood generally supplant the jitney. The motor bus involves a larger initial investment and will therefore in all likelihood be identified with more responsible and dependable owners. Such owners may not be so readily eliminated from the field by the buses controlled by the street railway companies.

2. Motor bus service so conducted identifies itself with the street railway service, as a part of it, and thus is a traffic feeder for the trolley cars at the same time that it tends to create a complete, satisfactory and acceptable transportation service, all of which, as has been previously pointed out, contributes fundamentally to the permanence and value of street railway investment.

3. It is well known that, despite the diligence of established carriers and of the Public Service Commission, irresponsible automobile operators do as a matter of fact, to some extent at least, compete with the rail carriers, either by failure to obtain certificates of convenience or by persistently exceeding the rights granted them. Such competition would be eliminated by motor buses operated in connection with the street railways.

4. It would prevent the diversion of traffic from the rail carriers, naturally and geographically entitled to it, to other carriers.

5. It would furnish a more responsible and substantial and unified automobile service.

6. It may at some future time enable street railway companies by the exten-

[14] Lehigh Valley Transit Co. vs. Bauder, P. U. R. 1921 D, 404.

[15] In re Washington Rapid Transit Co., P. U. R. 1923 B, page 328.

[16] In re Southern Pennsylvania Bus Company, Application Docket, Pa., No. 6720, 1922.

[17] In re Chester Auto Bus Line, P. U. R. 1923 E, page 384.

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sion of the auto-bus service to abandon unprofitable branches or lines without objection upon the part of any one.

7. It will insure the fixing of automobile transportation rates upon a scientific basis and to this extent eliminate an unfair and unfavorable comparison of rates as between motor bus and street railway carriers.

The increasing demand upon the part of the riding public for automobile transportation cannot, in my judgment, be safely ignored by the street railway companies, and it may possibly be that the motive of self-preservation may eventually force all street railway companies into greatly enlarged supplemental auto-bus transportation.

Accounting for Operating Expense and Depreciation

This Topic Considered in Report of Committee on Public Utility Rates at This Week's Convention of Railway and Utility Commissioners—Separate Fund Recommended for Depreciation Reserve

IN ITS report at the convention of the National Association of Railway & Utility Commissioners at Miami this week the committee on public utility rates said that previous reports of this committee have dealt with the fundamentals of rate making, such as valuation, depreciation and rate of return, and, as was pointed out in the report of the 1921 committee, valuation has received so much publicity that there has arisen the quite common view that valuation is an end in itself. The report at the Miami convention this week was given up largely to the subject of desirable regulations for the expenditure of a depreciation reserve fund, with some introductory references to the importance of accurate accounting of operating expense, to which attention had been called in the 1921 report. Thus, the report says that donations to educational and charitable institutions are not a proper charge for operating expenses. To allow them would be to make the ratepayer the real donor. In Alabama a federal judge, in a recent case, had allowed as an operating expense a contribution of $500 by the utility to the campaign fund of a candidate for the City Commission where the utility is located. An appeal on this has been taken by the state commission.

While the committee considers legitimate advertising as unquestionably a proper item to be allowed as an operating expense, it points out that utility advertising managers are not infallible and are liable to error especially if no questions are asked and their mistakes are passed on to the rate payer. If regulation is to take the place of competition for public service corporations, then regulation, while not infringing upon management, must know that management is honest, efficient and economical.

Reserve for Depreciation

This section of the report was written by E. R. Hughes of the Oklahoma Public Service Commission. An abstract follows:

Much has been said and written within the past few years on the maintenance of what is commonly called "the reserve for depreciation." Some have taken the position that such a reserve is entirely unnecessary and therefore unjustified. Others, who have recognized the necessity for such a fund, have held that it may be used by the utility affected in such a way and for such purposes as the utility may see fit to put it. A number of the state commissions, including that in Oklahoma, have taken the position that any amount allowed for depreciation should be maintained as a separate fund and strictly accounted for, in so far as its use is concerned.

It has long been recognized that some amount should be allowed for the gradual waste of property used and useful in the rendition of a public service. This principle was enunciated very clearly by the Supreme Court of the United States in the Knoxville water case, and it has been set forth in numerous textbooks on the subject. The necessity for the creation of such fund and the allowance in the fixing of a rate of an amount sufficient to take care of the gradual wasting away of the property used in the public service being conceded, the most important consideration then is: How shall the fund so created be treated by the commission with respect to its maintenance and use?

It should go without saying, in the opinion of the writer, that when a public utility engages in the business of serving the public, it assumes a responsibility for keeping its means of service in such condition that the service will not be interrupted or impaired. Its property cannot be removed and established elsewhere so long as it is needed in the service being rendered, and it cannot be permitted to run down or get out of repair to a point where service is affected.

For the reason that it is not possible to meet the factor of depreciation from day to day or from year to year, the full serviceability of the utility's property can only be maintained where there is provision made against the time when retirement or replacement can be made. This provision must be financial in its nature and must be reasonably liquid so that its use when needed will not be unduly delayed. It must be reasonably adequate in amount, and should be, as has been repeatedly asserted by various state commissions, fully protected at all times. From the nature of the obligation which rests upon the utility, the provision of such a fund is as much a part of the utility's property as any physical unit in it, and when provision is made therefor it renders the immediate physical conditions of the property relatively unimportant for the reason that whatever may have gone from the physical property through use is represented in a ready financial ability to retire or replace when necessary.

It is true that the consumer pays only for the commodity which he has received in the way of service, but it must not be overlooked that under regulation under the ordinary and usual conditions the concern supplying the commodity is in fact a monopoly enjoying the exclusive privilege and right of engaging in the business undertaking, and under usual and ordinary conditions the consumer is entirely dependent upon one concern for the supply of that commodity which, in many instances, is practically a necessity. He therefore looks to the regulating authority to see that all reasonable measures are taken to insure in so far as possible a continuation of the supply of the commodity and the continued rendition of uninterrupted and unimpaired service.

The Oklahoma Order

These considerations induced the Oklahoma commission in 1921 to conduct some hearings on the subject and in 1923 it issued an order based largely on that used by the Indiana Commission in several specific rate orders made by it. A summary of the material provisions of the Oklahoma order is as follows:

"1. That each and every public utility company operating within the State of Oklahoma shall, on and after Feb. 1, 1923, create, provide and maintain separately a depreciation reserve fund, into which shall be placed all the moneys allowed and earned for depreciation.

"2. No public utility company shall be permitted to pay out in dividends any sum in excess of 8 per cent of the record value of its property used and useful in rendering service until after the full amount of allowed depreciation shall be paid into the depreciation reserve fund of such company.

"3. That said fund shall be handled and accounted for entirely separate and apart from the other ordinary funds of such utilities.

"4. That such depreciation reserve shall be held strictly in said fund and shall only be used in the following way and for the following purposes, to wit:

"(a) For meeting depreciation.

"(b) For investment in government or other high grade listed securities to be held strictly in said fund, and which shall return to said fund not less than 4 per cent per annum, or

"(c) Any such utility may borrow from its depreciation reserve fund for a period not to exceed three years an amount equal to the cost of any new

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construction, extension or addition to the property—items chargeable to capital account—but as security to said fund there shall be deposited in same the utility's own bonds or the notes of such utility bearing interest at the rate of not less than 5 per cent per annum, which interest shall accrue to said fund.

"5. In handling such fund the utility will be held strictly accountable for its safe investment, for proper administration and accounting. Said accounting shall be double entry with the asset account designated 'depreciation fund' and the liability account designated 'depreciation reserve.'

"6. Each annual report filed by any public utility company shall set out clearly the exact conditions of said fund, showing clearly all additions to or deductions from this fund during the year covered by such report, the balance of said fund at the close of the year, and how invested."

The provisions of this order are not so drastic as many of the commissions of the United States have seen fit to adopt in connection with depreciation reserve requirements. It was sought to make the order sufficiently elastic and broad to cover all classes of public utilities, as well as to meet the different and varying conditions under which the different utilities were operated.

The great difficulty which confronts a regulating commission in this matter is usually the fact that after an allowance has been made, in the fixing of a rate for depreciation, in addition to the amount allowed at interest upon the investment, a great many utilities have taken the amount allowed as depreciation and capitalized it in property, to be used in connection with the service rendered, or have paid out the amount so earned in the way of dividends to the stockholders. The result of this practice is that when the time arrives when a continuance of public service depends upon replacement of property, used in the service, that such utility then applies to its commission for an additional rate based upon that necessity. The patron of the utility, having once paid into the coffers of the company, is again required to pay in the way of an advanced rate for that for which he has already paid once.

This question has been considered in numerous cases by commissions in the United States and the position of the Oklahoma Commission is in line with the decision of the Supreme Court in Railroad Commissioners vs. Cumberland Telephone & Telegraph Company, 212 U. S., 414, where the court, after saying that money collected for depreciation should not be so used as to add to the capital account, pointed out that this was not a case where there were surplus earnings after providing for depreciation fund, and the separate earnings were invested in extensions and additions. This distinction is a very important one to be remembered by the various commissions. In the Cumberland case also, the court declared that the burden of proof, after showing where the depreciation reserve fund was expended, rests upon the utility and not upon the commission.

In conclusion, the commissions of the country should closely scrutinize the operating conditions of the utilities regulated by them with a view to seeing that revenue paid into the treasury of the company for the purpose of guaranteeing continued rendition of service is not dissipated by the paying of exorbitant dividends and is not capitalized without a strict account of the fund raised by this method by the utility.

The full committee on public utility rates, rendering this report, was Frank D. Morgan, Alabama, chairman; E. R. Hughes, Oklahoma; A. A. Betts, Arizona; J. M. Thompson, Idaho; Henry C. Atwill, Massachusetts; William J. Smith, Illinois, and Porter Dunlap, Tennessee.

Utility Policies Discussed

Association of Railway and Utility Commissioners Consider Regulatory Measures at the Miami Convention

THIS week the National Association of Railway & Utilities Commissioners is holding its annual meeting in Miami, Fla., and an extended program of addresses and committee reports is under consideration. Those from whom addresses are scheduled include representatives of the American Electric Railway Association, National Electric Light Association, American Gas Association, American Railway Association and Interstate Commerce Commission. A few of the committee reports have been received in time for brief reference in this issue. One on public utility rates is printed in rather extended abstract in another column. Abstracts of some of the other reports follow:

The report of the committee on service of public utility companies was devoted largely to a consideration of the New Jersey situation of last summer, when there was no trolley service for fifty-one days in 142 municipalities, representing a total population of more than 1,000,000 inhabitants. According to the report, the situation which began with the strike of the employees became a strike against the public on the part of the company, which adopted a policy of "Agree to our plan or no service will be offered." Legal measures under which the company was required to begin service are described. The report, in defending the position of the court of equity of New Jersey in the case, cites the possible case of a water company which desired to increase its rates or relieve itself of other economic burdens and announced that it would withdraw all water service until the public officers and the public at large consented to its plans. But little imagination is needed, the report says, to point out the disaster to any large city if its water supply were cut off entirely for a period of fifty-one days. The report continues:

> The law should never be without a remedy under such conditions, and that remedy should be one that should immediately be effective and should not be surrounded by any of the ordinary delays incident to legal procedure. . . .
>
> The action of the company in New Jersey in withdrawing its service in its entirety was at once a challenge to the sovereignty of the state. Its success would have defeated all regulation. It would have nullified all laws and the supreme power of the state over its citizens and corporations. It would have pointed out to all utility companies that relief as to rates and to any other economic condition could be brought about by any company by simply withdrawing its entire service until its terms were met by the public. We express the doubt that nowhere since regulation became a part of our political institutions has any great public utility attempted to establish such a precedent.

In its recommendations the committee declares that in every state where regulation is effective steps should be taken and a proper legal machinery be provided to prevent a situation of this kind ever becoming effective, and that the franchise obligation to serve shall always be construed to mean continuous and uninterrupted service. The report was submitted by J. J. Divine, chairman of the West Virginia Commission.

GRADE CROSSINGS

The report of the committee on grade crossings and trespassing on railroads contains a table showing the apportionment of the cost of eliminating grade crossings in the different states, when fixed by statute. The report declares that the time has come when in some form the automobilist should specifically be required to share in the expense which has usually been divided between the railroad and the public. The proportion suggested is 40 per cent for the public, 40 per cent for the railroads and 20 per cent for the automobilist, and the suggestion is made that this 20 per cent might possibly be obtained by diverting the fines imposed upon automobilists for reckless driving into a fund for this purpose. The report, which was submitted by W. T. Gunnison, New Hampshire, chairman, also suggests that to compel automobilists to slow down at crossings obstructions might be placed in the highway.

Central Traffic Men Meet

AT A meeting of the Central Electric Traffic Association in Cleveland, on Nov. 21, the committee on prevention of freight claims recommended that all waybills covering inter-line shipments be placed in a large waybill envelope and carried outside the car rather than inside the car with the shipment.

The association also decided to advertise the lines of the Central Electric Railway Association territory in the *Traffic World*, the amount of space to be contracted for depending on the number of companies which are willing to participate in this advertising.

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Pennsylvania Men Discuss Bus and One-Man Cars

TWO very practical papers, one on the use of motor buses by street railways, by J. F. Shrader, and the other on one-man car operation, by W. H. Boyce, were the features of the annual meeting of the Pennsylvania Street Railway Association held at Harrisburg, Pa., on Dec. 4. The convention was limited to an afternoon and evening session only, but the attendance was larger than usual, being about 100 altogether. In the absence of President C. B. Fairchild, the meeting was presided over by Vice-President F. R. Phillips, Pittsburgh Railways.

The electric railway men were greeted by Governor Pinchot, who said that he was glad to say that the street railways had recognized their duty to the public, which cannot be said of all other public utilities, as, for example, the anthracite industry.

The papers presented by Mr. Shrader and Mr. Boyce appear elsewhere in this issue. John P. Dohoney of the Pennsylvania Public Service Commission sent a brief communication to the convention on the subject of safety, in which he commented that in a period of ten years there had been only four street car passengers killed as a result of crossing collisions in Pennsylvania. He said that this marvelous record reflects the precaution that is exercised in crossing movements and is made more notable by the fact that trolleys are operated over 611 crossings, 310 of which are on main lines.

Major Otto Rau addressed the meeting briefly on "The Giant Power Survey." Major J. S. S. Richardson, director of the Pennsylvania Public Service Information Committee, presented a paper reviewing the history of the development of the state information committees and outlining the plan of their work and the accomplishments of the Pennsylvania committee in its brief existence.

The convention passed a resolution indorsing the tax reduction plan of Secretary Mellon. Further business was the decision to appoint a committee to investigate the possibility of legislation to permit railways to operate trackless vehicles under their present charters. The executive committee was authorized also to appoint a permanent committee to co-operate on the giant power survey.

The new officers elected for the ensuing year were as follows:

President, F. R. Phillips, acting general manager Pittsburgh Railways; vice-president, W. S. Bell, general manager Wilkes-Barre Railway; secretary and treasurer, H. M. Stine, Harrisburg, Pa. The executive committee will consist of Messrs. Phillips and Bell and Gordon Campbell, C. L. S. Tingley, Thomas Cooper, C. F. Crane, and C. B. Fairchild.

At the evening banquet short speeches were made by several people. Edward E. Beidleman, former Lieutenant-Governor of Pennsylvania, expressed the belief that the pioneer investor deserves a greater return on his money than the man who takes no chances, and that new capital cannot be secured for future pioneering enterprises if the return is too rigidly limited. In other words, he disapproved of the limitation of railway earnings to the so-called fair return of about 6 per cent.

Kentucky Utilities Meeting Postponed

THE annual meeting of the Kentucky Association of Public Utilities, scheduled for Dec. 13 and 14 has been postponed to Jan. 10 and 11, 1924, according to an announcement from Edward F. Kelly, secretary.

American Association News

Midyear Meeting Program

AT THE meeting of the committee on subjects and meetings of the American Association, held in New York on Nov. 27, it was decided to make the city traffic problem the topic for the morning session of the midyear meeting, which will be held in St. Louis, Mo., on March 4, at the Chase Hotel. Traffic will be discussed from various standpoints including those of municipal authorities, motor vehicle interests and electric railways, with the idea of co-ordinating all interests in working toward better conditions.

It was decided to devote the afternoon session to the subject of finance, with three principal speakers, one a banker, one an economist and the third a holding company representative.

There will be the usual banquet in the evening with a speaker of national prominence closely associated with the administration in Washington, and one other speaker, of public prominence.

The members of the subjects and meetings committee present were Chairman Frank R. Coates, Gen. George H. Harries, Harlow C. Clark, J. K. Punderford, F. W. Doolittle, W. H. Hyland, Cornell S. Hawley, Harry L. Brown, E. H. Reed, representing E. M. White, and J. W. Welsh.

Extra Mail Pay

THE Post Office Department in circular letter R-A-514, dated Nov. 28, issued by the division of railway adjustment, office of second assistant postmaster-general advises that the department will pay for emergency mail service duly employed on and after Dec. 1, 1923, as supplied by the urban and interurban electric railways. L. H. Palmer, chairman of the committee on mail pay, interprets this to be largely to take care of the Christmas business, although it would apply at any time of the year when for some exceptional reason excess mail moves.

Heavy Electric Traction

THE first meeting of the heavy electric traction committee of the Engineering Association was held at New York Dec. 6. It was voted to revise and bring up to date the bibliography of heavy traction and electrification data, rearranging it in such form as to be more readily accessible. It was proposed to limit the number of periodicals indexed to approximately twenty-five of the leading American and foreign journals. The subject was referred for further study to a sub-committee, of which H. F. Brown is chairman.

The subject of self-propelled cars and storage battery locomotives was discussed. It was felt that information on this topic would be of importance not only to the steam railroads, but also to a certain number of interurbans which might require extensions in territory where an electric line is not justified. It was the sense of the committee that the topic should include self-propelled locomotives as well as motor cars. The subject was referred to a sub-committee, J. H. Davis chairman.

The subject of articulated trains was referred to a sub-committee headed by J. J. Sinclair.

There was some discussion regarding the subject of couplers for train service. The entire matter, including the proposed manner of treatment, was referred to a sub-committee, with A. H. Daus as chairman.

Those present at the meeting were J. C. Davidson, chairman; A. H. Armstrong, A. H. Candee for H. W. Cope, H. F. Brown, J. H. Davis, E. P. Chase for J. V. B. Duer, Norman Litchfield, L. S. Wells, J. J. Sinclair, A. H. Daus and Morris Buck.

Special Reports Available

THE Bureau of Information and Service of the American Electric Railway Association announces that the following special reports have been prepared and are available to member companies in good standing upon request:

Trend of Material Prices: A new edition of the association's compilation bringing down to date the trend of prices of materials used by electric railways as furnished by manufacturers.

One-Man Car Operation: A summary of the replies of over 200 companies to the association's questionnaire, showing the number and types of one-man cars operated, fare collection methods, accident record and the attitude of the public toward operation with one man.

Accident Statistics of Electric Railways: Comparative record of 113 companies for the years 1920, 1921 and 1922, showing number and cost of accidents, causes of the more frequent types of accidents and comparisons on unit basis to show the general progress in accident prevention.

In addition to the above, supplements to the Wage Bulletin, Fare Bulletin and Cost of Living Studies have been prepared bringing them down to date.

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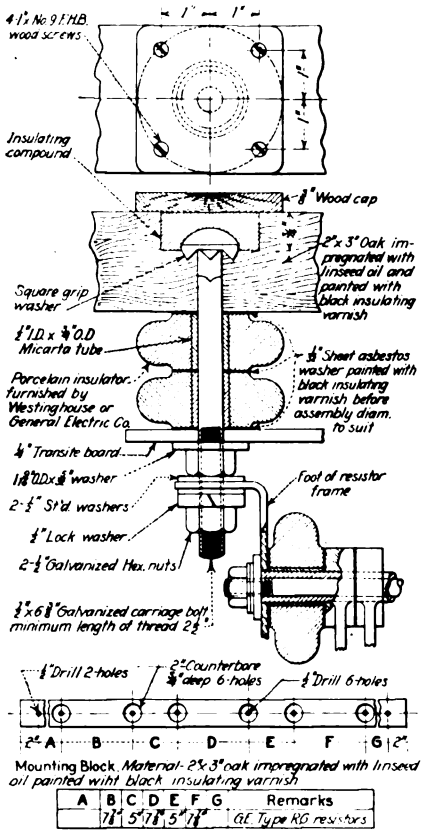
Maintenance of Equipment

Improved Type of Resistor Mounting

By H. S. Williams
Assistant Superintendent of Equipment, Department of Street Railways, Detroit

LAST season so much trouble was experienced with comparatively new equipment on the lines of the Detroit Municipal Railway, due to grounded resistors, that radical steps had to be taken to correct the inherent weakness of the method employed in mounting. This original method was the familiar scheme using two porcelain insulators and insulating sleeves at each supporting bolt, which plan is recommended by the large manufacturing companies. This scheme has proved unsatisfactory in that the leakage distances are too small. Of course, this trouble could be minimized if all the porcelain insulators were kept clean. This however, is impracticable because of the added cost of such care and the fact that the upper porcelain is often very inaccessible.



Sections and Plans of Method of Mounting Resistors

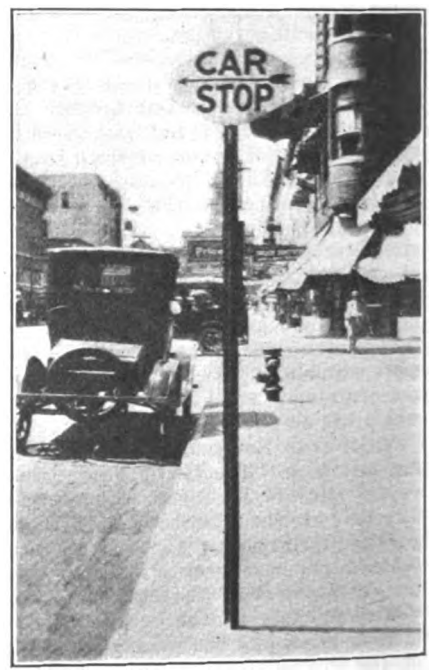
The accompanying illustration shows the improved plan of mountings which has been adopted. This is essentially a combination of the method used many years ago with the latest recommended practice, but with added refinements. The mounting block which fastens to the car underframe is made as long as convenient. This is of oak, and, after fitting and drilling, it is prepared after the principles used in dipping and baking railway armatures. It is baked in an oven, dipped in linseed oil or insulating varnish, baked again and given a final coat of black air-drying varnish. This gives it a lasting moisture-proof character.

The next step is the application of the grid mounting bolts. These are galvanized carriage bolts countersunk in the mounting blocks, and the countersink is filled with a special insulating compound so as to prevent any leakage at this point due to moisture. This compound is further guarded by an impregnated wood cap. Definitely to avoid trouble from the turning of the carriage bolt head in subsequent maintenance, a special square grip washer is used.

Insulating sleeves and porcelain insulators are then applied. With two porcelains used together the leakage distance is increased so that no matter how much alkali, dust and moisture is present they will stand up. The transite heat guard is then applied and bolted in place. Up to this point the installation is considered permanent, which explains the extra precautions used as to detail. It is believed that with this plan carefully followed, the slight added expense is fully warranted and that resistance grounding will be entirely overcome. All wires to the resistance have the insulation removed from the connectors back to the top side of the transite board and the bare wire is tinned thoroughly. The same porcelains used in mounting are being tried out at the ends of the resistance grids in order to increase leakage distance at this point. An opinion on its efficiency cannot be given yet.

Old Rail Used to Support Car Stop Sign*

DURING the recent war the Northern Texas Traction Company, Fort Worth, inaugurated the skip-stop system on its city lines. It was therefore necessary to designate each stop by a car-stop sign. For this purpose was used a metal plate fastened to a vertical post made of an old rail sunk into the sidewalk.



All Car Stops in Fort Worth Are Marked by Signs of This Type

On all lines on which front-entrance one-man cars were used these posts were placed at the curb in such a position that when the car came to a stop the car-stop sign would be exactly opposite the front door. Similarly, on lines where rear-entrance cars were used the posts were located further from the street corner, so that the sign would be opposite the rear-entrance door of the car.

Installation of these signs has resulted in speeding up the service and a lessening of confusion among the boarding and alighting passengers. When additional stops were installed new signs were erected at all of the

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

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new stopping points. Whenever double-truck two-man cars, with rear entrance, are replaced on any line by one-man front-entrance cars the car-stop signs are moved so that they will be in the proper position for the new type car.

New Cable Suspension Reduces Vibration

By G. H. McKelway
Engineer of Distribution Brooklyn-Manhattan Transit Corporation

A NEW form of suspension for high-tension triplex lead-covered cables has been worked out in Brooklyn to reduce the vibration where the cable is suspended from the elevated structure. In a number of places cable of this type is used where there is no underground conduit, and occasionally cables are run overhead on pole lines.

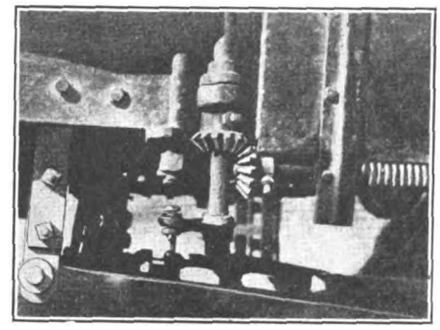
Originally the practice was to hang the cable directly from a messenger wire, which in turn was attached to the structure. The connection between the messenger wire and the cable was made by marline instead of by metal clips, since the elevated structure was used as a part of the return circuit. It was considered undesirable to permit any current to flow along the sheath of the cable, as this might cause damage by electrolysis. Some trouble was experienced due to cracking of the lead sheath, caused by vibration of the elevated structure whenever a train passed.

An improved method of construction was adopted to remedy the difficulty. A suspension wire is attached by U-clamps, which run through the flanges of light I-beams bolted to the girders. A second messenger wire is hung from this suspension wire by U-bolts attached at intervals of approximately 10 ft. The lead cable is suspended from the lower messenger by marline, the wrappings of marline being spaced 1 ft. apart.

Steady braces are provided on curves where there is danger of the cable being pulled against the elevated structure. These consist of pieces of strap iron bolted both to the girder and the lower messenger wire. This improved method of suspension has reduced the troubles from cracking of the lead sheaths considerably. Vibration is not entirely eliminated, but by careful inspection at frequent intervals cracks can be located and repairs made before moisture can enter to damage the insulation.

Bevel Gears Improve Door Operation*

THE Northern Texas Traction Company, Fort Worth, has found the use of bevel gears in place of toggles and rods for door and step operation to be a great improvement. These gears are installed on the lower end of the door rod, as shown



This Bevel Gear Arrangement Has Given Satisfaction on the Cars of the Northern Texas Traction Company

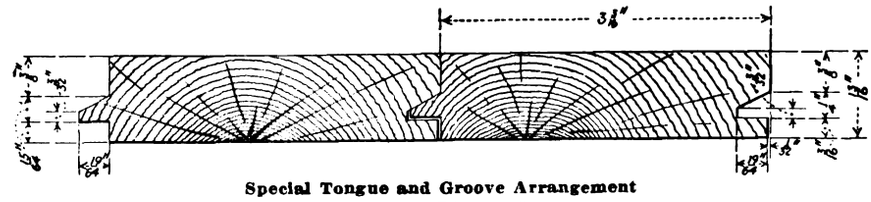
in the accompanying illustration. Their use reduces the amount of door and step rigging by half and makes it possible to adjust the mechanism with a single movement. Door and step trouble has been greatly reduced, and the operation from a transportation standpoint is much more satisfactory than with the older type apparatus.

Long Wear Platform Flooring

THE Chicago Surface Lines recently made a careful investigation of the construction of platform floors on its cars for the purpose of reducing maintenance costs.

These floors have heretofore been made of single $\frac{13}{16}$-in. hard maple boards, $3\frac{1}{4}$ in. wide. It was found that it often became necessary to renew flooring because of the splintering of the boards at the tongue and groove joint as the upper surface became worn. In many cases the floor still had ample strength but was replaced on account of its poor appearance.

The arrangement shown in the accompanying drawing has been adopted to increase the life of the flooring and also to avoid the unsightly appearance of open cracks. The tongue and groove are cut as near the lower surface as practicable, thus giving a wearing depth of $\frac{3}{8}$ in. from the upper surface. The lower face of the tongue is cut almost at right angles to the edge of the board, while the upper face is sloped down at a sharp angle. Consequently when the flooring becomes worn down to the edge of the groove the resulting crack in the joint does not become unsightly until all of the useful life has been obtained.



Special Tongue and Groove Arrangement for Increasing Life of Flooring

Emergency Valve Used as a Quick Release Valve*

ONE of the principal advantages of the Birney car is its extremely rapid acceleration, and when a question of converting the large double-truck cars of the El Paso Electric Railway into one-man type came up, there were many who did not believe that they would be able to make the time with them, particularly during the rush hours. The air equipment on these cars was the Westinghouse SME with the "D" emergency valve. The release on this valve was very slow, and would not make for quick acceleration. The valve was studied with the idea of converting it into a quick-release type, with final success.

The emergency valve was left in its original place, the emergency line was removed and the emergency port leading to the bottom portion of the valve was plugged and the emergency valve taken out. The main reservoir line was left in its original position, the straight air line from the "D" emergency valve was connected to the brake cylinder line on the K-1 emergency valve.

By making this change, not only was the quick acceleration obtained, but also much quicker brake action, thus obtaining more rapid operation and better conservation of equipment.

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

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New Equipment Available

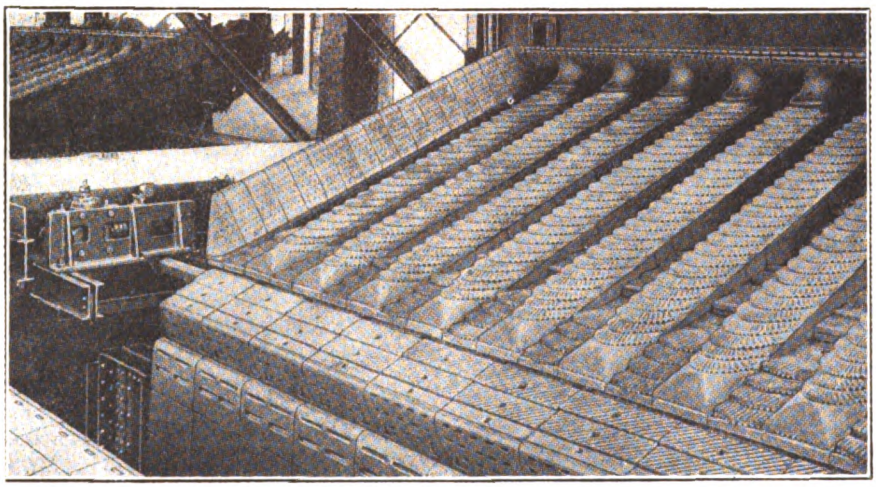
New Model Underfeed Stoker

THE Westinghouse Electric & Manufacturing Company announces the development of a new multiple retort underfeed stoker. This is sold in all the usual sizes and includes double and single dump grates, also double and single roll ash discharge devices. A new development in positive control of the contour of the fuel bed has been added, also another new feature of this stoker is the agitating element. This provides a means of maintaining minimum loss due to combustible in the refuse. The experimental installation of this type of stoker in Minneapolis was treated at length in this paper, in the issue of Aug. 12, 1922, on page 221.

The movement of the secondary ram is counter to that of the main ram. The motion agitates the fuel beds as the rams approach and recede from each other, thus uniformly distributing the fuel. The secondary rams are actuated by connecting rods from the main ram. The travel of the individual or group of rams is varied in increments from no travel to full travel. The action of the agitating grate is provided by a steam or air cylinder controlled by a pilot valve mounted adjacent to the side furnace door.

The wind box is beneath the stoker and is exceptionally large. The dampers are rectangular and of large area, hence the air velocity through the damper frames is relatively low for any condition. The damper frames are steel and cast iron set in the concrete floor of the wind box. The main and division dampers are made of steel plates with angles. Each damper has its control conveniently mounted in front of the stoker.

The new ash discharge device or clinker grinder which has been developed can be applied to any Westinghouse underfeed stoker. The construction provides for four walls which are relatively vertical, assuring positive discharge of the refuse into the deep pit, where the large rolls dispose of it. The front and rear walls are built of heavy sectionized cast-iron plates of uniform thickness. This provides for expansion and contraction without cracking. The large square forged-steel shafts are incased in heavy sectionalized cast-iron rolls and are supported by massive bearings.



Interior View of Stoker Showing Ash Discharge Device

Roller Pipe Cutting Machine

THE Geist Manufacturing Company, Waynesboro, Pa., has placed upon the market a high-production heavy-duty roller pipe cutter. The design of this machine embodies features which have eliminated certain weaknesses found in other machines of this type.

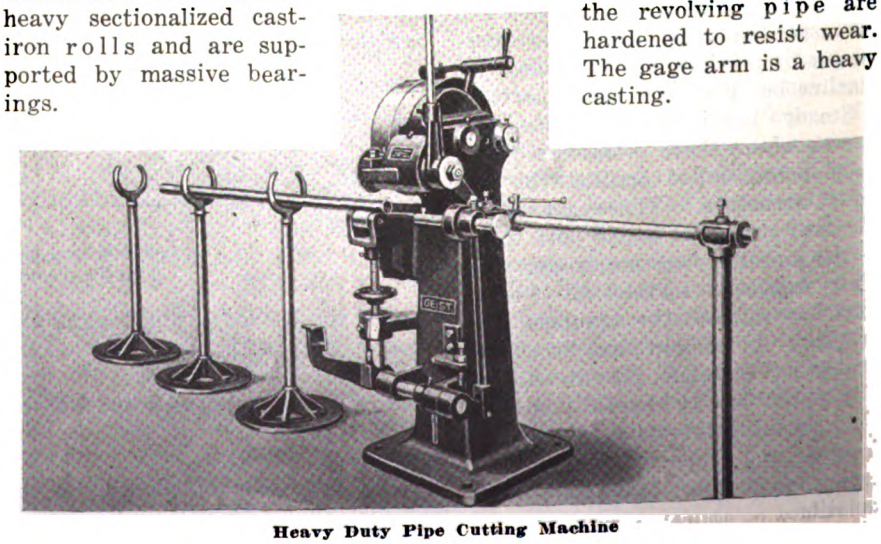
This machine is made in one size, having a range from ⅛ in. to 2 in. inclusive.

It is compact and rigid in design. All spindles and shafts are ground and run in bronze bushed bearings.

The cutter is made from tool steel and is heat-treated to give the maximum wearing qualities. It can be reground when dull. The cutter shaft bearing is provided with an adjustable cap on the cutter side for taking up any wear which may occur.

The rollers are made from tempered tool steel and are carried in roller bearings. The cage which supports the rollers is elevated to the cutter by a cam operated jointly by a pedal and a lever. The sliding surfaces of the cage are protected from scale and dirt by a flexible guard. The rollers are adjustable for the different sizes of pipe. This adjustment is obtained by means of a hand wheel located just below the rollers. The lever and the pedal can be positioned to suit the operator. Their movements are limited by an adjustable stop. A small cage of rollers for ⅛-in. to ⅜-in. pipe can be attached to the large cage without removing the regular rollers.

The length gage is adjustable for the different sizes and lengths of pipe. It will gage lengths of pipe up to and including 4 ft. The parts coming in contact with the revolving pipe are hardened to resist wear. The gage arm is a heavy casting.



Heavy Duty Pipe Cutting Machine

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The News of the Industry

North Shore Rights Through Chicago Disputed

Corporation Counsel Believes High-Speed Interurban Has Exceeded Its Rights

An opinion was recently delivered to the City Council of Chicago by the corporation counsel holding that the Chicago, North Shore & Milwaukee Railroad is operating passenger, merchandise dispatch, express and freight service over the Northwestern and South Side "L" lines within the city limits without legal rights. This opinion is the result of an order passed by the City Council which declares that the North Shore Line is operating within the city without franchise and requires that it be compelled to stop its trains at all stations or get off the right-of-way of the "L" lines altogether. The city law department contends that the franchises of the two "L" lines do not give these companies the right to grant trackage rights to the North Shore Line.

History of the Case

According to the legal department of the North Shore Line, this company operates over the "L" tracks under a statute of the State of Illinois which provides that one railway property may lease trackage rights over another railway property, even though such rights are obtained under protest. A city ordinance, however, does prevent certain steam road equipment from being operated over the elevated structure. This ordinance has not been violated by the North Shore Line because no attempt has been made to operate other than electric railway equipment.

In July, 1907, the City Council of Chicago passed an ordinance authorizing the Chicago, Milwaukee & St. Paul Railroad to electrify that part of its Evanston Division lying between Irving Park Boulevard and the city limits on the north. The ordinance provided that trains be operated electrically, either by the St. Paul company or by the Northwestern Elevated, but that in either case passengers should be carried from all stations within the city limits to all stations on the Union Loop without change of cars.

In 1910 the City Council passed an ordinance requiring the St. Paul company to elevate its tracks from Montrose Avenue to the north city limits, but no construction work was done then. Later the Chicago, North Shore & Milwaukee Railroad desired to get entrance over the elevated structure into the Chicago Loop. The St. Paul Railroad was willing to lease its right-of-way from Wilmette, a suburb just north of Chicago and Evanston, to Montrose Avenue to the North Shore Line, provided the Northwestern Elevated would surrender its contract made in 1907. The St. Paul company was ready also to elevate its entire right-of-way for additional tracks, provided the North Shore Line would undertake to handle electrically the freight business of the St. Paul Railroad along the lake shore in Chicago and pay interest on the capital expenditure for such track elevation.

The North Shore agreed to assume these obligations if the Northwestern Elevated would surrender its 1907 agreement and permit the operation of trains of the North Shore Line over its track to the Union Loop and over the lines of the South Side Elevated to Twelfth Street. A joint operating agreement was entered into which rendered inoperative the agreement of 1907. The lease from the St. Paul Railroad was made to the North Shore Line, which is financially responsible to the St. Paul for all obligations, the Northwestern Elevated guaranteeing the performance of such obligations.

In this agreement the Northwestern Elevated, as between it and the North Shore Line, assumes all the lessee's obligations and in return gets the lessee's share of the benefits accruing from the lease, the North Shore Line reserving certain specified track rights, for which it pays the Northwestern Elevated rental, based on car mileage. Without the additional security given by the North Shore Line, the St. Paul would not have elevated its full right-of-way, so as to provide four main tracks for express service to the city limits instead of two as required by the 1910 ordinance. The continuance of service by the Northwestern Elevated north of Wilson Avenue is thus claimed to be directly dependent upon the performance of its obligations under the agreement, including the obligation to let the North Shore Line use its tracks to the Union Loop.

This lease and operating agreement was approved by the Illinois Public Utilities Commission in an order entered May 28, 1919, after a public hearing. On the plea of business men on the South Side, the Illinois Commerce Commission on Nov. 2, 1921, made an order extending the service of the North Shore Line to Sixty-third Street and Dorchester Avenue on the South Side. At both commission hearings the city was represented.

These agreements are said to be in strict accord with the ordinances of 1907, whereby the North Shore Line pays the city of Chicago an annual license fee of $50 per car for each car operated over the elevated lines.

One-Man Cars Still Operating in Oakland

City Seeks Aid to Raise Funds to Install Municipal Bus System—Railway Makes Offer

Resort will probably be had to the ballot in connection with the one-man car dispute in Oakland, Cal. The question of voting bonds to provide funds for municipally operated buses will be put up to the voters just as soon as the provisions of the initiative measure have been met. To this end the public is being asked to sign petitions, and as soon as the requisite number of signatures has been obtained the question of voting the bonds will be put up to the City Council.

What the voters will do if the question ever reaches them is, of course, problematical, but it would seem unlikely that the public will vote to discommode itself by paying an extra fare to ride in city buses, although it has been promised that the city buses will be run with a 5-cent fare, as against the 6-cent fare now being collected by the railway.

The San Francisco-Oakland Terminal Railways, which operates the local Oakland lines, has declared the proposed ordinance "unreasonable and therefore void." Aside from the merit inherent in the company's case in the present controversy its position is strengthened by the fact that a large part of its rush-hour traffic is carried across the bay in the company's own ferryboats and that most of the passengers thus carried transfer to the company's local trolley lines and to its high-speed suburban trains.

In the meantime, the one-man cars continue to be operated despite a city ordinance, but with the approval of the Railroad Commission. There are fifty such cars in use, although some of the larger ones are being run with two-men crews, replacing other cars, which have been sent to the shops. Threats of police action have been repeatedly made against the company by the city officials, but to Nov. 27 there has been no action along this line.

As far as public sentiment about the bus is concerned it seems to be divided. Buses are favored generally as feeders for outlying districts, but there is growing opposition to them in the more congested sections.

The railway itself is the latest to make an offer to run buses. It has filed with the City Council of Berkeley an application to operate buses in that city at a license fee of $60 a year for each bus. This offer has been referred to City Manager Edy for his investigation and report.

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The controversy in Berkeley antedates the one in Oakland by a month or two. That city passed an ordinance prohibiting one-man cars and the measure has been respected. One-man cars are not operated within the limits of that city.

In Alameda, too, there is a controversy. It is somewhat different from the others. In that city both the Peerless Stage Company and the railway have offered to run buses. The railway seeks to use the buses as feeders to its trolley lines, but the stage company wants to run buses on regular half hour schedules between Alameda and Oakland. This situation is made truly complex by the fact that the stage company has been refused a franchise in Oakland, the city officials of which desire to run a municipal bus service.

To date the only city run bus in Oakland is the Rosalie. It has been in service since the latter part of October, first on one run and then on another.

The one-man car controversy at Oakland really became acute in August when the company put into use with the approval of the State Railroad Commission a number of one-man, two-man cars. Previous to that time cars of the Birney type had been operated on Telegraph Avenue as far as Alcatraz. The only rumble against these cars came in the form of a protesting resolution passed at the national convention of the Amalgamated Association in Oakland early in September. These cars were only 25 ft. in length.

In August the one-man, two-man cars appeared and immediately the trouble started. Mayor John L. Davie, backed by Commissioner Moorehead, formerly business agent of the Oakland carmen's union, immediately prepared a resolution condemning the cars and then had the resolution passed by the City Council in the form of an ordinance.

Atlantic City and Suburban Strike Declared Off

A truce has been declared in the strike of the employees of the Atlantic City & Suburban Railway, Atlantic City, N. J., against restoration of the one-man cars. Full service on the company's lines has been resumed under an agreement between the company and the men that for one month two men will be placed on all cars, with the exception of the one run between Pleasantville and Absecon, where one man will operate a car during the slack hours. One-man schedules for periods of sparse traffic on other lines are to be put into effect later. The strike followed announcement by the company of the resumption of the use of one-man cars. The men held to their original contention that this operation was dangerous.

Residents of fifteen towns on the mainland, including Pleasantville, Bower's Point and Absecon, were affected by the tie-up. Mayor Charles Jackson of Pleasantville issued permits for buses to operate on the shore road between that city and Atlantic City to relieve the situation.

Franchise Amendment Vote

$1,500,000 to Be Spent by Ottawa Electric Railway if Residents Sanction Plan

Residents of Ottawa, Ont., will have an opportunity on Jan. 7 to vote on the proposal under which the Ottawa Electric Railway will carry out $1,500,000 of improvements. The negotiations toward this end date back to last summer.

On Aug. 10 the Mayor wrote to the company asking under what agreement it would undertake the Feustel improvements and extensions, requiring an expenditure of $1,500,000.

On Aug. 18 the railway submitted a proposal with certain changes, agreed to since the negotiations with the city's street railway committee. Stripped of the "judicial phraseology," in which it is now clothed in a legal document, the agreement is briefly this:

The old agreement of 1893, which has stood the test of thirty years, and was automatically renewed last August for five years more, is to continue in effect with the following amendments:

The company is to have an exclusive franchise to carry passengers within the city limits by street cars or buses operating on regular routes; such franchise not to prevent the operation of cabs, taxis, or buses from outside points.

The company is to have the right to operate a certain number of one-man cars on light traffic lines, with a guarantee that their introduction will not affect the position or seniority of any employee.

The Sunday and limited rates of fare are to be discontinued, leaving a straight 5-cent fare for adults and 3-cent fare for children, with no change in the old rate for school children.

At the end of the present five-year extension of the old agreement (August, 1928) if the company finds it cannot carry on with the 5-cent fare, it may appeal to the Dominion Railway Board to have the rate of fare increased for the next five years.

At the same time if the corporation thinks the company has been making more money than it should out of the 5-cent fare, the city may appeal to the same board to have the rate of fare reduced.

The judgment of the Dominion Railway Board on such appeals to be accepted by the city and the company as final.

Extensions that may be required for the five-year periods after August, 1928, to be settled by a board of arbitration.

These, in short, are the principal terms. The company points out that under the old agreement the city had the right to buy the railway in August, 1923. It did not do so. The old agreement stipulates it may do so at the end of any five-year period after August, 1923; the price to be set by a board of arbitration. The conditions of the old agreement are not changed, except as described previously. Under the new agreement the city still has the right to buy at the same time and under the same terms.

Saginaw Transit Provides Service—Jitneys Disappear

Transportation service is now being furnished Saginaw exclusively by the Saginaw Transit Company, which was granted a franchise last June for street car-bus operation. The jitney buses that aided in the bankruptcy of the old Saginaw-Bay City Railway and later furnished all the local service since Aug. 11, 1921, have ceased to operate. They carried their last passengers on Dec. 1.

While complete city service is now being given by the new company, there is one car line yet to operate. The delay in steel shipments prevented the construction of the double-track switch and the territory that naturally would be served by that line is entirely dependent on motor bus service.

All of the bus equipment has been delivered and just as soon as the one railway route is ready the company will function under terms of the franchise.

Charles S. Kressler, general manager, is doing everything possible to give the proper service and it is generally believed that he will be successful. To ascertain the requirements of the city, a traffic flow census is to be taken of all manufacturing plants.

Mr. Kressler's recent talk to the merchants of the city when he pointed out the high costs of driving their own cars in preference to using the railway service has borne fruit and many business men now leave their automobiles in the garages and use the street cars or buses as the case may be.

In the future each car or bus will carry a neatly printed card bearing the name of the operator.

"Spreckels Day" in San Diego

At a luncheon of the Optimists' Club in San Diego Claus Spreckels told what the San Diego Electric Railway was doing for Greater San Diego. Mr. Spreckels called on his department heads to arise in turn and give an account of themselves and their activities. E. J. Burns, assistant general manager of the San Diego Electric Railway, referred to the construction work being undertaken by the railway and its resultant expenditures. The plan of the Optimists' Club is to entertain the department heads of San Diego's largest business concerns at a series of noonday luncheons. This particular day was celebrated as Spreckels Day.

Subway Plans Ordered

Mayor Rolph of San Francisco has ordered City Engineer O'Shaughnessy to prepare plans and estimates for the Market Street rapid transit subway, saying it was proposed to submit improvements to the people at special elections to be held later. This was Mayor Rolph's first act after his re-election.

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Employees to Purchase Securities

Will Create Purchase Fund Out of Wage Increase, Suggestion Made by Thomas E. Mitten

Employees of the International Railway, Buffalo, have voted to use the 2½ cents an hour wage increase granted by the company effective on Jan. 1, 1924, to create a fund for the purchase of securities of the company. Because of the low prices now quoted for the 5 per cent bonds and the common stock of the company, the employees consider that an unusual investment opportunity is presented by these securities.

The formation of the investment fund was suggested by Thomas E. Mitten, chairman of the board of the railway and president of Mitten Management, Inc., which has a contract for operating the International. The wage increase will total approximately $200,000 a year and the employees have voted to divert this money to the purchase of the company's securities in their own interest. According to figures presented by Mr. Mitten the $200,000 will at present prices purchase $200,000, par value, of 5 per cent bonds of the company and $1,000,000, par value, of stock. The return on the bonds will be immediate, but for the present at any rate the virtue of the stock will lie in the appreciation in its quoted price as the condition of the company improves. In fact Mr. Mitten said that any appreciation in the value of the stock rests largely on the successful operation of the property through co-operation of employees and employers. The bonds are now selling at $50 for each $100 par value and the stock is quoted at $10 for each $100 share.

In announcing the wage increase of 2½ cents an hour, Herbert G. Tulley, president of the International, explained that Buffalo paid during the first part of the year 2½ cents an hour more than the average wage of Rochester and Cleveland, but during the latter part of the year the basic wage was 2½ cents below, the result being that for the entire year the wage rate paid by the International has averaged the wages paid in these two cities. The Cleveland rate now is 60 cents and Rochester 55 cents, the average being 57½ cents.

Mr. Tulley said that while the company is not now actually earning sufficient money to pay the wage increase, square dealing with employees calls for wage readjustments whether they be up or down. In view of the fact that the Buffalo scale is based on the average of Rochester and Cleveland the directors decided to grant the 2½ cents increase, making the Buffalo rate 57½ cents an hour for trainmen.

At the quarterly meeting of the board Mr. Tulley announced that the deficit in the company's income during the year to Nov. 1 was $853,962. He estimated the total deficit of the year to Dec. 31, 1923, at $1,000,000. He said that through economics in operation, impossible under the labor conditions that existed before the strike, the company could return to the 5-cent fare if it were carrying upon its cars all passengers now transported in jitneys, club cars and in privately owned motor cars. The present fare is 7 cents with four tokens for 25 cents.

The president of the co-operative committee submitted a report showing that during the year fifteen members had died and that $15,000 in insurance had been paid to their families. Sick benefits of $10,379 had been paid and $20,000, par value, of the company's gold bonds had been acquired. There is now a cash balance on hand of $4,515 as the result of the first year's operation of the Mitten co-operative plan.

Yellow Cab

Drivers Measured By Their Deeds

How do you measure a man, by his reputation or his deeds? Hardly by reputation, for that is often false. By his deeds then? Of course. *That's the way we measure our drivers*, and they either rise or fall by *what they do.*

We pick these men by what their neighbors and tradesmen say of them, by their standing and reputation for ten years back. But it isn't their reputation that holds them here. We judge them by their deeds and how they serve you.

Their deeds have held most of them here for a long time. And they must be mighty good men or they couldn't stay here year after year. Don't *you* find them reliable men, and don't you find that in the main they are worthy of your friendship?

Naturally one will slip occasionally, "even as you and I." He will do something, or leave something undone, which annoys or angers you. And then you are apt to roast "the other ninety and nine." That is hardly fair, because as a body they are the best and fairest workmen we ever knew.

Just take notice of them when next you are on the street. See how busy they are and how seldom you see one loafing. They are alert, intent on their business, earning a living and anxious to please.

Be nice to them if they are nice to you. **They are part** of your daily life. Give them a smile once in a while. A smile is a big thing.

The thinking fellow calls a Yellow

Yellow Cab Co.

'Phone Calumet 6000

Why Not Some Advertising of This Sort, Boosting Electric Railway Trainmen? It Would React Favorably on the Men as Well as on the Car Riders. If They Did Not All Measure Up to the Standard Set in the Ad, Such Advertising Would Inspire Them to Try to Measure Up

Oklahoma City-Shawnee Interurban Line Planned

The Corporation Commission of Oklahoma has recommended approval by the Interstate Commerce Commission of a project to refinance and rehabilitate the old Oklahoma City-Shawnee-Atoka line of the Katy railroad, which has been in financial difficulties for several years. The line was disposed of at receiver's sale on Sept. 28, this year, and K. W. Shartel, attorney, of Oklahoma City, and others, are asking authority to issue bonds and stock to refinance the property.

If the Interstate Commerce Commission accepts the recommendation of the Oklahoma commission the line probably will fall into the hands of two companies organized for the purpose of operating it, the Oklahoma City-Shawnee Interurban Railway and the Oklahoma City-Ada-Atoka Railway. The former project contemplates electrification of the line from Oklahoma City to Shawnee and the latter to operate steam-propelled cars from Shawnee to Atoka.

Final ownership of the property depends upon success of efforts to issue $800,000 of common stock and an equal amount in first mortgage bonds in connection with each project and other financing details. There is a possibility that the proposed electric portion of the line may be acquired by the Shartel interests and run in connection with the interurban system of the Oklahoma Railway, now operating lines from Oklahoma City to Norman, to Guthrie, to El Reno and intermediate points on each line.

Mr. Kempster Returns After Illness.—After an absence of several months, due to illness, A. L. Kempster, general manager of the New Orleans Public Service, Inc., made his first public appearance at a dinner tendered him on Nov. 27 by the Commercial Club's members of the corporation. Mr. Kempster gave a short talk to the assembled corps of workers of the utility on its purpose and obligations to the public and the best methods to be employed to advance their joint interests.

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City Operates Bridge Service

Brooklyn Surface Lines Withdraw from Williamsburg Bridge When City Takes Over Shutle Line

Shuttle service over the Williamsburgh Bridge between Marcy Avenue, Brooklyn, and Essex Street, Manhattan, was started on Dec. 1 by the city of New York with rolling stock equipment of its own. Operation is under the direction of the Department of Plants and Structures, with Grover A. Whalen, head of the department in charge. The run from terminus to terminus of the bridge is a little more than a mile. Tickets are sold at the rate of three for 5 cents. The equipment on hand consists of fifty-four cars, composed of thirty-two Birneys bought especially for the bridge service and twenty-two rebuilt cars secured previously from the Second Avenue Railroad for use on the city's line on Staten Island.

On the morning that this service was begun the Nassau Electric Railroad, the Brooklyn, Queens County & Suburban Railway, the Coney Island & Brooklyn Railroad and the Brooklyn City Railroad, all operating surface lines in Brooklyn, withdrew from the operation of cars across the bridge from Brooklyn into Manhattan. These lines now all terminate near the Bridge Plaza, Brooklyn, and former patrons of them desiring to travel to Manhattan are required to pay an extra fare on the bridge locals operated by the city or else take the elevated line over the bridge from the plaza, for which they must pay an extra fare of 5 cents. It is, however, possible for a few of them to take cars of the New York City surface lines at the plaza in Brooklyn, for in contradistinction to the service operated from Brooklyn into Manhattan by the Brooklyn lines the New York surface lines, or more properly the Manhattan surface lines, operate from Manhattan into Brooklyn.

The original terminus of the Brooklyn lines which have been using the bridge was at the ferries at the foot of Broadway, Brooklyn, but with the opening of the bridge ten years ago a new approach to Manhattan from Brooklyn was afforded and the Brooklyn lines began to operate into Manhattan over the bridge, but there was not franchise obligation in connection with this operation. In addition, in accordance with a contract with the city now expired, the Brooklyn surface lines operated the purely local shuttle service over the bridge. The contention of the Brooklyn surface companies is that they were able to continue operation of their lines into Manhattan because they have been able partially to pay the added cost which the through service has entailed from the revenues derived from operation of the local service on the bridge. The Brooklyn companies regarded the determination of the city to take over the local bridge service to be not only detrimental to the best interests of the traveling public but unfair to the companies affected.

The companies said they could not possible, from a physical standpoint, continue their service in connection with the city service. The shuttle service as handled by the Brooklyn companies was about 40,000 passengers a day. In addition 68,000 passengers a day were handled on the through cars. The fare on the private shuttle line was 2 cents cash with three tickets for 5 cents.

It had been indicated that Mr. Whalen would ask the Transit Commission to take action to compel the Brooklyn surface lines to continue to run their cars across the bridge. The Transit Commission says that it has no such power. The commission points out, as the companies had done previously, that the Brooklyn lines have not been operating surface cars upon the bridge under corporate franchises.

Immigration Program at New York Meeting

Administrative leaders in Washington, not only in the House and Senate, but in executive departments as well, will follow the recommendations laid down in the message of President Coolidge, and be guided by the nation at large on the question of needed immigration laws. Advices to this effect have been received from official sources by the sponsors of the National Immigration Conference, which will be in session at the Hotel Astor in New York, on Dec. 13 and 14.

The immigration conference in New York will be the first of its kind ever held. It will be attended by representatives of business organizations, official departments of the government, public and social service organizations, delegates of several foreign governments, and individuals who have made a study of the whole effect of immigration on the national life. The conference has been arranged by the National Industrial Conference Board, which found at the end of a two-year study of the problem both here and abroad that definite information on which to base new laws was desired by legislators and industrial leaders of the country. The present per centum act expires next June and its retention or new laws form one of the major questions now before Congress.

Wages in Philadelphia to Be Increased

The Philadelphia Rapid Transit Company is to raise its basic wage from 64 cents to 65 cents an hour on Jan. 1. Any further increase in 1924 will be paid to the trustees of the cooperative wage dividend fund. Average of the three cities used as a basis for Philadelphia Rapid Transit wages is 67½ cents an hour, Chicago being 73 cents, Detroit 70, and Cleveland 60, so on the present scale there would be 2½ cents an hour to be paid to Philadelphia Rapid Transit wage fund trustees.

Indeterminate Franchise Suggested for Los Angeles

The Board of Freeholders elected at the last general election in Los Angeles for the purpose of framing a new city charter has approved a charter provision for the indeterminate type of franchise.

The proposed charter amendment as adopted is subject to exhaustive conditions and will allow the widest latitude possible in the selection of the type of franchise desired, whether for a fixed or indeterminate period of time. The proposed amendment to be incorporated in the new city charter gives the City Council of Los Angeles the power to grant either a fixed or indeterminate franchise.

Such a condition will allow public utilities or the city to carry out a program of expansion and alleviate troubles of that character that have been difficult to solve in the past.

A protection of the city's ultimate development of a subway or elevated railway system is contained in the amendments to the charter by a provision that gives the city power to revoke any franchise in or upon any of the streets within the part of the city bounded by Temple Street, Figueroa Street, Washington Street or Central Avenue on a year's written notice.

One Freeholder attempted to draw up a provision relating to transportation utilities, with a view of incorporating a clause for an eight-hour day for platform workers, but the amendment failed to carry that provision.

Ford Road May Be Electrified by Spring

Work on the electrification of the Detroit, Toledo & Ironton Railroad, the Ford road, is well under way. Completion of the work depends, however, upon the development of the Ford power house at River Rouge, Mich. Work on the first of eight 62,500 hp. units of the power house is 85 per cent completed. A test run of the first unit of this plant is scheduled for next January. The second unit is about 15 per cent completed.

The output of the plant will be used entirely for Ford industries, including the Detroit, Toledo & Ironton Railroad.

Work on the turbines was started more than a year ago at the Ford shops following the installation of two units of 12,500 kw. each, made by an outside firm. The production of the new turbines was undertaken by engineers and machinists who helped develop Ford automobile production methods and handled the manufacture of turbines for the Ford "Eagle" boats.

In connection with the electrification of the Detroit, Toledo & Ironton Railroad, the double track from River Rouge to Flat Rock is more than half completed. This is the first section on which electricity will replace steam. All of the activities toward electrification of the first section are scheduled for completion next May.

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Payment of Franchise Tax in Cincinnati in Prospect

Settlement of Cincinnati's traction problem is foreseen in the action taken at a recent meeting of the Hamilton County executive and advisory committee. One outstanding feature of the meeting was the adoption of a resolution which indicated that the organization would work to bring about the immediate payment of the $350,000 franchise tax due yearly from the Cincinnati Traction Company and induce better service and lower rates of fare. Committees representing the traction company and the Cincinnati Street Railway, which leases the railway system, have been negotiating for the past two years in an effort to bring about a settlement of the matter, but little progress has been made in the direction of a settlement. Therefore the city administration appears to be determined to force one of the companies to act.

Some members of the Republican organization are of the opinion that the only definite step is to refuse any further deferment of the franchise tax. Others feel that a forfeiture of the traction company's franchise is the surest move, while still another group contends that a consolidation of the Cincinnati Traction Company and the Cincinnati Street Railway and a divorcement of the traction company from its subsidiary companies would solve the problem. It was announced that Mayor George P. Carrel would upon his return to the city call a meeting of the Citizens' Traction Committee, appointed by him more than a year ago, to ascertain what that body has accomplished. It was stated that the Citizens' Traction Committee has been awaiting a decision from the committees representing the traction company and the street railway before making any recommendations. The traction committees have not been in session for more than three months, but since that time the Cincinnati Street Railway has made an offer to the Cincinnati Traction Company to take back the system for $1,000,000, which the latter company turned down.

Home Rule Legislation Chief Problem Before Legislature

So great and so complicated are the problems presented by the new home rule for cities amendment to the New York State Constitution, adopted by the people at the general election in November, that virtually no other legislation will be considered, or even drafted, until a tentative program for putting the home rule provisions into effect has been promulgated.

This applies particularly to public utility legislation, as until the exact scope of changes in the present law and the additional legislative powers that will be given cities under the provisions of enabling acts to carry the constitutional amendment into effect have been definitely determined any change in the statutes affecting public utility regulation in so far as their regulation by municipalities is concerned would be entirely without standing.

The first problem the Legislature of 1924 will have for solution will be the granting of specific powers to cities under the home rule amendment. In the interval a conference of mayors of the different cities is to be had to obtain the views of various executives as to just what powers are wanted. So that whatever public utility legislation is considered as a part of the legislative program of 1924 will be coordinated with and subject to the program which is ultimately adopted with reference to the application of home rule.

Hollywood Chamber of Commerce Makes Another Attempt to Compel Extensions

The Hollywood Chamber of Commerce recently renewed its fight to compel the Los Angeles Railway to extend several of its lines, totaling 10½ miles of single-track construction, into the Hollywood district by the filing of a petition for a rehearing of its entire case with the State Supreme Court. The petition sets forth that the tribunal, in its previous decision against the car line extensions into Hollywood, was not in full possession of the facts.

The original petition for a writ of mandate was denied by the State Supreme Court in a decision handed down on Oct. 31, the decision being based on the ground that the Railroad Commission of the State of California had no power to order or compel the railway company to extend its lines when no franchise to construct the line had been applied for, or granted. This matter was reviewed in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 10, page 832.

At the time that the court handed down its decision in denying the Railroad Commission jurisdiction in such matters, the court drew a distinction between a railway franchise and franchises under which other public utilities, such as water, gas, electric and power companies, operated. The railway franchise, the court sets forth, specifically limits the amount of territory to be served whereas the franchises of other public utilities do not contain such a provision. The extensions of carlines demanded, the court ruled, could only be obtained under a new franchise.

The Chamber of Commerce in its petition for a rehearing claims that the charter of the railway contains a clause providing for extensions into new territory, although it is admitted that the ordinary railway franchise does not do this. This declaration, it is cited, is as binding as a franchise when a district to be served offers remunerative traffic.

The territory specified is already served by the Pacific Electric Railway lines. The cost of the extensions is estimated at $1,500,000.

One-Man Car Agitation Dropped

The referendum petition for the abolition of the one-man cars in Massachusetts, which was to be filed Dec. 5, was not filed. Not enough people were interested to carry out the threatened referendum. Presumably, this closes the agitation in Massachusetts, at least for the present.

News Notes

Adjustment May Effect Electrification Project.—Litigation that has prevented work on the electrification of the Missouri, Kansas & Texas Railroad between Dallas and Denton may be ended through the efforts of the citizens of Dallas to bring about an adjustment of the opposition of residents on one street in the city of Dallas toward the construction of the interurban railway track. Arrangements for carrying out the work of electrification have been completed.

Elevated Use Unsettled.—The question of the continued use of the elevated railway at Kansas City has not been settled. Judge Stone of the Federal court said recently that both Kansas City, Kan., and Kansas City., Mo., would have to do away with the rentals which have been charged to the Kansas City Railways, but neither city would agree to do this. Consequently, the matter is still open and appears likely to remain open until after the question of lifting the receivership of the railways has been settled.

Grants Wage Increase.—The United Railways & Electric Company, Baltimore, has granted a wage increase to its employees amounting to about 2 per cent. The change takes effect Jan. 1. The largest class of employees, motormen and conductors, will receive from 46 to 51 cents an hour instead of from 45 to 50 cents.

Mr. Craig's Sentence Remitted.—President Coolidge on Dec. 5 remitted the sixty-day jail sentence imposed upon Charles L. Craig, Controller of New York City, by Federal Judge Julius M. Mayer of the United States Court for the Southern District of New York, for criminal contempt of court. This action was recommended by Attorney General Daugherty after consideration of the case by the legal staff of the Department of Justice. The Attorney General and his advisers opposed the granting of an outright pardon and severely criticised Mr. Craig, and the President approved the department's recommendations for only a remission of the sentence. Sentence was passed upon Mr. Craig by Judge Mayer because the court was convinced that Mr. Craig had cast aspersions upon the court that were in no way justified by the facts. Mr. Craig's remarks were made in connection with the court's handling of the affairs of the Brooklyn Rapid Transit Company, then in receivership.

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Ordinance Provides for Terminal Change.—Commissioner Paul H. Maloney of the department of public utilities of the New Orleans Commission Council has offered an ordinance for adoption which provides for the removal of the terminus of the Orleans-Kenner Electric Railway from its present site to South Liberty Street. The purpose sought by the Maloney ordinance is to relieve the existing traffic conditions in South Rampart Street, near Canal, which the report by John A. Beeler referred to as a menace to public safety. The ordinance represents the conclusions reached by the city officials and those of Jefferson Parish after a long series of conferences. The Orleans-Kenner line is not released, under the ordinance, from carrying out its obligations, under its franchise, to build a permanent terminal in New Orleans.

Men from Offices Act as Trainmen.—When twenty-four out of twenty-five operators of cars on the Holland division of the Michigan Railway failed to report for work on Dec. 1, officials of the company left their desks and became motormen for a day. F. W. Brown, general superintendent of the company, said the trouble had started when the men objected to the combination of freight and passenger business in one run. He announced that the men had violated their agreement with the company which provides that in case a matter at issue is not settled between the superintendent and the men it shall be referred to the general manager, and then, if still unsettled, shall go to the arbitration board. The twenty-four operators were not permitted to resume their work.

Reaches Agreement on Service.—The Public Service Commission on Nov. 16 closed its records on the complaint of the Woodlawn (Erie County) Taxpayers Association against George Bullock of the Buffalo & Lake Erie Traction Company, in relation to car service between Woodlawn Beach and Buffalo. This action was taken by the commission on an agreement of the receivers of the Buffalo & Lackawanna Traction Company and the Hamburg Railroad to operate their respective cars so as to meet at least once an hour for an interchange of passengers at the Hamburg turnpike at the Buffalo city line.

Foreign News

Interchangeable Season Tickets in London

A new form of interchangeable season ticket, good on railway, tramway and bus, has been used by the London Underground Railway and associated companies as an experiment since last May. It has proved so successful that the scheme is being further extended. The ticket, which is a season one, has been tried up until recently at Golder's Green Station. It enables a passenger living beyond that place to board a bus or a tramcar, travel to Golder's Green Underground Railway station and continue his journey by the railway. Over 1,000 tickets of this kind are now in daily use at this point. The scheme has been extended to a number of other suburban stations on the Underground Railway, and still further extensions are contemplated.

British Fare Agitation as Seen by "Journal" Representative

There is some agitation in nearly every city in the United Kingdom for a return to the pre-war rates of fare on electric railways, according to a representative of the ELECTRIC RAILWAY JOURNAL, who recently has returned to this country from a trip abroad. At least, there is periodic clamor for reductions in the rates being charged. The argument against a reduction in the rate of fare beyond the point that is justified, which seems to impress the public, is that the taxpayers in a community are discriminated against unjustly when street car fares are reduced to the point that does not allow an adequate return on the investment. Street cars are used by taxpayers and non-taxpayers alike. They are used extensively by people from other communities, and by visitors generally. If the fare is too low it means that the visitors and the non-taxpayers benefit at the expense of the community. If the fares do not provide for the return on capital and the maintenance and extension of lines, the necessary funds must come, directly or indirectly, from the city treasury. It is easy to demonstrate how an unremunerative rate of fare on a street railway would discriminate against the community and differs in that respect from electric, gas or water service which is installed in tax-paying property. If the charge for the service does not pay its cost, it is paid indirectly by those who use it. The public in Great Britain seems only recently to have grasped this phase of the fare situation and it has done much to temper the demands for unjustifiable reductions.

Weekly Passes on Four British Tramways

The experiences of Bradford and Doncaster, with a population of 300,000 and 54,000 respectively, with the weekly pass have induced the Rotherham and Colne Corporation Tramways to try the same plan. The population of Rotherham and Colne is 75,000 and 26,000 respectively. The Rotherham Tramways installed a series of passes on Nov. 12 at rates ranging from 1s. 6d. for 1d. stages to 4s. for stages costing 3.5d. to 4d. total. The Colne pass will cost 2s. The weekly pass is arousing great interest among other British tramways, which hope thereby to be able to retain the usual 1.5d. minimum fare for all but regular riders instead of being compelled to go back to the pre-war fare of 1d. for single trips. In some cases, therefore, the pass prices are being considered on the basis of giving a reduction to regular riders at little or no loss compared to what would follow a cut to the lower base fare for everybody.

Esthonia Plans Improvements

The Esthonian government plans spending 30,000,000 Esthonian marks for railway improvement and 25,000,000 marks for the construction of railway building. In addition 34,000,000 marks will be used for the electrification of the Reval-Nemme line.

Zurich Street Railways Extend

The report of the Zurich Municipal Street Railways (serving 199,567 inhabitants) for the calendar year 1922 is notable for announcement of extensions. In March, 1922, construction was begun of an extension costing 680,000 francs (approximately $136,000). In September a credit of 198,000 francs ($39,600) was granted for a second extension. The number of single-track miles in operation increased from 49.3 miles to 50.9 miles, exclusive of some 4.8 miles of carhouse and yard trackage.

The number of passengers declined slightly over 1921, viz., from 46,660,218 to 46,273,856, and revenue dropped from 11,716,327 francs to 11,577,076 francs. The average fare was 25 rappen or practically 5 cents. The average number of rides per inhabitant per annum was 232 compared with 230 in 1921. The city service amounted to 11,400,343 car-km. (say 7,068,000 car-miles), of which 3,018,653 car-km., or 1,872,000 car-miles, was furnished by trailers. The annual service per inhabitant was 57 car-km., or 35.3 car-miles. This was achieved with 241 motor cars and eighty-seven trailers.

There was no change in fares. Some 24 per cent of the riders used the 20 rappen or minimum single fare, another 15 per cent paid 30 rappen and about 8 per cent paid 40 rappen. Most of the remaining fares were paid in the form of weekly limited-ride tickets, workmen's tickets and unlimited-ride, non-transferable season tickets or passes. Total gross for the year was 11,774,808 francs, while operating expenses increased 0.46 per cent to 9,740,249 francs, leaving 2,034,558 francs for overhead charges, renewal funds and the like. Beginning with the year 1920, it has been possible to meet all of these costs and also to reduce to 1,589,296 francs (end of 1922) the deficit of 2,842,256 francs which had accumulated over the period 1914-1919 because of war conditions.

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Financial and Corporate

Operation Unified

Railway Near Philadelphia Co-ordinates Its Lines and Buses—Population Served Greatly Increased

Events are taking place rapidly in the affairs of the West Chester Street Railway, West Chester, Pa. In the last six months the company has acquired many miles of track and more than 100 miles of bus routes. This has resulted in an increase in population contact from 42,000 to more than 300,000.

The West Chester Street Railway formerly operated a line of 21 miles of single track extending from West Grove through Avondale and Toughkenamon to Kennett Square, a distance of 7½ miles, extending thence southward a distance of 14 miles to Brandywine Springs on the outskirts of Wilmington. Almost the entire population served by the railway was located on the Kennett-West Grove division, the earnings of which are understood practically to have carried the whole property.

During the early part of the current year the interest controlling the old property decided to cease operation, and service was stopped during April, 1923. The property was purchased by a bondholders' committee under foreclosure proceedings, and sold by it to local interests. An attempt was made by the purchasers to refinance operation of the whole property, but this attempt was finally abandoned and the 7½-mile section between Kennett and West Grove was sold to the same interests which control the West Chester Street Railway, operating a railway from Coatesville through Downingtown and West Chester to Kennett Square. The West Grove division will be connected with the Kennett division of the West Chester Street Railway and through service operated from West Grove to West Chester.

In order to effect revival of service between Kennett and West Grove it was necessary, under the Pennsylvania State Laws, to reorganize the West Chester, Kennett & Wilmington Electric Railway, this being done under the name of the Chester County Traction Company, which will be a subsidiary of the West Chester Street Railway. In this manner the population per mile of track operated on its Kennett division will be increased. The section of railway between Kennett and Brandywine Springs was sold to the S. Snyder Corporation, Rochester, N. Y.

The West Chester Street Railway has through its subsidiary, the People's Transportation Corporation, acquired control of all the motor bus routes in southern Chester County, connecting points in this district with the cities of Chester, Pa., and Wilmington, Del., and a co-ordinated plan of railway and motor bus transportation for the entire district is now being worked out.

$1,325,896 Balance Reported at New Orleans Under New Agreement

The New Orleans Public Service, Inc., has reported for the year ended Sept. 30, 1923. This is the first year of operation under the new agreement at New Orleans. The balance indicated as available for sinking fund requirements, dividends and surplus return was $1,325,896. The rate base was fixed to begin at $44,700,000. The rate of fare dating from Sept. 27, a year ago, was 7 cents. The statement of earnings follows:

INCOME STATEMENT OF NEW ORLEANS PUBLIC SERVICE, INC., BY DEPARTMENTS FOR TWELVE MONTHS TO SEPT. 30, 1923

	Railway	Electric	Gas	All Departments
Operating revenue	$7,571,560	$3,914,109	$2,743,750	$14,229,420
Operating expenses, including renewals and replacements reserve	5,331,175	2,229,132	1,686,908	9,247,215
Net operating revenue	2,240,385	1,684,977	1,056,842	4,982,205
Taxes and uncollectible consumers' accounts	*862,258	451,930	321,293	1,635,482
Net operating income	1,378,127	1,233,047	735,549	3,346,723
Miscellaneous income	93,502	28,239	33,642	155,384
Gross corporate income	1,471,629	1,261,286	769,191	3,502,107
Income deductions				2,176,211
Balance available for sinking fund requirements, dividends and surplus reserve, in accordance with ordinance No. 6822 C.C.S.				$1,325,896
				Average for Year
Rate base				$52,939,371
Per cent earned				6.61

* Represents taxes only.

Commissioner Maloney of the Department of Public Utilities announced on Nov. 25 that he expected to complete soon the negotiations between the city and the Public Service, Inc., over the rate base on which the company is to be permitted to fix its rates for the ensuing year under its agreement with the city. As indicated in the accompanying statement the company in its annual report under the agreement with the city reported a rate base of $52,939,371 and a return for the twelve months of 6.61 per cent, which is 0.89 per cent under the return allowed by the franchise.

The city had the books of the company audited, and as a result, Commissioner Maloney says he is opposed to both the rate of return and the rate base shown in the company's report. He thinks the rate of return is larger than shown and the rate base should be lower. The dispute between the city and the company, he says, is over several large items carried by the company as a part of the rate base. It is understood that under the rate base claimed by the city the company will show a return of more than 7 per cent, or less than one-half of 1 per cent under the rate allowed by the franchise.

Some New York Companies Do Better

The New York Transit Commission has made public statements concerning railway operations in New York during the month of September, compiled from monthly reports furnished to the commission by the several companies. The figures for September, 1923, are compared with those for the similar month in 1922.

The Interborough Rapid Transit Company, with gross of $4,315,178.09, gained, in operating revenue, $57,095.60 over September, 1922, while operating expenses of $2,685,495 represented a decrease of $62,236. The net corporate deficit of the company for the month was $211,027, less by $56,981 than in September, 1922. Interborough passengers carried in September, 1923, numbered 79,631,000, which was 1,381,211 over the previous September. The Interborough subway operations ran behind $21,513 in September, about $25,000 less than last September's deficit, the big loss occurring on the elevated lines.

The New York Rapid Transit Corporation (B.-M. T.), with gross of $2,056,426, gained $151,843 in operating revenue, while at $1,399,078 its operating expenses decreased $9,901. The company showed a net corporate income for the month of $91,727.53, as against a deficit of $71,207 under the receivership in 1922. Passengers carried numbered 40,078,420, a gain of 3,043,471 for September, 1923, as against September, 1922.

The New York Railways, with gross of $758,524, showed a decrease in operating revenue of $60,626. Operating expenses of $654,674 were $38,533 less than for the similar month in 1922. The net loss of $139,662 was $6,500 more than in September, 1922. With traffic of 13,428,905 the company carried 1,045,776 fewer passengers in September, 1923, than in the similar month in 1922.

The Third Avenue Railway system had a net corporate income of $20,824, or $12,495 less than September, 1922. Passenger traffic was 4,893,081, or 173,798 less than in September, 1922.

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Mr. Fagan's Figures Attacked

Special Master, Representatives of City and Pittsburgh Railways' Reorganizers Question Receiver's Figures

At the proceedings conducted before the court on Nov. 26 with the end in view of lifting the receivership of the Pittsburgh Railways three elements were on record as declaring the railway solvent. They are former Judge Wasson, special master for the court; the city of Pittsburgh, and the railways company reorganizers, as represented by the Philadelphia Company. As stated previously, Charles A. Fagan, one of the receivers, holds that the company is still insolvent.

Special Master Henry G. Wasson, delegated by the court to inform it whether the reorganization was possible at this time, recommended the reorganization. He figured the working assets of the company at the end on one year's operation by the owners would be $1,795,075.

Receiver Fagan of the railways acting independently of his two colleagues, Receivers W. D. George and S. L. Tone, informed the court, shortly after the Wasson recommendation was filed, that the railways, instead of being solvent, was still "manifestly insolvent" and he submitted figures to show that instead of a surplus the railways after one year's operation would show a deficit of at least $1,285,207 or, if other elements were considered, a deficit of $3,036,668.

The city's figures, with those of the Philadelphia Company, parent company of the Pittsburgh Railways, were filed with the court on Nov. 26, the latter in the name of the Pittsburgh Railways as a corporation, and in the form of an answer to Mr. Fagan's figures.

A surplus at the end of the first year's operation, instead of a deficit of $1,500,723 is claimed in the reply to the Fagan figures submitted in behalf of the reorganizers by A. W. Robertson, vice-president and chief counsel. Mr. Robertson's petition is in part as follows:

From an examination of the items in Exhibit A, attached to Mr. Fagan's report as made in detail in our Exhibit 2, it will be seen that items totaling $1,101,930 are duplicates and are included twice in the figures shown in said Exhibit A, and that the total deductions in said exhibit should be reduced by the amount of such duplication.

A further examination of Exhibit A discloses that it includes $1,684,000 as payment of retirement of capital, which is not properly chargeable against operating expenses, and which the company has no expectations whatever of paying out of the operating income, but does expect to pay such obligations as they come due in future years by selling other securities or extending the time of payment of the respective obligations themselves.

Taking into account these several items, the aggregate of the sums which must be met during the coming year are reduced to $4,800,728. This leaves a surplus of $1,500,723, instead of a deficit as shown in the original Exhibit A.

Partial Discontinuance Allowed.—The Public Service Commission recently granted permission to the Massachusetts Northeastern Street Railway to discontinue its railway service on 3 miles of its road between Rowe's Corner, Newton, to the state line at South Hampton. Residents of Newton protested against the discontinuance of this branch.

Abandonment Threatened at Astoria, Ore.

The railway at Astoria, Ore., will probably be abandoned. The system is one of a little more than 5 miles. It is owned by the Pacific Power & Light Company. Just about a year ago, Dec. 8 to be exact, an area of thirty-five city blocks was wiped out by fire and the railway and the power and light lines of the company were damaged to the extent of about $175,000. Fortunately the main feeders of the company were installed just beyond the limits reached by the fire, so that power and railway service were quickly resumed. More than fourteen blocks of railway track was destroyed. The necessity arises now to rehabilitate the railway system. That work the company's engineers estimate would cost $150,000. As the railway is a losing proposition the company has notified the local City Commission of its intention of abandoning the railway.

Auction Sales in New York

At the public auction rooms of A. H. Muller & Sons the following securities were sold on Dec. 5:

4,000 shares Interborough Consolidated Corporation, common, 5 cents per share.

505 shares of Second Avenue Railroad, 50 cents per share.

$5,000 Second Avenue Railroad 6 per cent receiver's certificates, 37½ per cent flat.

$41,000 Second Avenue Railroad first consolidated 5 per cent bonds, due 1948, certificates of deposit 3 per cent.

1,000 shares of Mobile Light & Railroad Company, $1 per share.

310 shares of Interborough Consolidated Corporation common, $3 lot.

300 shares of Interborough Consolidated Corporation common; 550 shares Interborough Consolidated Corporation preferred, $100 each, $85 lot.

50 shares of Brooklyn Rapid Transit Company, $2 lot.

Permission Sought to Abandon Suburban Line in Oklahoma

The Pittsburgh County Railway, which operates city lines in McAlester and North McAlester and an interurban line to Hartshorne, Okla., will be heard on Dec. 20 before the Corporation Commission on a petition seeking permission to abandon its line extending from the eastern limits of McAlester to the country club. During the past two years, the petition recites, the line has been operated at a great loss. In fact the petition states that the whole city system is being operated at a loss and continued operation of the country club line will only increase the financial burden now placed on the entire system. Business began falling off on the country club line as early as 1919, when the company secured an order from the commission permitting it to suspend service from April 1 to Nov. 1 of each year. The company now desires permission to abandon the line entirely and take up the tracks.

Negotiations on to Lift Birmingham Receivership

The receivership of the Birmingham Railway, Light & Power Company, Birmingham, Ala., may be lifted soon after Jan. 1. J. S. Pevear, co-receiver for the company, and W. B. White, attorney representing Lee C. Bradley, the other receiver, have been in New York working toward that end.

It has not been made public in Birmingham how the transaction will be handled, but it has been indicated that local interests may borrow the money in New York, give the property of the company as security, and operate it themselves.

Preferred Stock Offered. — Harrison & Company and Janney & Company, Philadelphia, Pa., are offering $1,400,000 of the first preferred 8 per cent cumulative stock of the Georgia Railway & Power Company, Atlanta, Ga., series of 1924. The price is 104 and accrued dividends to yield 7.69 per cent.

Mortgage Gold Bonds Offered.—A syndicate, headed by Drexel & Company, Philadelphia, Pa., is offering $4,000,000 of the first and refunding mortgage 5 per cent gold bonds of the Southern Public Utilities Company, Charlotte, N. C. The bonds, dated July 1, 1913, and due July 1, 1943, are offered at 91¼ and interest to yield about 5.75 per cent. This is an additional issue, the proceeds for which will reimburse the company in part for capital expenditures already incurred in excess of $7,800,000, which includes the cost of the new 80,000 installed hp. Mountain Island hydro-electric station to be put in operation next month.

Board Has Vacancy.—The death of former Governor Samuel W. McCall of Massachusetts creates a vacancy in the board of trustees of the Eastern Massachusetts Street Railway, Boston, Mass. Mr. McCall was one of the five public trustees having been appointed to succeed Homer Loring, former chairman, who resigned. The terms of the trustees, who were appointed for a five-year term, expire in January next. The law requires appointment of successors to serve for another five-year period beginning in January. The four remaining trustees are Arthur G. Wadleigh, chairman; Fred J. Crowley, Isaac Sprague and Earle P. Charlton.

Collateral Securing Notes Sold.—At an auction of $3,000,000 first lien and refunding mortgage gold bonds of the Washington-Virginia Railway, Washington, D. C., the entire amount was bought by Edward P. Hopkinson, Jr., representing the note holders, for $2,000. The 6 per cent notes, which matured on Jan. 1, 1922, were secured by these bonds. Before the sale R. H. Phillips representing some of the bondholders, stated he thought bidders should know that receivers had been appointed for the company, and he deemed it improper that the bonds should be sold without an order of the court.

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Traffic and Transportation

Commission Recommends Traffic Improvements

The Los Angeles Traffic Commission has recommended to the City Council that certain practices be adopted for bettering traffic conditions. One provision calls for immediate adoption of an ordinance prohibiting the parking of passenger vehicles in the downtown congested district of the city from 7 to 10 a.m. and 4 to 6:15 p.m. instead of only from 4 to 6:15 p.m. as at present, and to be effective only during the holiday season to relieve pre-holiday congestion. Stricter enforcement of present state and city traffic regulations is also suggested.

The commission also recommended that the police department rigidly enforce the existing loading zone ordinance, prohibit the parking of vehicles in the second line of traffic and use its full authority to facilitate the free movement of street cars wherever police officers are available.

It recommends further that the Los Angeles Railway and Pacific Electric Railway be authorized to paint yellow lines on the street sufaces wherever desirable parallel to the outside street tracks 4 ft. from the outside rails. This color is suggested in order that the lines will not be confused with the white lines used in marking the loading zones.

The Traffic Commission offers to aid the Los Angeles City Council in any capacity it may determine to relieve what is termed to be an unusual condition in traffic congestion.

Special Theater Fare Rates Made by Indiana Interurban

It has been announced by the Indianapolis & Cincinnati Traction Company that very low round-trip rates will be made during December for the benefit of patrons attending Indianapolis theaters in the evening. The new reduced fare will be good only on evening trains. It is expected that this plan will develop additional business on trains that are usually operated at a loss. It is understood that if the theater fare arrangement proves popular it may be made a permanent feature of the I. & C. service.

One-Man Car Case Before the Wisconsin Supreme Court

The one-man car situation in Milwaukee is expected to be drawn to a head on Dec. 14. On that day the Wisconsin Supreme Court will hear and consider the appeal of the city attorney of Milwaukee charging that the Wisconsin Railroad Commission exceeded its authority when it granted permission to the Milwaukee Electric Railway & Light Company for the operation of one-man cars in Milwaukee. The city contends that the State Legislature never conferred on the commission power to approve the operation of one-man cars in Milwaukee.

The city attorney says that operation of one-man cars in Milwaukee is contrary to a city ordinance. The contention of the city attorney that cars must be run with two men was not upheld by the Dane County Circuit Court, Madison. That court ruled that the Railroad Commission did have jurisdiction over the operation of these cars in Wisconsin cities, and it is from this decision that the attorney for Milwaukee is appealing to the Wisconsin Supreme Court.

Plush Seats in New Chicago "L" Cars

Several trains of the new steel cars recently received by the Chicago "L" were placed in service Dec. 2 on the various branches of the Chicago Elevated System. Shipments of these cars from the plant of the Cincinnati Car Company to date total 75 out of the 102 ordered. The cars are similar in construction to the company's 1914 design of steel cars with the exception that the center side door has been eliminated.

The interior has been equipped with a view particularly toward supplying passenger comfort and attractive appearance. Green plush upholstered cross seats, white maple grooved floor, shaded side and center lights, and oscillating fans at either end are some of the interior features.

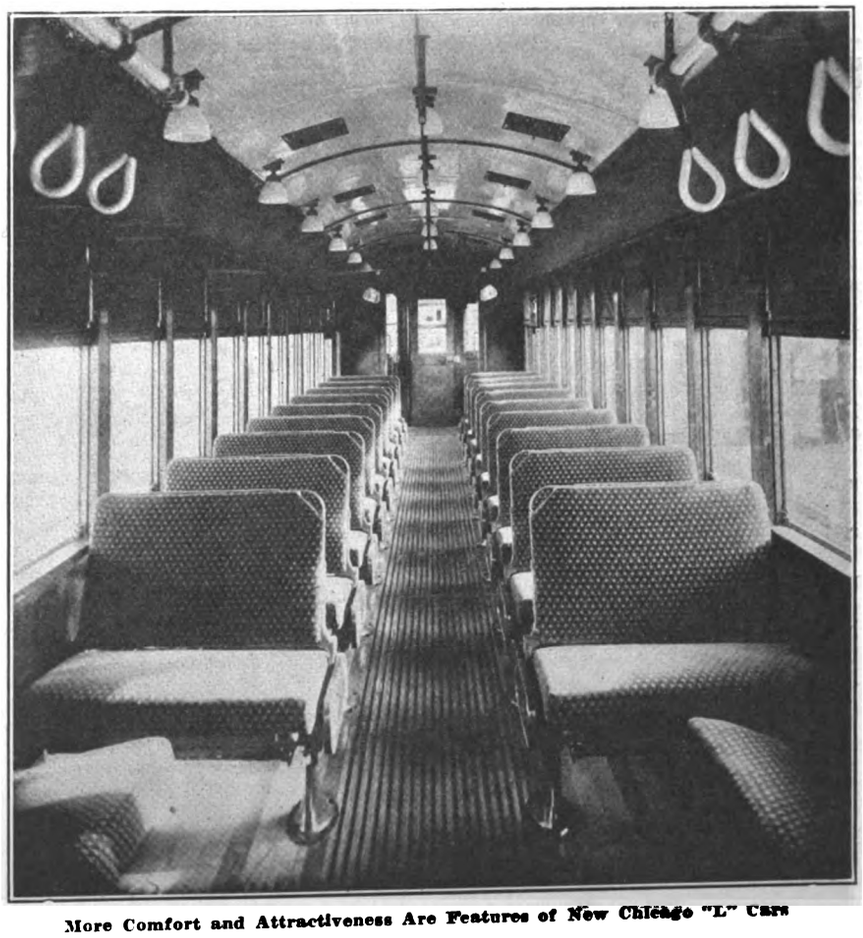
Electro-pneumatically operated sliding doors, with automatic interlock switches inclosed in the rubber bumper, have been provided at the ends of the car. Control switches for operating these doors are mounted on the outside of the dash at each end of the car and so arranged that the guard may open the doors at both ends of the cars.

All the new cars will be motor cars with two motors on each car, both located on one truck. The motor truck has a wheelbase 12 in. longer than that of the dead truck.

Following out the plan which originated some months ago, the new cars are painted orange above the belt rail and a brilliant green below the belt rail, with the sash and doors also painted green.

PRINCIPAL DIMENSIONS OF NEW CHICAGO "L" CAR

Length over bumpers	48 ft. 0 in.
Width over drip rails	8 ft. 10 7/16 in.
Height, top rail to top roof, light	12 ft. 3 1/2 in.
Truck centers	33 ft. 8 in.
Wheel base of trucks (trailer end)	5 ft. 6 in.
Wheel base of trucks (motor end)	6 ft. 6 in.
Wheel diameter	34 in.
Seating capacity	48
Door width	3 ft. 8 in.
Aisle width	21 3/4 in.
End wall width between longitudinal seats	4 ft. 0 1/2 in.
Seat width	40 in.
Seat spacing	2 ft. 8 1/2 in.



More Comfort and Attractiveness Are Features of New Chicago "L" Cars

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Ten Cents Cash Asked

Atlanta Company Says It Can't Continue Under Present Conditions—Wants Jitneys Curtailed

An increase in single cash fares from 7 to 10 cents is being sought by the Georgia Railway & Power Company, tickets to remain at their present price of 6⅔ cents each if bought in strips. The company desires to charge 2 cents for transfers. It wants jitneys eliminated from st ee s
way now operates and desires to do away with unnecessary car stops. These are some of the things requested in a petition filed by the company with the Atlanta City Council, on Dec. 1.

The petition states:

If present conditions continue, there will shortly be no margin of profit left to the company after operating expenses have been paid, and the ability of the railway to maintain the present transportation service will be ended—a condition which has never before existed in Atlanta, but which can be prevented by the plan submitted in this petition.

Already the credit of the railway is exhausted and not one dollar of additional capital can be borrowed either for the purpose of improving existing mileage or for making extensions.

The railway business can be put on a living basis by increasing the number of passengers carried, by lessening the cost of operation, or by increasing the fare per passenger.

As we cannot increase the number of passengers carried or decrease the cost of operation, the only thing left to do is to increase the fares.

Jitney competition is unfair. If continued it will subject the railway to such losses that it will be forced to discontinue operation. Jitneys should not be licensed except where the necessity for them is shown.

Ten cents cash fare is asked because the cost of furnishing railway service has more than doubled since 1914. Car riders will pay no increase in fare if they buy tickets.

A 2-cent charge for transfers is asked because the cost of furnishing service has more than doubled.

No service should be furnished free. Free service can only be given at the expense of those who pay the fares.

The management should be vested with reasonable authority in eliminating unnecessary car stops. The car stops in Atlanta are unnecessarily frequent and prevent quick, reliable service as well as increase the cost of the service.

The petition also asks the removal of all the indirect and special taxes assessed against the railway and its property, declaring that these taxes must ultimately be levied against the passengers, since the only money received by the company with which to pay taxes comes from the fares received by its passengers.

It asks that railway property in Atlanta be taxed only on an equal basis with other classes of property in the city.

The petition closes with the statement that the company is interested only in making a reasonable profit on its investment, and in rendering the best service possible to the people of Atlanta.

Indiana Interurbans to Use Buses

Extensive operation of buses is being planned by electric railways in Indiana to meet competition from lines independent of the railways. The Interstate Public Service Company and the Indianapolis & Cincinnati Traction Company are operating buses now as feeders and the present bus systems will be extended. As noted elsewhere in this issue the I. & C. has closed a contract for bus service to connect Versailles, Osgood and Greensburg, to be operated in conjunction with the traction lines. Several bus lines now carry passengers from small towns and farms to the cities and stations of the Interstate Public Service.

Buses May Have to Be Withdrawn in Louisville

James P. Barnes, president of the Kentucky Carriers, Inc., Louisville, Ky., subsidiary of the Louisville Railway, stated on Nov. 30 that the present city bus service would probably be abandoned unless the public supports the local lines better. At the present time the bus service is not earning more than 60 per cent of operating costs, and very little improvement has been shown in earnings since the recent change in the operating schedules. The fact that the idea of service by bus is new and that the public has not become accustomed to the service are regarded as partly responsible for lack of patronage.

Flood at Oklahoma City Causes Influx of Jitneys

Jitney competition menaces the Oklahoma Railway. Following the destruction by flood of the bridge and a half mile of fill on the right-of-way between Oklahoma City proper and the section of the city known as Capitol Hill, city and Norman interurban cars had to be rerouted via Packingtown. This involved serious delay to traffic and automobiles began carrying passengers between Capitol Hill and the city for 10 cents. The railway facilities were restored with the opening of the new bridge over the North Canadian on Dec. 3, but the city attorney announces that there is no legal barrier on the ordinance books of the city preventing the operation of jitneys.

Will Establish Safety Zones.—The Trenton-Mercer County Traction Corporation, Trenton, N. J., will establish safety zones and mark trolley stops with lights along part of Pennington Road.

Enforcement of Ordinance Against One-Man Cars Postponed.—A measure approved by the electorate of Dayton, Ohio, early this fall, placed in immediate effectiveness theoretically, a ban on the one-man car. Jan. 1 is the date tentatively set by the city for enforcing the measure, but in the event the companies cannot make the physical changes in their property by this time, it has been indicated that the date will be extended. Indications are said to point to an arrangement being made which will permit the cars to remain in service under conditions of street traffic more favorable than those that now exist.

Higher Rates Sought.—The United Electric Railways, Providence, R. I., has applied to the Rhode Island Public Utilities Commission for permission to raise its fares so as to give nine rides for 50 cents. The rate at present is ten rides for 50 cents. Single fares are to remain at 6 cents. The reason given by the company in its request for increased rates was that receipts were running behind operating expenses.

"Transportation" Appears.—The National Transportation Institute is publishing, each Tuesday, a new pamphlet, entitled "Transportation." In its relation to all industries, the subject of transportation is covered in detail in this sheet. Number 4 of Vol. 1 tells what the National Transportation Institute really is. It explains in an editorial that the institute represents the business men's solution of the transportation problems of the United States. Further, that its purpose is to aid the public in understanding the business problems of transportation, in order that growth of agriculture and industry may continue. The paper is dated Chicago.

Bus Operation Started.—Operation of its first auxiliary motor bus line was started Nov. 6 by the Springfield Railway, Springfield, Ohio, the bus operating in Melrose addition and connecting with the Yellow Springs Street cars. Service will be extended by the company if found desirable after the tentative schedule has been given a trial.

Provisions Made for First Class Mail.—First class mail out of Salt Lake City will be carried into Provo by the Orem Electric Railroad within a short time. Arrangements are now being made looking toward converting the interurban into a mail carrier road.

Saving Time in Evening Rush.—The Grand Rapids Railway, in order to speed up accommodations during the evening rush, has ruled that no fares shall be collected from patrons on entering outbound one-man cars. It is said much time is saved and traffic does not pile up in the downtown section if patrons are hurried directly into the cars during the rush hour. Fares are paid as patrons leave.

First Cattle Cars Moved.—The first electric-way shipment of livestock from Louisville to Indiana markets by means of the new tracks of the Interstate Public Service Company, entering directly into the Bourbon Stock Yards in East Louisville, was consigned on Nov. 12. On that date an electric locomotive pulled out of the yards with three cars of cattle for Indianapolis and three destined for Frankfort, Ind. The six cars contained an average of thirty head of cattle each. The rates, it is said, will be about on a par with railroad transportation charges, but delivery is speedier due to direct movement and elimination of loss of time by switching.

Railway Explains.—The Louisville Railway is running a series of advertisements in the Louisville newspapers in an effort to explain to the public just why the company is not always able to serve its patrons as it would like to serve them.

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Certificate Refused. — Because adequate freight service is being given over the route from Oklahoma City to El Reno and Geary, the Oklahoma Corporation Commission refused to grant a certificate of convenience and necessity to the Highway Transfer Company to operate motor car freight lines. One of the objectors to the granting of this certificate was the Oklahoma Railway, That company contended its own lines had established stops about every half mile where freight was received and discharged. The order became effective Nov. 21, 1923.

Bus Contract Helps Service.—Interurban facilities of the Indianapolis & Cincinnati Traction Company have been extended by the closing of a contract for bus service in Versailles, Osgood and Greensburg. An announcement of this service was made by Hudson R. Biery, assistant to President Henry.

Company Shows Its Progress.—The Galveston Electric Company, in an advertisement in the annual trade edition of the Galveston *Daily News*, presented "The Old and the New" in railway operation in Galveston. Two pictures were reproduced. One showed the old-time mule car, while the other showed one of the new one-man safety cars recently put in use in Galveston. The aims and ideals of the traction company are then set forth briefly by R. G. Carroll, local manager at Galveston.

Increased Fares Sought.—The Hannibal Railway & Electric Company, Hannibal, Mo., has filed an application for increased fares with the Missouri Public Service Commission. A hearing on the petition will be held in Jefferson City, Mo., on Dec. 11. The company estimates the increase would net it approximately $1,800 a year. Increased cost of labor and materials is given as the reason for the application.

Traffic Model Will Tell Story.—The Springfield, Mass., Police Department has introduced an adjustable traffic model which is recommended by the American Automobile Association for adoption by courts throughout the country in trying cases arising from street accidents. An improved form of this model was used at an inquest in Springfield recently for the first time. It is provided with miniature street cars, tracks, poles, wires, hydrants, trees, automobiles, vehicles and pedestrians, which can be so placed as to illustrate any kind of street accident. The model is 3 ft. long by 20 in. wide and rests on a wooden base. It has movable sidewalks and intersecting streets. To show an accident on a street without street car lines a metal covering is made to fit over the tracks. Policemen are instructed in the case of every accident to secure the measurements in order to show correctly to the judge and jury the relative positions of the various parties and factors concerned. It has been found that the use of the model saves time and expense in trying cases, particularly as its use does away with the need for special drawings.

Legal Notes

ALABAMA—*Waiting Passengers Include Others Than Those Who Signal the Car to Stop.*

Where an interurban car stops to receive passengers the invitation to board the car is not limited to those who signaled for the car to stop. Hence, a person attempting to board the car at such a point and having his hand injured when the door was being closed has cause for action. [Mobile Light & R. Co. vs. Ellis, 96 Southern Rep., 773.]

INDIANA—*Jury Qualified to Pass on Adequate Bonding.*

Where plaintiff's horse ran away while crossing a railroad, claimed due to an electric shock, an instruction that the jury, in determining whether the bonding of defendant's rails was defective and whether there was a leakage of electrical current, should consider whether the earth near the crossing was charged with electricity and whether the electric current would leak from the rails if the bonding was in good condition, and whether other horses suffered an electric shock at the crossing under similar circumstances, and whether electric sparks or flashes were seen at the joints of the rails at the crossing, and, if so, whether that indicated defective bonding, in so far as those matters were shown in evidence together with all the other evidence upon the question *held* not reversible error under the evidence. [Indianapolis & Cincinnati Traction Co. vs. Montfort, 139 Northeast Rep., 677.]

KENTUCKY—*Third-class City Cannot Grant Franchise Without Requiring Company to Pave Between Tracks.*

The limitation of Ky. St. Sec. 3290, upon the power of third-class cities in granting street railway franchises which prohibits such franchise without requiring the company to pave between the tracks, is mandatory. Hence a franchise granted without such requirement, either expressed or implied, would be void. The provisions of Sec. 3450, relating to the assessment of such cost where the payment is required by the franchise, applies whether the requirement is expressed or implied. [City of Henderson vs. Henderson Traction Co., 254 Southwest Rep., 332.]

MISSOURI—*Penal Statute Held Not to Deny Equal Protection or Due Process.*

Rev. St. 1909, Art. 5425, providing that, when any person shall die from injury resulting from negligence in running any car or train, the corporation shall forfeit and pay as a penalty the sum of not less than $2,000 and not exceeding $10,000, construed as wholly penal and as authorizing recovery of maximum amount, though there is no pecuniary loss, does not deprive railway company of equal protection of the laws, or due process of law, in violation of Const. U. S. Amend. 14. [Grier vs. Kansas City, C. C. & St. J. Ry. Co., 254 Southwest. Rep., 359.]

NEW YORK—*That Car in Collision Was of the One-man Type Held Properly Commented On.*

In an action against the railway company for damages, it was proper for plaintiff's counsel to call the attention of the jury to the fact that the car concerned in the collision was of the one-man type and to point out the duties of the operator in a car of the type used, although there was no contention that the failure to have a conductor on the car was a proximate cause of the accident. [Christman vs. Union Railway, 200 New York Sup., 800.]

OHIO—*Commission Authorized to Deny Application for Issuance of Securities Based on Overvaluation.*

Under Gen. Code, Secs. 614-53 to 614-55, authorizing the Public Utilities Commission to supervise the issue of securities by utilities and railroads, such commission is authorized to deny an application for the issuance of securities based upon an overvaluation, or upon which a fair return may not be probably realized or reasonably expected. [Lima Toledo R. Co. vs. Public Utilities Commission, 140 Northeast. Rep., 603.]

PENNSYLVANIA—*Obligation to Maintain Paving Not Removed by Offer to Surrender Right-of-Way on Street.*

A street railway company is not relieved of obligation, assumed as condition of right to occupy a street, to repair the street because of its receipts being reduced by a subsequent grant by the borough to another company to occupy a parallel street and by another company with which it had had connection passing into the hands of another at foreclosure sale. It is also not relieved of its obligation by an offer to surrender its right on the street and remove the tracks, though it cannot be compelled to continue indefinitely operations at a loss. If it desires to surrender all its powers and franchises and cease its corporate existence, it may make application under P. L. 293; Pa. St. 1920, sec. 5791. If it merely desires to abandon part of its line, thereby affecting service, the determination of the question is for the Public Service Commission, to which is committed the regulation of service. [Borough of Norristown vs. Reading Transit & Lt. Co., 121 Atlantic Rep., 495.]

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New Publications

Workmen's Compensation Legislation of United States and Canada—1920-1922

Bulletin No. 332 of the United States Bureau of Labor Statistics, Workmen's Insurance and Compensation Series. Government Printing Office, Washington, 1923.

This bulletin gives a summary of legislation in force on the subject of compensation, which has been enacted in the years covered, followed by an appendix giving the exact text of all laws passed, or of amendments to previously existing laws. It is issued strictly as a supplement to an earlier bulletin, No. 272, which covered the legislation in force at the end of the calendar year 1919.

Ball Test Applied to Cement Mortar and Concrete

By R. E. Crepps and R. E. Mills. Bulletin No. 12 of the Engineering Experiment Station at Purdue University. Published by Purdue University, Lafayette, Ind.

This bulletin describes a method of testing concrete, particularly for highway construction, by means of a steel ball in a manner similar to the Brinell method of testing, which has been generally accepted as a reliable index of the mechanical properties of steel. According to the authors, the ball test affords a valuable and convenient means of determining the compressive strength, provides a reliable index of strength for any age or mix, allows material in place to be tested and provides a new means of studying questions in connection with concrete pavements. Such questions include the effect of wheel loads upon surface strength, the effects of different types of tires upon surface strength, the effect of tire inflation upon surface strength, the distribution of damage on any area of contact, the effect of impact and the recovery of surface strength. Methods of making the test and the procedure involved are described.

Workmen's Compensation Acts in the United States—The Medical Aspect

Research Report No. 61 of the National Industrial Conference Board, New York City. 282 pages.

This volume is a discussion of the medical side of workmen's compensation. The importance of the questions on this subject has been emphasized largely by the inclusion of diseases of occupations in later revisions of compensation laws, and also by the granting of compensation for diseases having only a casual and sometimes remote connection with the occupation or with the original injury. The needed medical experience is now available in the records of decisions of industrial boards and commissions and of the courts. These decisions have been carefully studied by the National Industrial Conference Board and the principles and practices developed have been analyzed in this report. Various types of injury and diseases resulting from accidents are treated in detail. In connection with the study, reference is made to some 800 reported cases.

Personal Items

Samuel Rea Elected President of Long Island Railroad

The board of directors of the Long Island Railroad elected on Dec. 5 Samuel Rea as president of the company, to succeed Ralph Peters, deceased. This is in accordance with the policy that has been pursued on the Pennsylvania Railroad System for several years, that the president of the Pennsylvania Railroad Company shall also act as president of the principal companies in the system.

George LeBoutillier continues as the vice-president of the company, resident in New York, in special charge of the operations of the road and all questions relating to its improvement and service, and of the various departments dealing with all features of the company's operations, except finance and accounting. These latter features are under the supervision of the vice-presidents at Philadelphia, as was the case during Mr. Peters' administration.

C. J. Quill has been appointed to the position of transportation salesman of the Tacoma Railway & Power Company, Tacoma, Wash.

Walter A. Shaw has been appointed by Mayor Dever as the city representative on the Board of Supervising Engineers, Chicago Traction, and his appointment approved by the City Council. Mr. Shaw was formerly engineer of the Illinois Public Utilities Commission, later acting in the capacity of consulting engineer for the city of Chicago and more recently as advisory engineer to the Lincoln Park Board.

Samuel T. MacQuarrie has been appointed director of the New England Bureau of Public Service Information, with headquarters at 24 Milk Street, Boston, Mass. Mr. MacQuarrie has been associated with the banking house of Curtis & Sanger, Boston, and for about twenty years was employed by the Fore River Shipbuilding Corporation at Quincy, Mass., and later by the succeeding Bethlehem Shipbuilding Corporation, Ltd., as assistant to the works manager, and in charge of publicity prior to the Bethlehem acquisition. He succeeds Joseph B. Groce who has joined the staff of the Edison Electric Illuminating Company, Boston.

Frederick Rollins Low, since 1888 editor of *Power*, a McGraw-Hill publication, was inducted as president of the American Society of Mechanical Engineers at the convention held in New York during the week ended Dec. 8. Mr. Low has been active in the affairs of the American Society of Mechanical Engineers since becoming a member in 1886. He served as vice-president of the society in 1918. He will be the delegate of the association to the World Power Conference in London.

Joseph A. Whitlow, formerly connected with the Pine Bluff Company, Pine Bluff, Ark., and superintendent of the Alapco division, has been appointed manager of the Tulsa properties of the Public Service Company of Oklahoma. Mr. Whitlow went to Alapco early in 1919, succeeding the late Minor Q. Woodward with the Pine Bluff Company. His resignation became effective on Dec. 1.

William C. Wheeler has been appointed engineer of equipment Chicago Surface Lines, succeeding Charles Gordon, who resigned some months ago to become Western editor ELECTRIC RAILWAY JOURNAL. For the past two and one-half years Mr. Wheeler has been employed in the railway motor engineering department of the General Electric Company at Schenectady. He is a graduate of the school of engineering, University of Missouri, and has done considerable work in the shops of street railway companies and the Union Pacific Railroad at Sedalia, Mo.

J. L. Longino, vice-president and general manager of the Arkansas Light & Power Company, was recently elected president of the Arkansas Utilities Association at its sixteenth annual convention. It was early in the current year that Mr. Longino was made vice-president and general manager of the Arkansas property, advancing to that position from the one of operating superintendent. Two years prior to this he had been made manager of the Pine Bluff Company, an associated public utility which operates the electric railway, power and water services in Pine Bluff. His promotion of this year did not alter his association with the Pine Bluff Company as general manager, although he was relieved of some duties by L. B. West, auditor of the company.

Obituary

William H. Burk, secretary, treasurer and auditor of the Waterloo, Cedar Falls & Northern Railway, died suddenly at his home in Waterloo, Iowa, recently. He had been ill for the past two years. Mr. Burk was connected with the Chicago Great Western for some time, being general Eastern agent in New York City before going to Waterloo twelve years ago.

Alex G. Drury, Jr., nationally known mechanical and electrical engineer, died at his home in Cincinnati on Nov. 29. For the past ten years Mr. Drury had been engineer for the Cincinnati, Newport & Covington Light & Traction Company, which leases the electric railway systems in Covington and Newport, Ky., to the Cincinnati, Newport & Covington Street Railway, a subsidiary of the Columbia Gas & Electric Company. He was thirty-eight years old.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Much Welding Being Done

Manufacturer Reports Substantial Increase in Use of Thermit Process

Tangible evidence is at hand that track reconstruction work has continued at a fast pace during the year now drawing to a close. It will be recalled that more miles of track were rebuilt during 1922 than in any year previously recorded. The complete figures for 1923 will not be available for several weeks, but the pace that has been set is indicated from sources other than the railways themselves.

Among the manufacturers of track material reporting very satisfactory business this year is the Metal & Thermit Corporation. Its railway business has been 50 per cent greater this year than the best year. Not only this, but the company reports a substantial increase in the number of customers. To be more nearly exact, it had on its books this year three times as many customers as last year.

This expansion is attributed by the company to two things: (a) the constantly growing appreciation of the value of the Thermit rail weld and (b) the reduction in cost of installation through economies effected in carrying out the process. This cost, the company now reports, has been so reduced that it compares favorably with any other method of joining rails.

Perhaps the biggest order of the company has been for material for from 5,500 to 6,000 joints. This, by the way, was from a company still in receivership. This simply reflects again that the electric railways are rehabitating strongly, even where the company may be in receivership.

Another large order received by the company was for material for about 5,000 joints. These, of course, are some of the outstanding installations. Orders for material from 1,000 to 3,000 joints have been plentiful.

The Metal & Thermit Corporation is more than optimistic about the prospects for business in the electric railway field in 1924. Its business, in this field is, of course, only a small part of the entire output of the company. In other lines, notably steam railway work, it also reports a substantial growth in business.

New Radial Line in Toronto in Prospect

The first spike was driven recently on the track to be laid by the Toronto Eastern Railway which was the initial step in the operation of a new radial line running from Bowmanville to Toronto. It is expected that the line will be in operation by the end of next summer. Construction of the line was started in 1914. At that time the work was begun by the Canadian Northern Railway, but will be finished by the Canadian National Railways. When the war came construction activity ceased, but since that time Canadian National engineers have been occupied with working out the completion of the project. Originally tracks on the proposed radial were laid from Bowmanville to Whitby and grading on the right of way was completed from Whitby to Pickering, but the rails on the latter part were not laid. About a year ago Sir Henry Thornton, president of the Canadian National Railways, announced that he would have the road extended to Toronto and operated as a fast electric railway. Many distinguished people, including railway officials, were present at the ceremony of commencing the new rails.

Standardization Being Accomplished by Germans

The extent to which industrial life in Germany has been coordinated, it is said, is shown by the fact that more than 700 German national standards have been adopted. In addition to the work of the central body there are no less than sixty-five special industry committees actively working on such subjects ranging from the standardization of pipe fittings to sheet paving material and railway car construction.

A striking example is cited of the efficiency of national standardization as it has been developed in Germany in the case of a rush order placed with German manufacturers for 200 locomotives for delivery to Russia. Production of different parts was allotted to seventeen different manufacturers to be produced strictly upon the plan of interchangeable parts, no one manufacturer making a complete locomotive. No serious practical difficulty was encountered in filling the order. The inspectors made a particularly striking test of the feasibility and accuracy of the plan by ordering a complete locomotive to be assembled from parts chosen at random from the parts furnished by the seventeen manufacturers. It proved to be ready for service immediately after assembly without the necessity of any disassembling for readjustment.

"The extent to which Germany has so far succeeded in keeping her industrial machine intact is due in no small part to the elaborate scale on which her standardization work is performed." So states Dr. P. G. Agnew, secretary of the American Engineering Standards Committee, in a bulletin which he has prepared for the committee.

Brill Declares Dividend

A disbursement of 1¾ per cent was made on the common stock of the J. G. Brill Company on Dec. 1. The amount of outstanding common stock is $4,810,000, on which there were no dividends paid from 1908 until March 1, 1923, when a disbursement of 1¾ per cent was made. This dividend has been paid quarterly since. The price range of the common stock has been as follows:

	High	Low
1917	33	10
1918	27	18
1919	64¾	19¼
1920	63	24
1921	56	25
1922	59	36
1923	91	49

This year the company has had good business, the direct result of increased purchases by public utility companies.

Lumber Conference Reaches Conclusions

It is expected that trade in lumber products in various countries will be facilitated following the recent European Lumber Conference held in Bratislava. At the conference it was decided to establish a permanent European commission, composed chiefly of reputable lumber exporters, to which would be assigned the task of establishing a lumber trade Court of Arbitration. In the case of dispute and on appeal by both parties this court would render decisions which would be final and binding. A second decision of the conference contemplates the formation of a European association to be composed of the various European lumber trade associations. The conference considered also the matter of standardization of lumber sizes and classification, but took no definite action in this direction. Besides the Czech delegation there were present representatives from France, Italy, Austria, Germany, Holland, Switzerland, Hungary and Rumania.

Metal, Coal and Material Prices

Metals—New York	Dec. 4, 1923
Copper, electrolytic, cents per lb.	13.125
Copper wire base, cents per lb.	15.50
Lead, cents per lb.	7.00
Zinc, cents per lb.	6.70
Tin, Straits, cents per lb.	47.00
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.625
Somerset mine run, Boston, net tons	2.125
Pittsburgh mine run, Pittsburgh, net tons	2.00
Franklin, Ill., screenings, Chicago, net tons	1.575
Central, Ill., screenings, Chicago, net tons	1.35
Kansas screenings, Kansas City, net tons	2.00
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.65
Weatherproof wire base, N. Y., cents per lb.	17.00
Cement, Chicago net prices, without bags	$2.10
Linseed oil (5-bbl. lots), N. Y., per gal.	$0.95
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	11.25
Turpentine, (bbl. lots), N. Y., per gal.	$0.93

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Victorian Railways Invite Bids

The Victorian Government Railways, Melbourne, Australia, is inviting bids on the following machinery and equipment: Spring coiling machine and necessary equipment, including electrical motive apparatus; paper rolling machine, including electrical motive apparatus; combination turret lathe, including leading screws and nuts and taper-turning attachment; gear-cutting machine; automatic cross-cut saw; cross grooving and trenching machine; planing and thicknessing machine, including side cutters. A copy of the specifications covering this equipment may be consulted by interested manufacturers at the Boston or New York district offices, or at the Cincinnati co-operative office. Bids will close at Melbourne on Jan. 9, 1924.

Rolling Stock

Fort William Electric Railway, Fort William, Ont., during 1923 remodeled two single-truck and one double-truck one-man cars.

West Chester Street Railway, West Chester, Pa., built and rebuilt in the railway shop during 1923 four interurban two-man cars.

New York, N. Y.—The department of Plant and Structures is considering the purchase of new cars to supplement present service on the Williamsburg Bridge and also to provide for other service that will likely be taken over by the city.

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., during 1923 ordered two city double-truck two-man cars and one interurban two-man car.

Spokane United Railways rebuilt four one-man cars during 1923.

Salt Lake & Utah Railroad, Salt Lake City, rebuilt or remodeled during 1923 three insulated box cars, one tank car and one flat car.

Indiana County Street Railways, Indiana, Pa., ordered from the Kuhlman Car Company in 1923 three interurban double-truck two-man cars.

Northern Texas Traction Company, Fort Worth, during 1923 ordered from the American Car Company ten double-truck one-man cars. Twenty-two cars were remodeled, the Cincinnati Car Company remodeling twelve city motor double-truck one-man cars and the St. Louis Car Company rebuilding ten.

San Francisco, Napa & Calistoga Railway, Napa, Cal., during 1923 ordered from McGuire-Cummings one interurban steel locomotive double-truck car and one work car from the Pacific Car & Foundry Company.

Quebec Railway, Light & Power Company, Quebec, during 1923 ordered of the Ottawa Car Manufacturing Company, Ltd., ten single-truck one-man cars. Ten double-truck two-man cars were rebuilt.

Sacramento Northern, Railroad, Sacramento, Cal., ordered during 1923 two electric locomotives from the General Electric Company.

Worcester Consolidated Street Railway, Worcester, Mass., during 1923 ordered ten double-truck two-man cars for city service from the Osgood-Bradley Car Company.

Track and Line

Trenton & Mercer County Traction Corporation, Trenton, N. J., will remove its switch on Brunswick Avenue to Harney's Corner in Lawrence Township.

Toronto Transportation Commission built in 1923 7.152 miles of new single track in pavement and rebuilt 7.774 miles.

Salt Lake & Utah Railroad, Salt Lake City, during 1923 increased its side tracks by 5,553 ft. of track none of which was in paved streets.

Alabama Power Company, Gadsden, Ala., will rebuild the Cansler Street line from Ninth Street to a point on Twelfth Street. Seventy-pound rail will replace the 40-lb. rail and the street occupied by the car line will be repaved. The Cansler Street improvement will cost from $12,000 to $15,000. Work is progressing on the rebuilding of the car line trestle over Black Creek on the Attalla line.

Wisconsin Public Service Corporation, Green Bay, Wis., rebuilt in 1923 2,500 ft. of city single track paved and raised to level with new ties and ballast.

Pittsburgh Railways built during 1923 0.467 miles of city single track and 0.025 miles of interurban track in pavement. In open construction there was built 0.171 miles of city track and 0.062 miles of interurban. The company rebuilt 34.326 miles of city track and 0.911 miles of interurban track in pavement and in open construction 1.028 city miles and 1.826 interurban miles.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., will extend the Wyatt Park line tracks 1,700 ft. on Thirty-third Street. An agreement to this effect was reached recently following a conference with the park board members and S. B. Irelan, general manager of the company.

Power Houses, Shops and Buildings

Sydney, Australia.—The railway commissioners are now receiving bids and placing orders for the power plant equipment, including a number of large turbo-generators and boilers for the electrification of the Sydney Suburban Railways. When installed the generating units will be the largest in Australia, each being of 20,000-kw. normal rating. It is expected that the electrification of the first section of the Suburban Railway system of Sydney will be completed by March, 1925.

Trade Notes

Morton Manufacturing Company, Chicago, manufacturers of the Acme line of railway appliances, has just completed an addition to its Chicago factory, giving it 18,000 sq.ft. of additional floor space.

Walter N. Ballou has been appointed manager of the transportation division of the Atlanta office of the Westinghouse Electric & Manufacturing Company. He will have charge of the light and heavy traction business of the company in that territory.

Western Electric Company, New York, N. Y., has announced important organization changes which involve the appointment of three new assistant works managers and two superintendents in the manufacturing department. These changes are part of a program of expansion being carried out in the new Western Electric works at Kearny, N. J., which in their ultimate development may duplicate the tremendous plant at Chicago. C. L. Rice, formerly production superintendent of the Hawthorne works at Chicago, and S. S. Holmes, general superintendent of installation of the installation department, have been promoted to assistant works managers at Hawthorne. R. C. Dodd, at present operating superintendent of the Hawthorne works at Chicago, has been promoted to assistant works manager at the new Kearny, N. J. works. This appointment is effective March 1, 1924. Other changes are as follows:

J. J. McKenna, formerly assistant general purchasing agent at Hawthorne, succeeds Mr. Rice as superintendent of production and W. H. Meese, supervisor of installation methods and results, succeeds Mr. Dodd as operating superintendent at Hawthorne.

New Advertising Literature

Linde Air Products Company, New York, N. Y., has just published an illustrated booklet of 122 pages fully describing the latest methods for various kinds of work. It states that the keynote of successful cast-iron welding is a thorough understanding of the necessity for adequate preheating, proper welding practices and suitable annealing. In many shops the application of advanced methods has accomplished saving in money, labor and time.

Ohio Brass Company, Mansfield, Ohio, has issued a pamphlet called "How to Save Time, Money and Temper!" "Cam yourself, Bill, cam yourself" tells about the advantages of using cam tips. These cam tips can be found not only on frogs but on Ohio Brass crossings, section insulators, strain plates, etc. The circular says that you can "cam up" your whole system, save time, money and temper and have all the cars rolling all the time.

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New York, Saturday, December 15, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 24

Cost of Repair Parts Varies with the Times

RECENTLY, in discussing with an electric railway shop superintendent the advisability of the railway manufacturing for its own use various car parts made up in small quantities, he said that a check of costs which had just been completed showed that several parts previously made in the shop at a saving could now be bought outside cheaper. So orders were to be placed for them.

Labor and raw material prices are constantly changing, and what is economical repair shop practice at one time may be found to be costly at another. The margin of saving between making repair parts in an electric railway shop and purchasing them outside is frequently quite small and railways often make parts as a matter of convenience rather than take a chance of slow delivery. A frequent check of manufacturers' prices with the shop costs will show whether it is advisable to continue to make them or place orders with a manufacturer.

As manufacturers specialize in manufacturing work, and as they usually keep their plants equipped with the most modern labor-saving machines on account of trade competition, it ought generally to be possible for them to do such work cheaper than it can be done in an electric railway shop which is organized and equipped for maintenance work, and often has old tools to work with. Abnormal conditions may make railway manufacturing desirable at times, but a watchful eye should be kept for the opportunity again to buy maintenance parts outside more cheaply.

Cleaning Done Right Contributes to Low Maintenance

IMPROVED appearance and better sanitation are desirable aspects of good car cleaning, but a more important result is the contribution this makes toward preservation of the car structure. The importance of cleanliness has increased considerably with the greater use of steel car construction. Corrosion is the greatest enemy of steel and iron and the best protective coatings have their usefulness decreased enormously by lack of attention in keeping all parts clean.

Working to meet this maintenance problem, special consideration has been given in car construction to avoid pockets and crevices which collect dirt and moisture. Sanitary corners have been provided, moldings and projections are beveled and seat pedestals are made with well-rounded bases. But these precautions merely make cleaning easy and are of little help in eliminating corrosion unless the cleaning is actually done. The dirt which collects retains moisture. This combination forms an acid which accelerates corrosive action, where steel is used, or soon rots away wooden construction. The corners are the hard parts to keep free from dirt, but they are the important points, if maintenance costs are to be held to a low figure.

Making Air Tanks Safe at Reasonable Cost

A GREAT deal of attention has been directed recently to the need for establishing definite specifications for the construction of electric railway air tanks. A committee of the American Electric Railway Engineering Association has been working on this subject and has been co-operating with a sub-committee of the American Society of Mechanical Engineers, which is engaged in the preparation of a code for the manufacture of unfired pressure vessels. This code will probably include electric railway air reservoirs.

Primarily, the object of such specifications is to insure safety. The railway companies should be, and are, in entire accord with this object, and it is to be hoped that the work under way will result in the production of a code which will not only assure safety but will also avoid saddling upon the railways an unnecessarily expensive and heavy equipment to be hauled around throughout its life.

The interest of railways goes farther than providing a construction that will be safe when first installed. In addition, the construction of air tanks for electric railway service should be such that easy, systematic and regular inspection and tests can be made. These are necessary in order to be sure that the deterioration resulting from service has not weakened the tank to a points where blowouts are likely to occur.

The present inspection and test practice of electric railways usually consists of some kind of a pressure test or a close visual inspection of the material of the tanks on the outside after all loose scale and dirt have been knocked off with a light hammer. Some roads apply pressure with a hydraulic pump, but on many roads the pressure test consists only of setting up the safety valves and pumping up the air pressure to an amount considerably in excess of that regularly obtained. Some roads have a practice of periodically rotating the reservoirs so that excessive corrosion will not take place at one particular section of the shell.

The need for an inspection of the interior of the tanks has been felt for some time, but as the usual pipe connections are seldom larger than 1 in., the opening is too small for inspection purposes. A few railways are now using tanks with a 2-in. pipe connection in one head. This makes it possible to examine them internally, as a drop light with small sized lamp can be inserted. With this better means of inspection it should be possible to utilize a lighter gage of metal for

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the tank than might be considered necessary with only exterior inspection.

In addition to the better facility for inspection, the 2-in. connection can be used to advantage for providing a moisture trap in the air piping to prevent freezing of the condensed moisture at points that will interrupt the air supply.

Due to advances made in welding, a large field has been opened up for the application of this process to air reservoirs. Some engineers have felt that a welded tank increased the hazard, but with provision for careful, systematic inspection and test after installation, no doubt a satisfactory welded tank can be made at a lower cost than a riveted tank (which some members of the A.S.M.E. are inclined to feel is necessary) and perhaps with lower weight, while giving an adequate safety factor.

Having provided for adequate tests to insure safety, why not tell the public about it? It has been suggested that a very effective method of doing this would be to stencil a statement conspicuously on the outside of the tank which would read something like this: "Tested to 1½ times maximum working pressure," accompanied by the date and name of company.

While the general public is not competent to judge as to the frequency with which such tests should be made, a stenciling of this nature would at least indicate that the tank had been tested at some time and it would also serve as an incentive for the railway to make tests well within the proper interval.

Public Beginning to See that Riders Alone Cannot Support Subways

ONCE every so often some one proposes that the elevated roads, or part of them, in large cities be taken down. Scrapping is the word generally used. The obstruction which they cause to light and air on the streets below and to adjoining property is the principal argument urged against the existing structures. During the past week agitation of this kind has again come up, this time in connection with the Sixth Avenue line, New York City. Julius Miller, borough president of Manhattan, has gone somewhat further than has been done with previous proposals of a similar nature and has suggested that the cost of acquiring the structure and building a substitute subway be raised by assessments on abutting property. He believes not only that the increase in value of this property resulting from the change will amount to much more than the entire cost but that the owners of this abutting property would be willing to pay for the change by an assessment. The amount required has been estimated by him at 10 per cent of the assessed value of the property.

Now, it is undoubtedly true that in the course of the growth of a city the methods of transportation in use may have to be changed. Undoubtedly, also, property owners prefer a subway to an elevated railway on the street on which their real estate is located. The elimination of the overhead lattice work of steel girders, ties and rails on Sixth Avenue would improve the appearance of the street and make the ground-floor stores much lighter. With the railway underground there would be a pleasing reduction in noise. It is easy to see, therefore, why the property owners on that avenue favor such a step.

However, grave misgivings may well exist concerning several features of the plan. The estimated cost seems too low by a large amount. The existence of an underground railway, the Hudson & Manhattan, under Sixth Avenue from Ninth Street to Thirty-third Street would seem to impose great engineering difficulties in the design of a new subway. Apparently no detailed estimates have been made of the traffic which would be carried, nor the cost of operation, nor who will operate the line. It has simply been assumed as a matter of course that a Sixth Avenue subway would be a paying proposition.

Actually, of course, a subway is a luxury in any city. Even in Detroit, where the subsoil is ideal for subway construction because it contains no rock but can be cut like cheese, the cheapest form of subway, if supported entirely by the car rider would require a fare of 10 cents or more, according to D. L. Turner. This suggests that at least one good result may come from the campaign on Sixth Avenue, even if the subway is never built. A large number of more or less influential people will learn at first hand something about the intricacies of subway building and its tremendous cost. They will discover the thousand and one things that are required, and to which the average man never gives a thought. And if careful analyses are made of probable operating costs and passenger revenue, these property owners may learn that every railway is not *ipso facto*, a gold mine. The plan is commendable in that Mr. Miller is going about the work in the right way, namely, by placing some part of the cost of the construction on the owners of abutting property. They primarily are the ones benefited. The principle of assessment for rapid transit improvements, suggested also in Mr. Turner's report on Detroit as presented in this paper last week, is logical.

Finally, it is evident that even if the campaign for funds among Sixth Avenue property holders is successful, New York cannot dispense now with the carrying capacity of the Sixth Avenue elevated. The city is ten years at least behind in its transit program. If the building of a subway under Sixth Avenue takes five years the elevated will have to remain in place for at least that length of time because the other present north and south rapid transit lines have not the excess capacity required to accommodate the passengers who now use the Sixth Avenue elevated. After a Sixth Avenue subway is built, it may be that the elevated over the street will not be required, but if history is any guide, New York City will need for many years all of the rapid transit lines which it has now and can build to care for its constantly increasing traffic.

This condition, that the means of transportation is a step behind the demand, applies in every growing city, and is one of the safeguards of the electric railway. Thus there have been statements in the past that the surface lines in New York were obsolete and should be scrapped. Nevertheless, they carry now about 39 per cent of the local business of the city, as compared with 59 per cent on the rapid transit lines and 2 per cent by buses, and there is no other way known of taking care satisfactorily of this large proportion of the traveling public. In other words, good transportation in a city is a necessity, and a city cannot get along without electric cars in its principal streets until a better means for local transit is provided. This seems a long way off.

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Use of Mold Successful in Arc Welding Copper Rail Bonds

Two Methods of Arc Welding Are Described—The First Employs a Carbon Electrode and the Second a Copper Alloy Rod—Figures of Numerous Bond Tests Are Given —Procedure Has Been Developed as a Result of Research Covering Three Years

By Chester F. Gailor
Consulting Engineer, New York City

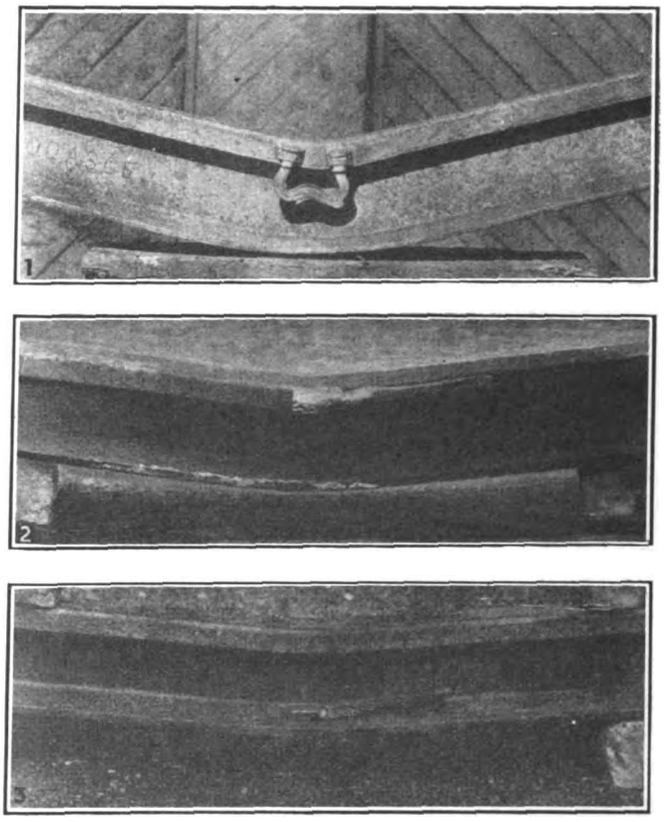
ONLY recently has the practice of arc welding bonds to rails been accomplished in a reliable and satisfactory manner. The first attempt to arc weld copper bonds to rails was made by using, both for the bonds and the filler needed, pieces of old trolley wire welded by the carbon arc method. It was considered necessary at that time to secure deep penetration into the rail steel to produce a desirable weld. This caused unnecessary gouging and burning of the steel, and usually resulted in an ugly looking weld of questionable character. A careful study of the factors involved demonstrated the fallacy of this practice and resulted in the development of a welding process which eliminates that feature.

Many attempts have been made to manufacture a rail bond with a suitable terminal which could be satisfactorily welded to the rail without the use of a mold. This has been found very difficult because the copper, in a fluid state under the influence of the arc, does not amalgamate readily with the steel. Copper in such a small mass usually will chill without producing a weld. The use of molds, however, has made it possible to use sufficient copper around the bond to produce a reliable weld and at the same time form a suitable terminal on the bond.

The problem of confining the weld metal and the necessity for producing a weld and bond terminal of a suitable character prompted the use of a mold. It was soon found that a carbon mold met the requirements better than any other material. Carbon will withstand the action of the arc and erosive action of the metal when boiling in the mold and will not chill the metal as rapidly as will most other materials. Consequently, a carbon mold in one form or another has been in use since the very beginning of this method of bonding.

It was found difficult to produce a satisfactory weld in the remote corners of the mold, especially on the smaller sizes of bonds with limited area of contact. In some cases where molds of other materials than carbon were used for experimental purposes, it was found difficult to force the copper metal into the corners of the mold, as the material had sufficient chilling and repulsive action to hold the copper back for an appreciable distance from the corners. This indicated that acute angles in the mold and thin sections of copper welding should be avoided.

The carbon molds are designed to produce a terminal and welded contact to the rail equal to at least four times the cross section of the copper metal in the bond itself. With this area it is virtually impossible for an operator to apply a bond which when finished will not test 100 per cent efficient. A larger contact terminal could not be justified.



Condition of Rails and Bonds After Being Subjected to Severe Drop Tests

During the study it was found that a combination of copper, steel and carbon for the mold was most desirable. It developed that the mass of carbon needed around and under the head of the bond was considerably more than the space available between the finished bond terminal and the top, which many heavy-section joint plates now in use, would permit. The combination of these materials, however, enables the bond to be applied at a point on the rail head much lower than if an all carbon mold were used.

The life of such carbon molds of course depends largely on the welder. A set of carbons will, as a rule, weld forty or fifty bonds. When the speed of the operation is considered the use of molds is fully justified.

Investigation and research conducted principally in the laboratories of the Rail Welding & Bonding Company resulted in the development and perfection of two different methods. One method is by the use of the carbon arc including the use of reversed polarity, with the carbon electrode negative. Instead of using scrap copper for an electrode, a copper alloy welding rod is employed, which contains a combination of metals act-

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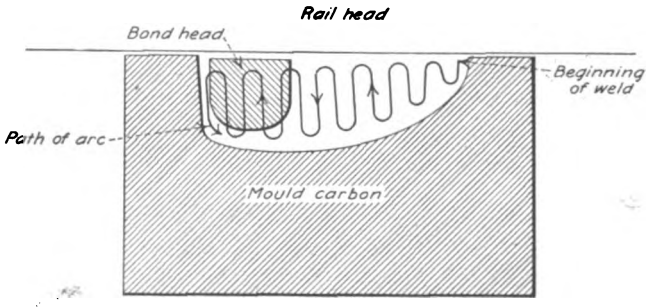
ing as a strong deoxidizer for both steel and copper. Under the influence of the arc this will thoroughly cleanse the steel surfaces, bringing pure copper into contact with the steel in the rail under the most favorable conditions.

This action of the copper alloy rod obviates the possibility of gouging the rail steel. In fact, the best bonds are produced where the arc is drawn along the surface of the rail steel, close enough to secure the desired weld, but still far enough away to avoid any direct penetration. The action of the copper metal in the mold under the influence of the arc is very similar to that of copper when handled in a crucible. All the foreign substances and slag rise to the top, leaving the pure copper forming the bond terminal welded to the rail. This method is recommended in all cases where dynamotors and similar low voltage generating units supply the necessary electric current. The total time



Path Which Arc Should Follow in Welding Bond

for welding a bond of the ordinary standard size and type is approximately two minutes. Where conditions are sufficiently favorable bonds may be installed in half the time. It has been found very essential that sufficient current be available to keep the copper metal flowing uniformly and the metal in the mold always in a fluid state. Otherwise, the metal will chill, preventing the cleansing and boiling action, which is highly necessary. In practice at least 200 amp. are required to weld bonds successfully with this method.

Metallic Arc Welding

The second method of bond welding, which is the result of a research started about three years ago, is distinctly different. In this the welding metal must all be kept in a molten state and the length of arc changed from time to time to produce a good weld. The same molds and accessories are employed as in the first method. The current usually is supplied by a lightweight portable resistance welder, a $\frac{1}{16}$-in. diameter copper alloy rod forming the positive electrode.

The resistance should be set to permit a current of about 225 amp. The weld is commenced at the end of the mold remote from where the bond head projects into it. The arc is struck by touching the electrode to the mold. A globule of melted copper will start to form at the end of the mold and the arc should be kept at the front edge of the globule, allowing it to enlarge until the entire bottom of the mold is covered. An arc of about $\frac{1}{4}$ to $\frac{3}{8}$ in. in length is ordinarily used at the beginning of the job. As soon as the arc touches the bond head it should be shortened to $\frac{1}{8}$ in., as the short arc is necessary to melt down the copper of the bond head properly. After the bond head is melted down the arc is played back and forth and in and out from the rail over the entire head to keep all the copper in a molten state and insure that the head is well filled out in back and properly welded to the rail. This procedure is followed whether the bond is applied to the head, web or base of the rail. When applying the weld to the base a slightly longer arc, $\frac{3}{8}$ to $\frac{1}{2}$ in., is used at the beginning to fill the mold.

Mechanical Tests

During the development of the process it was found necessary to make mechanical tests in order to establish the principles involved, and also to get some idea of the comparative life of the various types of bonds. The vibrating machine used for testing bonds mechanically consists of a steel framework carrying two upright standards mounted on eccentrics in such a manner as to give a maximum movement of $\frac{13}{32}$ in. between the two members. The bonds were welded to pieces of steel and inserted between the two upright members and the machine operated continuously until failure occurred. This movement, being far in excess of that resulting from actual practice, was adopted in order to speed up the operation. A summary of several of such tests is shown in an accompanying table.

Several methods of testing the strength of the bond heads when subjected to shearing stresses such as are apt to be imposed upon bonds welded to the head of rails were tried with varying results. The most valuable of those tried was a simple shear test to show the relative strength of the weld and the copper forming the bond terminal. This test clearly indicates the merits of the weld, as the loads required to shear the bond terminals all ran over 30,000 lb.

The use of a sleeve at the junction of the bond head and bond itself was shown to be very valuable. This sleeve and the head on the bond itself hold the strands and laminations in one solid mass, preventing the welding heat from overheating any individual strand and at the same time throwing the bending action back into the flexible portion of the bond. This particular feature was found to add practically 25 per cent to the life of the bonds.

Electrical Tests

Reliable resistance tests of welded bonds were difficult to make, as it was found after a preliminary investigation that there are very few instruments available which could accurately measure the resistance in the contact between the welded copper bond head and the rail steel. The following is a brief summary of resistance tests which include 1 in. of steel at each bond head and the bond itself. No fish plates or mechanical connections were used so that these results show the actual resistance of the bonds enumerated in the accompanying table.

RESULTS OF MECHANICAL TESTS OF WELDED BONDS

Size	Type of Bond	No. Vibrations Before Failure of Bond
7-in	0000 laminated U	5,100,000
9-in.	0000 Webber U	2,403,000
8-in.	Single cable U	1,830,000
8-in.	Double cable U	1,050,000

RESULTS OF ELECTRICAL TESTS OF WELDED BONDS

Size	Type of Bond	Ohms Resistance
6-in.	0000 laminated U	.0000389
7-in.	0000 laminated U	.0000493
8-in.	Webber	.0000454
8-in.	Single cable U	.0000516
8-in.	Multiple cable U	.0000484
8-in.	400,000 circ.mil single cable U	.0000260

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Careful consideration was given to the study of the rail steel at and adjacent to the point of weld. The idea of securing even the usual penetration when making a bond weld was found not only decidedly wrong from a bonding point of view, but it created a condition that proved liable to cause failure in the rail section when mechanical tests were conducted. The improvement in the process of welding, as outlined herein, quickly eliminated this feature, by making it both unnecessary and improper to penetrate the steel with the arc.

Among many other tests which were conducted to prove that the welding of copper bonds to steel rails with these processes of welding did not weaken or materially affect the structure were severe drop tests made on extra high carbon tee rails by dropping the 2,000-lb. tup so as to strike the rail at the point of weld. No failures or indications of any objectionable character were in evidence at the conclusion of these tests. The rails were removed from the testing apparatus because of the excessive vertical deflection which caused the rail to rest on the bed of the machine.

Aside from the area heated during the welding, which was in no way damaged, there was no evidence of any change in the structure of the steel or the rail section itself.

Systematic Inspection Reduces Pull-Ins

THERE has been a steady reduction in equipment failures, covering a period of several years, on the Eastern Massachusetts Street Railway, formerly the Bay State Street Railway, which operates 665 miles of city and interurban lines. This dated back to the reorganization which placed the road under state control with operation by a board of public trustees. An accompanying table shows a reduction from a maximum of 1,489 pull-ins due to equipment failures in July, 1920, to 92 in July, 1923.

This marked improvement in the record in three years is due to numerous changes in methods, but according to W. C. Bolt, superintendent of rolling stock and shops, they all can be summarized in the words "systematic maintenance and inspection."

Cars are given a general shop overhauling at between 60,000 and 75,000 car-miles, depending on the type and age of cars. Between these general overhaulings the cars are inspected every 1,000 miles at the carhouse for minor adjustment and repair. It is stated that this plan, vigorously followed, has made it possible almost to eliminate failures of equipment in service and substantially to reduce the cost of maintaining cars.

The comparative record of pull-ins by operating divisions for the month of October, 1923, shows considerable difference in the records of the various parts of the system. Two of the smaller divisions had perfect records for the month, and two of the larger stations had but one pull-in each due to maintenance, averaging 0.007 pull-ins of this character per 1,000 car-miles. From this the number of pull-ins for the various divisions ranges up to a maximum of thirty-six, or 0.184 maintenance pull-ins per 1,000 car-miles.

Publication of the monthly record is said to have created considerable competitive interest, and has been a contributing cause to the present good record. Equipment failure pull-ins are also analyzed carefully each month, as indicated in another table. The company makes this record up for each operating division, although only the total is shown in the table. This enables the department heads to determine the causes that result in car failures and to eliminate the sources of trouble.

PULL-IN REPORT, EASTERN MASSACHUSETTS STREET RAILWAY MONTHS OF SEPTEMBER AND OCTOBER, 1923

Cause of failure	Number of Pull-Ins October	September	Increase
Contactors	6	3	3
Circuit breakers	0	1	1*
Air	8	20	12*
Car body	6	5	1
Controllers	8	12	4*
Doors and steps	11	13	2*
Wheels	0	0	..
Air and hand brakes	4	8	4*
Gears and pinions	1	3	2*
Hot bearings	12	12	..
Lights	16	6	10
Sanders	0	2	2*
Armatures	8	13	5*
Fields	3	5	2*
Miscellaneous motor	2	7	5*
Wires and cables	14	5	9
Trolleys	6	4	2
Trucks	1	3	2*
Resistance	20	17	3
Grounded brush holders	2	1	1
Fenders	0	1	1*
Miscellaneous	3	5	2*
Broken axles	0	2	2*
Heaters	1	0	1
Split mercury	0	0	..
Frozen air	0	0	..
Sand boxes empty	1	6	5*
Lightning	0	1	1*
Broken windows	15	8	7
Accidents	53	62	9*
Lights (operating pull-in)	0	0	..
Inspections	4	1	3
No trouble found	20	17	3
Wet sand	1	2	1*
Total pull-ins	226	245	19*
Operating pull-ins	94	97	3*
Maintenance pull-ins	132	148	16*
Station car-miles	1,639,527		
Maintenance pull-ins per 1,000 car-miles	0.08		

* Indicates decrease.

RECORD OF EQUIPMENT FAILURES BY MONTHS, EASTERN MASSACHUSETTS STREET RAILWAY

Month	Pull-Ins Due to Equipment Failures	Pull-Ins per 1,000 Car-Miles
May, 1920	1,238	0.60
June	1,364	0.66
July	1,489	0.70
August	1,389	0.68
September	1,022	0.54
October	1,182	0.63
November	1,071	0.61
December	941	0.54
January, 1921	1,192	0.72
February	1,069	0.74
March	948	0.57
April	700	0.44
May	715	0.43
June	628	0.38
July	1,060	0.59
August	1,049	0.57
September	916	0.56
October	734	0.45
November	758	0.49
December	653	0.40
January, 1922	1,048	0.66
February	827	0.56
March	612	0.37
April	437	0.28
May	312	0.19
June	271	0.17
July	287	0.16
August	274	0.16
September	246	0.15
October	188	0.11
November	163	0.10
December	313	0.19
January, 1923	560	0.34
February	501	0.33
March	559	0.33
April	250	0.15
May	172	0.10
June	111	0.07
July	92	0.055
August	105	0.063
September	148	0.093
October	132	0.08

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Reclamation Storeroom Accomplishes a Big Saving*

The System Developed by the Northern Texas Traction Company for Reclaiming Waste Material Has Improved Efficiency of Mechanical Department and Reduced Expenses

ON MANY railway properties thousands of dollars a year have undoubtedly been thrown away via the junk pile. Further losses have resulted from lack of a system whereby a single person passes on all material before it is scrapped. If so-called waste material is examined to see whether or not it can be reclaimed and restored to usefulness, large savings can often be made in material which would otherwise be drawn from stores.

This problem was the subject for discussion at a meeting of the master mechanics of the Stone & Webster companies some time ago. As a result of this discussion, it was decided that the Northern Texas Traction Company, Fort Worth, should experiment with the establishment of such a department.

A survey was made of conditions at the shop and it was found that material and spare parts were lying around everywhere. This material had been taken off the cars from time to time and left there with the idea that it would be used at some future date. Time and effort were being lost, however, in looking for what was wanted and, in a great many cases, material was requisitioned from the storeroom when a thorough search would have discovered the desired article in some corner of the shop. This was the inevitable result of having no centralized place equipped for handling second-hand material and reissuing it. Moreover, it was felt that proper examination was not being made before material went to the junk pile.

A section of the truck shop 40 ft. x 36 ft. was therefore partitioned off and some 350 shelves of various sizes were built. Scrap cupboards, waste bins, spare controller racks, glass racks, 560 small bolt bins and an armature rack were placed in this room. A work bench was installed and equipped with a vise, compressed air connections and other tools for reclaiming material needing minor repairs. Surplus material and spare parts were collected and moved into this room, assorted and put away. The room thus assumed the appearance of a storeroom, although all the material belonged to the mechanical department and not to supplies.

A man who had had previous experience in the storeroom, as well as in the shop, was placed in charge of this reclamation room under the supervision of the master mechanic. Another man was kept busy scrapping material, stripping good parts from junked material and making minor repairs. The latter man, with the assistance of the general foreman, determines whether or not worn parts that are brought in are worth reclaiming. When they are, they are taken to the department where the repairs are made, and then returned to the reclaiming room for reissue. A third man, who is an all-around mechanic, puts in a portion of his time in this department, making miscellaneous minor repairs.

A rule was made in the mechanical department that if any man in any department needs material or parts, he must first apply to the reclamation room to ascertain whether or not the material desired is to be had there. If not, the man in charge of the room has authority to write a requisition on the general storeroom. By this plan the general foreman is relieved of much detail work.

The establishment of this department has resulted in saving time in the reassembling of cars and in furnishing more accurate jobs. When cars are brought into the shop for overhauling all parts are removed, repaired and stored in this room. When the car is completed the same material is placed back on the same car, after, of course, it has had the necessary attention.

It is impossible to place a monetary value on some of the benefits derived from the establishment of this department, such as relieving the foreman of detail work and permitting him to give closer attention to other duties, relieving congested conditions in the storeroom and reducing the amount of clerical work in that department, and systematizing the use of material, both new and used. In some other respects, however, the saving in dollars and cents is quite apparent. A check made of the orders for March, 1923, showed that about 56 per cent of the calls for material were supplied by the reclamation room. But it is felt that the other benefits derived from it would be well worth while even with no saving at all in money.

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association.

Repairs to Car Bodies Principal Expense Item in Railway Shops

FIGURES recently made public by the Department of Commerce show that nearly 80 per cent of the money value of work done in electric railway shops is expended in repairs to cars. In 1921 the sum of

	1921	1919	1911	1909
Motive power and machinery departments:				
Repairs to motors, etc., value	$7,226,905	$7,081,735	$4,933,436	$4,004,396
Work for other corporations, value	$78,472	$75,182	$56,944	$88,070
All other products or work, value	$409,667	[1]$769,386	[2]$390,193	[3]$417,926
Car departments:				
Cars built — Passenger — Number	127	88	235	129
Cars built — Passenger — Value	$822,398	$635,770	$737,926	$498,709
Cars built — Freight — Number	2	46	11	63
Cars built — Freight — Value	$7.200	$95,638	$21,196	$59,102
Cars built — Other — Number	48	17	58	51
Cars built — Other — Value	$418,669	$30,885	$51,982	$68,941
Repairs to cars of all kinds, value	$69,131,546	$60,060,255	$27,628,802	$22,869,777
Work for other corporations, value	$1,249,497	$1,174,282	$441,323	$624,805
All other products or work, value	$3,900,209	$2.240,975	$2,204,814	$1,714,129
Bridge and building departments (shop work):				
Repairs and renewals, value	$420,445	$261,679	$199,751	$273,581
All other products or work, value	$96,497	$6,976	$234,676	$57,367
All other products and work not classified, value	$3,550,921	$2,777,938	$1,675,522	$1,285,818
Total value	$87,312,426	$75,210,701	$38,576,565	$31,962,561

[1] Includes value of 2 electric locomotives built.
[2] Includes values of 1 electric locomotive built.
[3] Includes value of 3 electric locomotives built.

$69,131,546 was spent in this way. Repairs to motors, etc., was the next largest item, but the expenditure on this account amounted only to $7,226,905. A total of 177 cars, including passenger, freight and others, was built in electric railway repair shops, but the value of the equipment was only slightly more than $1,000,000. It appears that the railways are generally following the practice of using their shops for maintenance work and going direct to the manufacturer when they want new cars.

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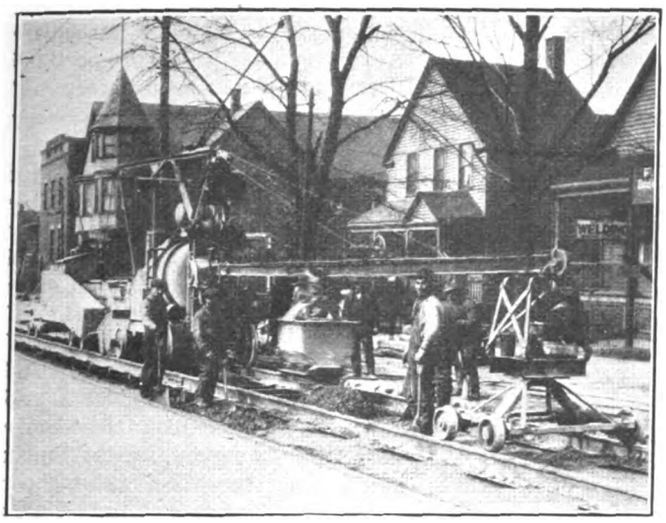
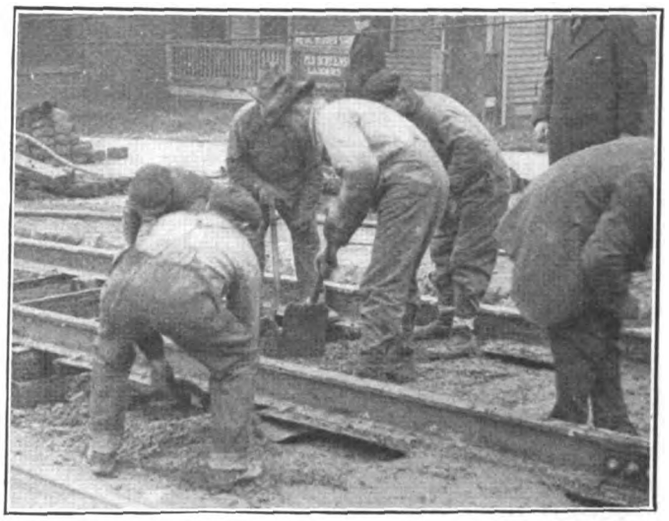


Pouring the Concrete Track Base and Leaving Openings Under the Tie Plates



How the Concrete Is Distributed and the Under-Tie Openings Made with Shovels

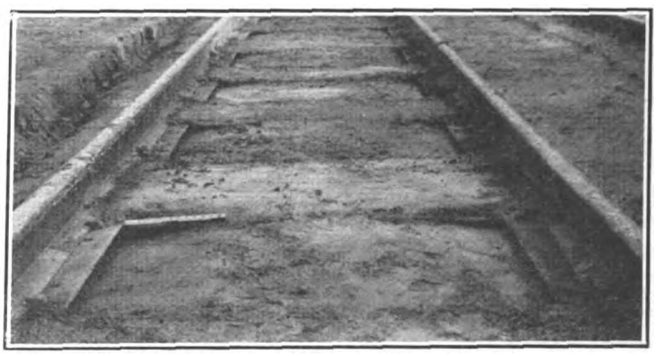
Insuring a Bearing Under Steel Ties

Opening Is Left Under Ties When Pouring Concrete and After It Sets Space Is Filled in with Special Mix and Thoroughly Tamped

THE Cleveland Railway Company has worked out an improved method of placing concrete under steel ties in new track construction. There is always more or less difficulty, under the usual scheme employed, of getting the workmen to tamp the concrete under and around the steel ties to make certain of a complete bearing. Unless the operation of mixing concrete is followed very closely by continuous inspection, the workmen will make the mix too soft, in order to make it flow under the plates easily, and this reduces the strength of the concrete.

Under the new plan worked out by Charles H. Clark, engineer maintenance of way, a space about 1½ in. deep is left under the tie plate when pouring the concrete base, and this is allowed to set around the channels. After this has set for two or three days, the open space under the tie plates is filled in and tamped with power tampers, the material used being a mix of slag screenings and cement in the proportion of 1 to 3, slightly dampened.

While the concrete base is mixed in a power mixer, as shown in one of the illustrations, the slag screenings are mixed by hand as used. A Jackson electric four-tamper outfit was used for compacting the special mix under the ties.



The Concrete Base Is Permitted to Set in This Form for Two or Three Days

This new method of concreting the ties under the bearing plates increases the expense of construction slightly, but the assurance of having the ties in com-

Pouring the Concrete Track Base and Leaving Openings Under the Tie Plates

Closer View of Electric Tamping Tools Working Special Bearing Mix Under the Tie Plates

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plete bearing more than justifies this added cost, Mr. Clark believes.

The new 102-lb. section 516 rail developed by the Cleveland Railway Company and laid with International steel ties is shown on page 1005 as installed on Quincy Avenue, Cleveland. The rails are given the standard tilt of 1 in 25.

Good Reports of Ciment Fondu Confirmed

Boston Elevated Railway Finds the Tensile Strength to Be Satisfactory at the End of Six Months—The Results of Tests Made in England Are Also Given

TESTS made by the Boston Elevated Railway to determine the tensile strength of Ciment Fondu at the end of six months showed a figure slightly lower than that obtained at the end of three months. The earlier experiments with this material, which is a quick setting cement, were described in the ELECTRIC RAILWAY JOURNAL for Sept. 15, 1923. It was noted at that time that the strength at the end of three months was somewhat greater than at the end of twenty-eight days, although it was not quite up to the strength shown at earlier periods. Although the reports now available show the cement at six months to be slightly weaker than at three months, nevertheless the tensile strength of Ciment Fondu appears to be holding reasonably constant. On the whole the company believes the tests so far made to be most satisfactory. Average figures for the results of these tests at each of the periods noted are given in the accompanying table.

TESTS MADE BY BOSTON ELEVATED RAILWAY

Tensile Strength 1 to 3 Mortar in Pounds per Square Inch

Fifteen hours	Twenty-four hours	Forty-eight hours	Four days	Seven days	Fourteen days	Twenty-eight days	Three months	Six months
302	360	393	457	472	500	413	469	458
280	340	386	445	507	520	455	448	429
315	372	375	482	478	490	433	460	446
Av. 299	357	385	461	486	503	434	459	444

Interesting experiments made in England with Ciment Fondu are described in the Oct. 18 issue of the *Tramway & Railway World*. The tensile strength of neat Ciment Fondu at the end of twenty-four hours was found to be 811 lb. per square inch, as compared with 91 lb. per square inch for neat portland cement of the same age. A mixture of 1:3 Ciment Fondu and sand developed a strength of 573 lb. per square inch at the end of twenty-four hours, whereas a similar mixture of portland cement and sand developed only 11 lb. per square inch. The Boston tests developed a strength of 432 lb. per square inch for neat Ciment Fondu at twenty-four hours. At the end of seven days in the English tests neat Ciment Fondu had a tensile strength of 1,003 lb. per square inch. Mortar in a proportion of 1:3 at the same age had a strength of 612 lb. per square inch. It will be seen that all of these figures are considerably higher than those obtained in the test made by the Boston Elevated Railway. This may have resulted from a variation in the methods of making the tests or in the material.

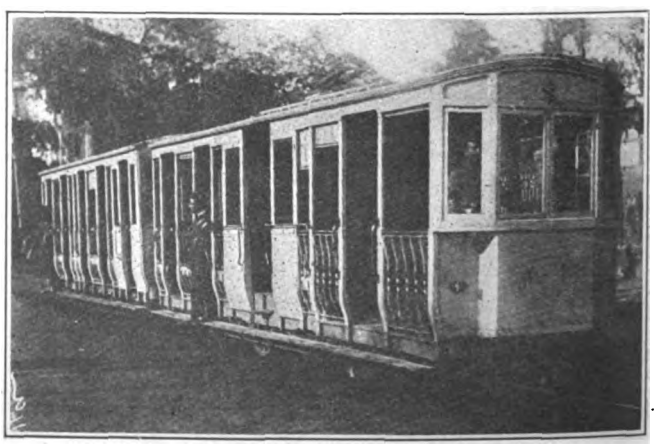
Tests were made to determine the crushing strength of 6-in. cubes of concrete in which Ciment Fondu was used. At the end of twenty-six hours a strength of 7,930 lb. per square inch was developed, and at the end of ninety days this had increased to 9,100 lb. per square inch. From records of previous tests of portland cement concrete at ninety days it has been determined that 5,000 lb. per square inch represented exceptionally good performance.

Heretofore Ciment Fondu has been used in the same proportion as portland cement, but experiments made in France indicate that it is in reality not necessary to use as much of the new material as of portland cement. The mixture used there consisted of 800 liters of gravel and 400 liters of sand mixed with 300 kg. of portland cement and with either 300 kg. or 200 kg. of Ciment Fondu. The cubes made with the portland cement at the end of three months broke under a load of 155 kg. per sq.cm., while at six months they broke at 163½ kg. per sq.cm. Similar cubes of Ciment Fondu at the end of three days had a strength of 324 kg. per sq.cm., or nearly double that of the portland cement concrete at the end of three months. At the end of three months this value had increased slightly. The weaker mixture containing 200 kg. of Ciment Fondu developed a strength at the end of three days of 242 kg. per sq.cm.; at three months 252 kg. per sq.cm., and at six months 257 kg. per sq.cm. This cement is now being used in construction work by the city of Paris, the P. L. M. Railway and the Ouest Railway.

Not only its quick setting qualities, but also the fact that a smaller quantity can be used as a substitute for portland cement, make Ciment Fondu a material of particular interest to electric railways for use in track construction.

The author of the article in the *Tramway & Railway World* says that once its practical advantages when used on a large scale are established it will have a revolutionary effect on concrete construction works of all kinds.

A Modern Electric Train in Cairo, Egypt



These Egyptian motor and trailer trains may not compare in capacity with American rolling stock standards, but they probably are superior in the speed with which they can be loaded and unloaded—judging by the number of doors rather than the characteristics of the people.

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Good Results from Lettering Signs by Silk Screen Process

Details Are Given for Making Stencils and Frames, for Mounting to Save Time and Labor, for Applying the Color, Making the Squeegees and for Handling and Drying the Signs After They Are Lettered

ALL electric railways use signs in considerable quantities and must reletter them at quite frequent intervals to keep them in readable condition. In addition, the publicity campaigns which are now such an important part of the work of many railways require posters and cards in such quantities that careful attention must be given to their production.

Many methods for lettering are used by the sign departments of electric railways. A common one consists of first laying out the letters on cardboard and perforating this so that by forcing white lead through the perforation outlines of the letters are obtained on the sign surface. The letters are then filled in by hand. Where the same lettering is used in large quantities or at regular intervals stencils are frequently made with the letters cut out. Then by going over these with paint and a brush the letters are placed on the sign. With this method some lines are left on the letters which require filling in by hand as the center parts of the letters on the open stencil must be supported. This filling in by hand takes fully as much time as the stenciling.

Squeegeeing White Lead Through Silk Screen Stencil in Sign Lettering Work

To overcome some of these difficulties and reduce the time and labor for lettering, the silk screen process has been developed. It has several advantages over the stencil and hand process. There is a marked saving in the time required to complete a job, and as the lettering produced is built up, it has a far higher visibility than ordinary brush work.

The silk screen process consists of using a stencil of silk with the letters or designs laid out on it and the outline around the design filled in with a "cut-in" solution, so that later in using this as a stencil the paint used for the lettering or design will not pass through the silk where the solution was applied. This process is now being used by a considerable number of electric railways, among which are the Los Angeles Railway Corporation, the Pacific Electric Railway, the Brooklyn-Manhattan Transit Corporation, the Terre Haute, Indianapolis & Eastern Traction Company and the Indianapolis Street Railway. Most of the problems which have arisen in connection with the system have been solved.

The equipment for lettering signs by the silk-screen process consists of the silk stencil stretched on a substantial frame; a mounting to hold different stencils so that they can be quickly placed over the sign while it is being lettered, and raised again so as to insert another sign, and the squeegee for forcing the paint through the stencil and onto the sign. Practices found successful for cleaning the silk, fastening it to the frame, making the frame, filling in around the letters on the screen, and mounting for rapid handling follow. The practice used in the shops of the New York Rapid Transit Corporation for maintaining signs by this process is given as a definite procedure which has worked out satisfactorily.

Various materials have been tried as the fabric on which the design is laid out in this process, but silk bolting cloth has proved preferable to other fabrics. The mesh runs straight, retains its shape and is uniform and even. Considerable strength is also required in order to withstand the strain of squeegeeing the paint through the fabric, and silk bolting cloth holds up exceptionally well. Kress & Company, Brooklyn, N. Y., have made a special study of the desirable characteristics for a bolting cloth to be used with this process and are furnishing much of the material used at the present time.

Before laying out the design, the silk is stretched upon a wooden frame in a manner quite similar to that

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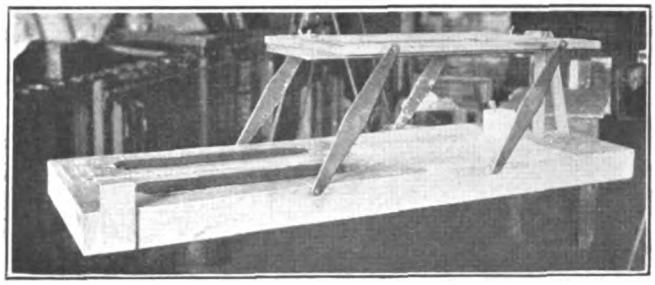
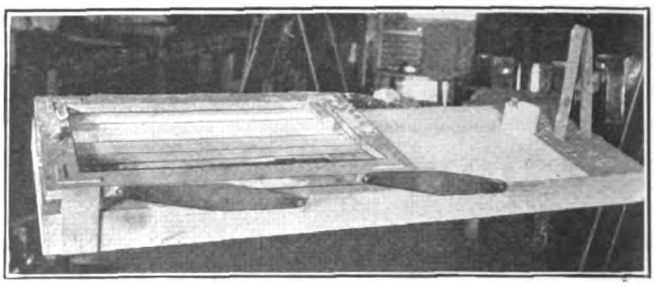




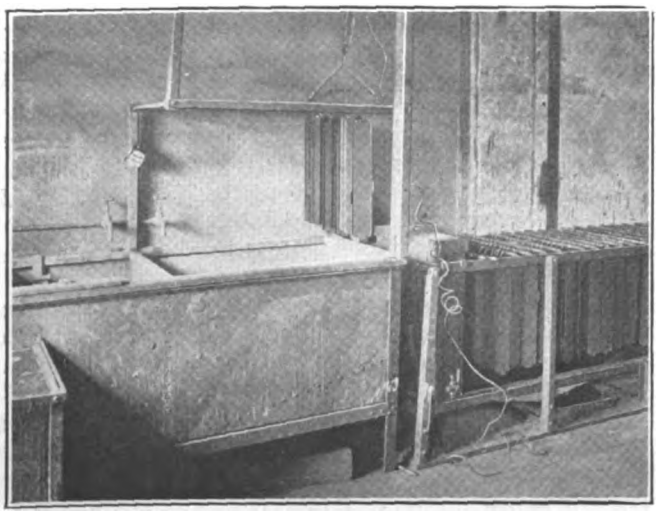
Framework for Supporting and Operating Stencil
At Left—Raised position with signs in place. At Right—Stencil lowered, ready to receive white lead.

used by artists in attaching canvas. The frame should be made a few inches wider than the size of the design to be reproduced. Some additional space is necessary to hold the paint during the operation. The frame should be made in a particularly substantial manner and well-dressed strips approximately 3 in. x 3 in. have been found quite satisfactory. The corners should be mitered and corner irons used to keep the frame in shape. It is essential that the surface of the silk screen be flat, and so of course the frame must touch on all four sides if properly made. The actual dimensions of the frame will vary with the size of the design to be lettered.

An accompanying illustration shows several signs as used by the New York Rapid Transit Corporation which vary in size from that necessary for a single destination sign to frames about 2 ft. x 3 ft. used for lettering routing and destination signs for operation involving a large number of routings.

Preparing the Screen

After the silk is stretched tightly, it is quite essential to cleanse it and make certain that all grease or other foreign matter is removed, which may get onto the silk during the mounting operation. This can be accomplished by saturating thoroughly with either hot water, alcohol or benzol. The letters or design are then laid out on the screen. Usually, this can best be accomplished by laying out a sketch on some convenient material and then by laying the frame face down against this sketch, so that the letters can be traced upon the silk with a lead pencil. The traced design is then cut in by either leaving the silk mesh solid and the lettering open or by painting in the design or lettering solid and leaving the mesh open, it being understood that the open portions are the ones through which the paint is forced. A cut-in solution which has proved entirely satisfactory consists of ⅛ lb. of English drop black dry, or bone black dry, dissolved in a quart of good orange shellac, with a tablespoonful of castor oil or other essential oil added to make the shellac pliable so that it will not chip out under the squeegeeing process. The New York Rapid Transit Corporation uses a tablespoonful of powdered black and 1 oz. of glycerine to a gallon of orange shellac. The cut-in solution will thicken while using and can be thinned by the addition of ten parts of alcohol and two parts of castor oil. A pyralin or liquid celluloid solution is sometimes used, but this is not as dependable as the one just given, as it is necessary to coat both sides of the silk. This pyralin mixture, however, is of particular advantage where it is desirable to clean out the screen for other use. This latter solution is made by mixing pyralin red No. 65/5 with a very small quantity of Du Pont thinner No. 12138. A black solution is made by mixing pyralin black No. 67/2 in the same manner. Celluloid solutions are highly inflammable and it is essential to keep them away from open flames.



Equipment Used for Removing Paint and Washing, Dipping and Drying Steel Signs

The potash cleaning tank is shown at the extreme left. Signs are washed in the tank in the center and are then raised to the racks immediately overhead for drying. When thoroughly dry they are dipped in the small tank at the right end of the washing tank. This contains body color for the flat surface of the signs. After this dipping they are placed in the racks at the right for drying.

The cut-in solution is best applied by a small camel hair or sable brush. When working on a flat surface, a bridge or hand rest will be found of advantage. When the design is finished, the frame should be raised about half an inch, so that the silk will not touch the top of the table or bench. Strips tacked temporarily to the end of each frame will give the desired effect. These should be removed as soon as the screen is coated with the cut-in solution. It is almost impossible to coat in with the solution around the edges where the screen rests against the frame. A satisfactory method for protecting these places is by the use of paper glued on and then shellacked. A lining of paper 4 or 5 in. wide can be glued to the inside of the frame so as to extend down over the face of the screen. Several strips of very thin paper will be found to work more satisfactory than a single sheet of thicker paper.

Mounting of Frame Essential

When the frame with screens has been properly assembled, the next essential is an additional mechanism for holding the frame and for moving it into and out of position quickly. For the smaller sizes of frame some sort of a hinged mechanism has proved very efficient. An accompanying illustration shows the mechanism used by the New York Rapid Transit Corporation for holding the smaller sized frames which are

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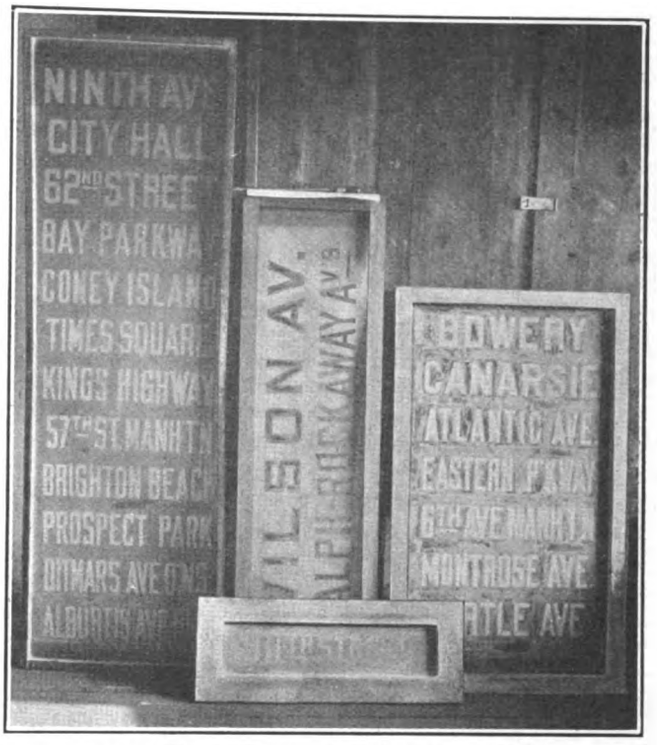
used for lettering the steel destination signs in its elevated cars. This framework is of 3-in. x 1-in. wood and is about 3 ft. long by 2 ft. wide. Two strap iron hinges are fitted to either side of the portions which hold the printing frame. The other end of these hinges is attached to the supporting base. The frame can thus be raised and pushed back out of the way while the sheet iron sign is being reversed or a new one placed in position.

Two small handles on either end assist in the operation. The frame which holds the silk stencil is fastened to the movable part of this framework by two hand screws, so that where it is necessary to change frames, this can be accomplished very rapidly. The entire operating mechanism is arranged so that it can be placed on a table or bench for support, which will bring it to a convenient height for rapid operation. The supporting base has a sheet iron stop at the rear end, which prevents the frame from being pushed back too far when in the raised position.

The supports for the signs to be lettered, of course, will vary with different types. For the sheet iron signs just referred to, a wooden framework is made, so that the signs are supported at the edges. This is essential as both sides of these signs are lettered, and after one side has been lettered it is placed with the lettered side down, so of course it is essential that this does not rest on anything that would smear the lettering.



Several Sizes and Types of Silk Screen Stencils

How Signs Are Maintained

As this type of sign is used in large quantities, it is necessary to reletter at intervals. The facilities for handling this maintenance work and carrying it on rapidly are particularly interesting. When the sheet iron signs are received for relettering the first operation is to clean and remove the old paint. This is done by placing them in a potash solution over night. The potash tank is installed at one end of the room and the signs are hung on rods by wire hooks. These rods have small grooves so as to keep the signs spaced the required distance apart. Fourteen signs are thus handled at one operation. A large quantity are placed in the tank, and after the paint is loosened it is washed off in a washing tank, which is adjacent to the potash tank. A small overhead traveler is arranged with pulley, so that the rods with the signs attached can be lifted out of one tank and placed in the next. After washing, they are raised just above the washing tank to a wooden framework, on which they are allowed to remain while drying. Just at the end of the washing tank is a dipping tank, which contains the flat body color. When the signs are dry, they are dipped in this tank and then placed on the drying rack. This rack is made of angle iron and the round cross-rods which support the signs extend from one side to the other, while the signs hang down in between. Signs are taken from the drying rack after dipping and are placed in the frame for lettering by the silk screen process. After they are lettered they are dipped in varnish, and after drying are ready to be sent out.

The use of the silk screen process for this class of work has resulted in marked economy on this system. The lettering is now done on a piecework basis and the labor rate is 2¼ cents per sign. Previous to the installation of this system, the lettering of ten signs was considered a day's work for one man, and the average cost per sign was in the neighborhood of 65 cents.

Several other arrangements are used by different railways for holding and operating the frames with the silk stencils. Another type used has hinges placed at one end of the frame, and the frames are raised by having a pulley attachment to the wall over which a small rope operates with one end attached to the frame while the other has a small weight. The weight raises the stencil frame after the sign has been lettered and while it is being removed for the insertion of another one.

In some cases the frames are made larger than is necessary for the signs to be lettered, and various sizes of signs are used with the same frame by tacking ½-in. strips on top of the bench to serve as guides holding the signs in position. Some sort of accurate support is quite essential in order to make the stencil register accurately with the sign to be lettered.

The paint used for lettering is forced through the silk screen by means of a squeegee, and an accompanying illustration shows the construction of such a squee-

Lettering a Long Routing and Destination Sign by the Silk Screen Process

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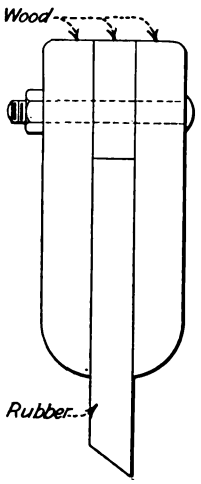
gee which has proved satisfactory. This consists of a sheet of rubber about $\frac{1}{8}$ in. thick clamped between two blocks, with a spacing block at the top. A medium grade of hard rubber is best. This should be cut into a strip about 4½ in. wide, and for single signs it should be a little longer than the width of the design to be lettered. For signs having a large amount of lettering, a squeegee about 12 in. long will be found to be of convenient length and about as long as can be handled readily. In placing the rubber between the boards, it should be allowed to extend about 2 in. outside. The side pieces can best be held in place by two bolts. This method of construction permits of removing the rubber when worn down or for trimming off or sharpening. The edges of the rubber should be beveled and the extended edge made sharp, as it is this edge that is drawn over the side of the frame so as to force the paint through the screen. Careful cutting is quite essential in order to provide an efficient squeegee.



Squeegee Used with Silk Screen Method of Lettering

For white letters, white lead mixed with turpentine and oil is generally used. A small quantity of this is placed along the edge of the frame farthest from the operator. By drawing the squeegee across the screen the paint is forced through onto the sign and so letters it. After drawing the squeegee across the frame in one direction, it is usually found most convenient to draw it in the opposite direction for the next operation, as this makes it unnecessary to scoop up the paint from one end and place it on the other end.

After finishing a job the stencil should be well cleaned. All surplus paint can be removed by a stiff card, and by pouring a small quantity of kerosene or gasoline into the stencil the paint in the screen can be removed by rubbing with a soft cloth. The operation should be repeated until the cleaning is satisfactory, when both sides should be dried carefully. Some roads find that a mixture of equal parts of kerosene and gasoline makes a good cleaning preparation.

Using Large Frames for Curtain Signs

The New York Rapid Transit Corporation uses the silk screen process for lettering its routing and destination signs, which have thirty-one readings on a single sheet. These sheets are lettered on both sides, using 3-in. letters with a 3-in. space on one side and 4-in. letters with a corresponding space on the opposite side. For lettering one of these complete signs, three frames with silk stencils are used. These frames are 26 in. wide by approximately 6 ft. long. Black linen is used as the material for these signs and the lettering is of white lead. The linen is laid on a long table and the lettering is done by beginning at one end and preceeding progressively. One frame is placed in position at a time and the edges of the table are marked so as to insure that the frames register properly with the sign. After the signs are lettered, they are dried by placing on drying racks, which consist of pipe extensions from the wall, so arranged that the signs can be supported on these to insure no interference while drying.

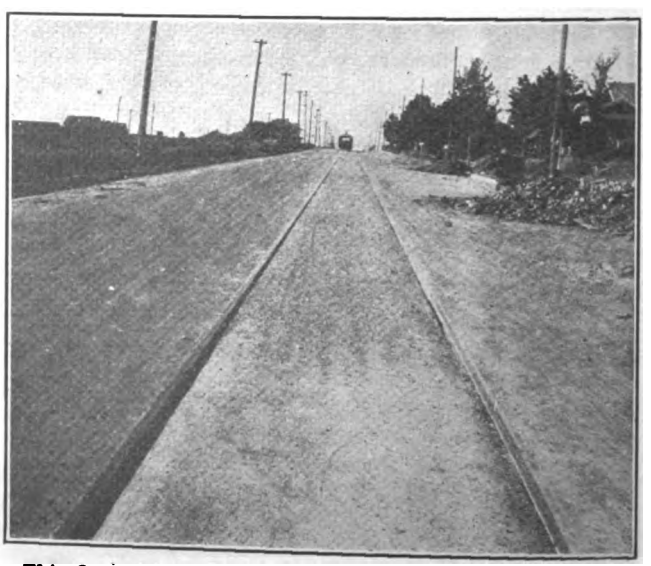
The silk screen process has proved to be very successful for special designs and illustrations, such as are used in publicity campaigns. The particular advantage in using this rather than an engraving or lithographing process lies in the low cost where small quantities are needed. For doing work of this nature it is necessary to prepare a sensitized screen. The original design or lettered copy is traced in black on a transparent surface, such as glass, celluloid, tracing cloth or tracing paper. The cloth is stretched over its supporting frame and after being cleansed the sensitized solution is poured on at one side, so as to cover the mesh entirely. By having the screen at an angle, the solution gradually flows over the surface. This photographic negative is placed with the printing side down on the screen and a heavy piece of glass is placed over this. Then by holding the screen in close contact with the negative, it can be printed the same as in regular photography, by exposing to the sunlight for about twenty minutes. The screen is then washed out by flowing water over both sides. The portion that is protected from the sun's rays will wash out completely, leaving the sun-fixed portions which are insoluble. The printing is then carried on in the same manner as already described.

Where multi-colored reproductions are desired, a separate screen for each color will be needed. The different frames should be prepared of exactly the same size, so as to insure perfect register, and the tracings are prepared by sketching in each color separately on the different screens.

Concrete Cuts Paving Costs*

THE use of concrete for paving between the rails, regardless of the type of pavement used on the rest of the street, has saved the Northern Texas Traction Company, Fort Worth, 50 per cent of the first cost of the work and has at the same time reduced the amount of upkeep required. The franchise of this company states that the railway shall pave between its tracks with the same kind of pavement as is used elsewhere on the street. In the past this practice has resulted in a large amount of unsatisfactory paving being placed between the rails. Moreover, the maintenance of this

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.


This Concrete Paving Between the Rails in Fort Worth Cost Only Half as Much as the Paving Elsewhere on the Street

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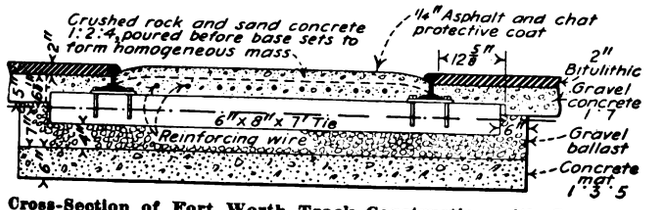
unsatisfactory paving has been very costly. In reconstructing some track recently, preparatory to paving the street, the company sought permission from the city to place concrete paving between the rails, and in spite of objections from the paving contractor permission to do so was granted.

The cost of the paving which the contractor intended to lay would have been about $2 per square yard. Experience has shown that the maintenance cost of this type of paving after it was laid was high. The company therefore told the city officials that it was tired



Cross-Section of Fort Worth Track Construction with Concrete Pavement. A Wire Net Is Used for Reinforcing

of paying out large sums for the first cost of such paving and later for its upkeep, and promised to lay a better paving of its own between the rails at a cost of only $1 per square yard, with practically no maintenance after the job was finished.

The first step in laying the railway's pavement consisted in bringing up the concrete to within ¼ in. of the top of the rail. About 2 in. below the surface the concrete was reinforced by wire net reinforcing. After the concrete had firmly set the surface was given a coating of tar and chat as a finish. It is predicted by the company that this paving will outlast by several years the bitulithic paving used on the rest of the street.

Track Relaid Amid Heaviest Vehicular Traffic

The Original Rails Laid in 1898 on Broadway, New York City, Were Replaced Under Conditions of Unusual Difficulty

A COMBINATION of circumstances made particularly difficult the job recently done by the Third Avenue Railway, New York, in renewing the rails on Broadway from Forty-fifth Street to Fifty-ninth Street. This area includes the Longacre Square theater district, which is reputed to have the heaviest vehicular traffic in the world. In spite of this fact the work had to be done during the daytime because there are a large number of hotels in this vicinity and they would not tolerate the noise of track reconstruction work at night. A headway shorter than two minutes is operated on Broadway and it was necessary to remove each rail and replace it by a new rail in the interval between cars. With the underground conduit type of construction in use there it was not feasible to switch cars onto another track while this work was in progress.

Another difficulty arose from the nature of the original construction work. The old rail was that laid in 1898, when the first electric car line on upper Broadway was electrified. The foundation was continuous between the yokes and was built with an extremely rich concrete mixture. Considerable difficulty in making even minor repairs had been caused by the solid nature of this foundation. This was one of the factors, however, which made it possible to postpone renewal work and to continue the use of the old rail until a short time ago.

The work done on the present job consisted of removal and replacement of the paving, excavation of a sufficient depth of the old concrete to permit removal of the old rails and the longitudinal timber stringers on which they are supported, in case it was necessary, and the renewal of the track rails.

Knowing the difficulty of the job it was undertaking and the necessity of getting through as speedily as possible the railway assembled an unusual amount of apparatus. A specially mounted new air compressor, built by the Chicago Pneumatic Tool Company and having a capacity of 350 cu.ft. per minute, was used for the first time. In addition to this there was also an older compressor, having a capacity of 150 cu.ft. This made possible the simultaneous operation of nine compressed air drills, six on the large machine and three on the small one.

The southbound track was relaid first and then the northbound. Only two blocks were open at one time. While the excavation of one block was in progress, new 9-in. grooved girder rail was being put down in the block behind. This in itself was no small task with the short headway on the route, but service was not interrupted for longer than a few minutes on account of the track reconstruction. As soon as the new rail was laid the excavation was concreted ready for the asphalt pavement, or else temporarily filled in so that traffic could pass.

In many cases the digging had to go down to depth of 16 in. or more. This was necessary in order to cut free from the concrete the timber supports which run lengthwise under the rails. It was found that where "dutchmen" had been put in at the joints the supporting timbers usually were cut up. The amount of timber replacement averaged about 3 ft. for each 60 ft. of rail put in. The slot rail was not renewed.

This was the first job on which the 350-cu.ft. capac-

A 350-Cu.Ft. Compressor Was Employed to Expedite Track Reconstruction Work on Upper Broadway, New York

ity air compressor was used and it proved to expedite the construction greatly. The new machine proved to be very reliable and operated continuously for many hours each day without a single shutdown. Under ordinary circumstances a machine of this capacity would hardly be needed, but where an asphalt pavement had to be taken up and a solid concrete foundation excavated the greatest possible number of pneumatic drills was necessary. By the use of the new machine, together with the older one already mentioned, and a large gang of experienced track men, it was possible to complete the job of 3,500 ft. of double track in seven weeks.

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The Readers' Forum

Insurance Men Want to Help Reduce Premiums

WESTERN ACTUARIAL BUREAU

CHICAGO, ILL., Dec. 7, 1923.

To the Editors:

Your editorial on fire prevention in the issue of Dec. 1 was more than of passing interest, in that you have hit upon the key to lower insurance costs to street railway companies.

You may remember from the articles which appeared in your paper, some time since, covering the East St. Louis & Suburban Railway and the Tennessee Electric Power Company, that quite a material saving in fire insurance premiums may be enjoyed through proper attention to even ordinary fire protective precautions.

That the fire insurance companies are willing to co-operate in this work is evidenced by the fact that in many insurance jurisdictions special men or separate departments are maintained to handle just the electrical properties.

Keep up the good work. We are with you in any effort put forth to help in the fire prevention work on street railway properties. JAMES S. MAHAN.

Further Suggestion on Reducing Number of Car Parts

DEPARTMENT OF COMMERCE
OFFICE OF THE SECRETARY

WASHINGTON, D. C., Dec. 5, 1923.

To the Editors:

Your idea of approaching the storekeepers in promoting simplification of car parts is a splendid one. They ought to know what excessive diversity means in increased inventory, increased investment, increased carrying charges, greater depreciation and obsolescence, as well as extra space required, and the ever-present difficulty of always having on hand plenty of what they don't want and never enough of what they do want.

One major advantage of simplified practice is that it can be applied by purchaser as well as by manufacturer. Why should an electric railway company carry in its stores ten, or even five, different varieties of the same thing if their requirement can be amply covered with one or two? The steam roads have been doing some effective simplification of stocks recently, and in the past two and a half years forty of the large roads have reduced their total stores investment from $480,000,000 to $300,000,000, or 37½ per cent. At the same time, they have cut their stocks on hand from six months' to three months' supply, and find that they can give good service on that minumum through the better co-ordination of purchasing and delivery schedules.

In the automotive field we know of a certain large garage company which, by simplifying its equipment to one make of motor trucks and one make of passenger cars, reduced spare parts stock from 20,000 to 5,000 items, reduced varieties of tires, oils, greases, etc., decreased stockroom space, personnel and investment; also secured better prices in purchasing, and reduced costs (not including pay of drivers) 2 cents per mile in 1922 over 1921 and 5 cents per mile in 1922 over 1920.

Isn't there something in these examples for the electric railway companies? If, coincident with their efforts to induce more people to ride, they applied simplified practice, i.e., the elimination of superfluous varieties, to their purchases, etc., wouldn't the combination prove a paying one?

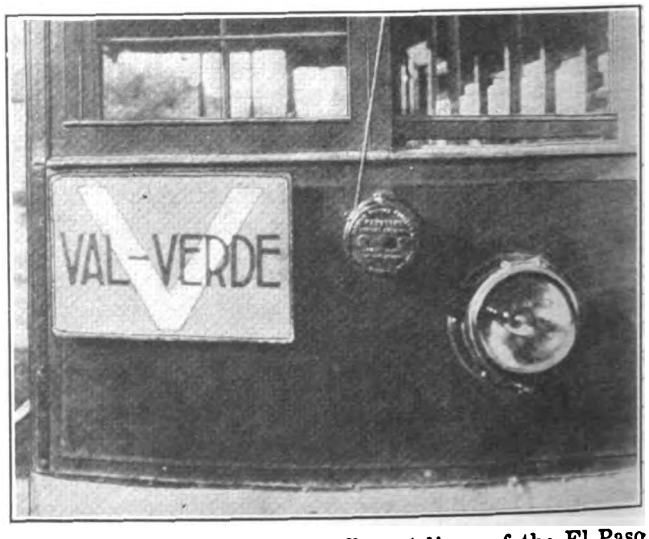
Simplified practice means the reduction of variety in sizes, dimensions and immaterial differences of everyday commodities as a means of eliminating waste, decreasing costs, increasing profits and values in production, distribution and consumption. It is not standardization! Instead, it is often the forerunner of standardization, for by eliminating unnecessary varieties the way is cleared for that concentration on the varieties remaining which permits the development of standards that are real standards. Simplified practice is a measure which can be applied with immediate benefit and with accruing advantage during the usual long evolutionary period required in producing a standard.

The survey you propose to make will, we believe, bear out these statements. We will be eager to hear your findings and conclusions. If we can be of further help to you, let us know. Meantime, the best of success to you. You have started a well worth while movement, and we are very confident many of the companies will warmly respond to your suggestion as to how they may apply simplified practice to advantage in their big problem of lowering operating ratios.

DIVISION OF SIMPLIFIED PRACTICE,
BY R. M. HUDSON.

[For previous discussion of this subject see ELECTRIC RAILWAY JOURNAL for Oct. 27, page 744, and Nov. 17, page 845.—EDS.]

Large Letters on Dash Sign Distinguish Routes*



CARS which operate on different lines of the El Paso Electric Railway and running in part over the same streets are equipped with special car destination signs, 16x24 in. on the dash, in addition to the regular illuminated sign carried on the hood. These signs are differently colored for the different lines, and the line is designated by a large letter such as P for Park and V for Val Verde, as shown in the illustration.

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

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Equipment Maintenance Notes

Board Shows Progress of Car Overhauling

THE accompanying illustration shows a progress board which is installed in the office of the superintendent of rapid transit shops of the New York Rapid Transit Corporation at Thirty-ninth Street, Brooklyn. This is arranged to show the progress made in overhauling cars by the different departments through the use of pegs which are placed in holes on the board. The board is about 4 ft. x 4 ft. in dimensions and has the various holes arranged in rows and columns. Car numbers are placed at the top of the board and opposite each row at the side is a designation of the type of work to be done, such as stripped, gates removed, seats inspected, hand straps inspected, floor repaired, doors inspected, foundation brake rigging overhauled, shields over resistance repaired, etc.

The board is divided into two parts the upper section being used for elevated cars and the lower section for subway cars. Each class of work is designated by a different colored peg—blue is used for wiremen, yellow for painters, green for the truck department, white for pipe fitters, red for riggers, light blue for machinists and black for the carpenters. Seven pockets are provided at the bottom of the board for holding the pegs. When a car is received in the overhauling shop the clerk places the car number at the top of the board, and as soon as the particular class of work is finished the foreman puts a peg in the proper location to indicate that the work is completed. The progress of the work can thus be seen at a glance not only by the superintendent of rapid transit shops and his assistants but by each individual foreman. They can thus see what class of work is behind and bring proper pressure on those responsible so that the work will be turned out promptly. The working of the board is entirely automatic, as each foreman places the pegs in position, and at the same time looks over the record of work so as to see which cars are ready for his men. The board has also proved an incentive to each foreman to keep a record of the work in a small notebook. Previous to the use of this the general superintendent had particular difficulty in having each individual foreman keep a record of the dates that work was done on various cars, but with the use of this board the foremen place a record in their notebooks so that they can peg up their work each morning, in order to show its progress. When the work on a car is completed and leaves the shop the clerk removes the pegs from the column under the car number and removes the car number.

A Distinctive Colored Peg Designates Each Class of Work in Overhauling Cars

Wooden Journal Box for Skidding Truck

AFTER a truck has been dismantled it is often necessary to move the frame about the shop for repairs. This of course can be accomplished by means of an overhead crane. However, "skidding" a truck around on pairs of wheels is an easy method. As this requires the replacing of the four journal boxes and brasses it is looked upon as rather an arduous task. A device worked up in the shops of the Metropolitan West Side Elevated Railway, Chicago, facilitates this work by eliminating the placing of the journal boxes and brasses.

A pine wood block, cut to fit the pedestal jaws, of such height that the center of the axle will be in its nor-

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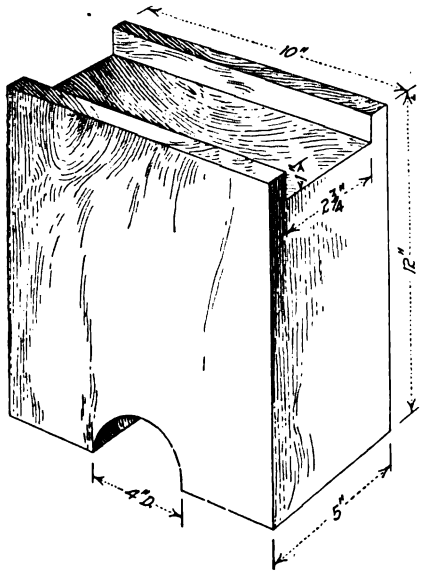
mal position, is used. The truck is lifted, a pair of wheels rolled under and these wood blocks inserted in place of the journal boxes. With grease on the bearing end of the box, a truck may be skidded about with ease. As a safeguard against

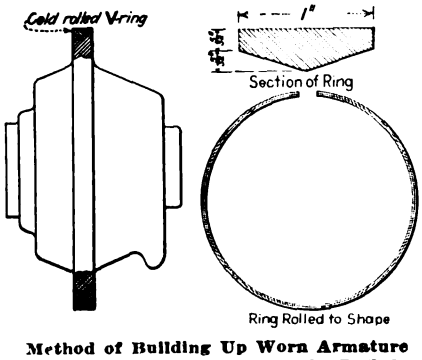


Wood Block Used in Place of Journal Box, for Mounting Truck on Axle, to Skid Truck About Shop

the block sliding out of position, a groove is cut in the upper end 3¾ in. wide and 1 in. deep to receive the truck frame member. The block itself measures 12 in. long, 10 in. wide and 5 in. thick, and besides having the groove to receive the truck frame at the one end, it has a semi-cylindrical groove at the other end to receive the axle bearing.

Building Up Worn Armature Housings

CONSIDERABLE wear occurs between the bearing surface of armature housings and the frames of split-frame motors. A method of re-

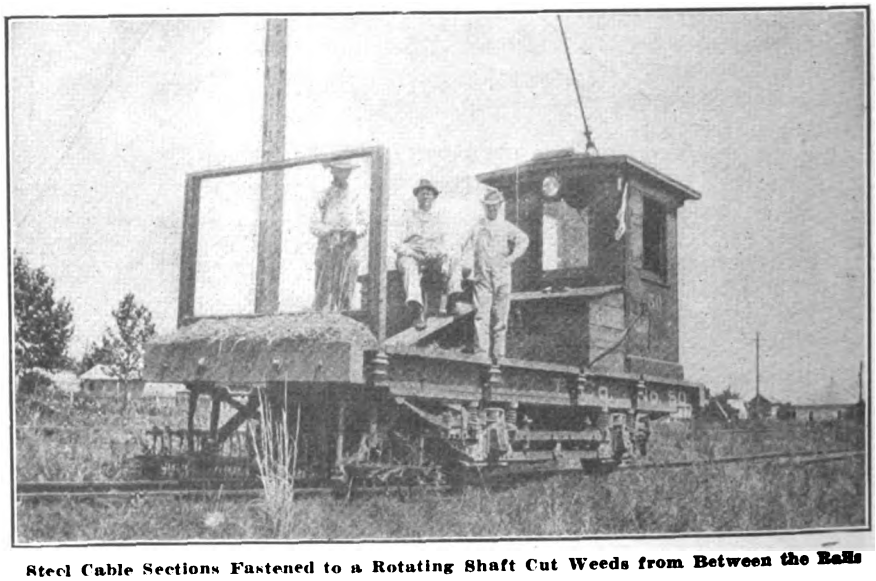


Method of Building Up Worn Armature Housing and Section of Cold Rolled Steel Ring Used

newing the wearing surface of housings is used at the West Shops of the Chicago Surface Lines which is very simple and can be carried out without much cost. An accompanying illustration shows the method. The worn head is turned up with a V-shaped groove and a ring of cold rolled bar stock is fitted into this. The section of the groove and the shape of the ring used are shown in the accompanying drawing. The ring is formed of ordinary steel plate with an opening so that it can be sprung into place on the armature housing, and, of course, it is held firmly in place by the two halves of the motor shells when these are fastened together. By this arrangement repairs are carried out at small expense. Drilling for screws is unnecessary and the adding of metal by welding also is not required. When the ring becomes worn it can be removed and readily replaced.

Weed Whipper Reduces Danger of Accidents*

ONE of the problems of the track department of the Northern Texas Traction Company, Fort Worth, is to keep the grass cut below the level of the rails on interurban lines. This is particularly important because grass on the rails makes it difficult to stop cars in an emergency. To accomplish this without a great deal of waste of time and labor, the company has built a single-truck service car with an end cab, equipped with a stationary motor on the deck. This motor drives a shaft suspended just above the rails and in front of the truck. The shaft, which is of 3-in. diameter, is bored with one-half inch staggered holes 2 in. apart, through which 24-in. sections of steel cable are thrust. The latter are held in place by seven screws. With this equipment it is possible to cut an average of twelve miles of grassy track per day. Its use has made it possible to keep a neat appearing right-of-way and at the same time to reduce the accident hazards by keeping the grass off the rails.



Steel Cable Sections Fastened to a Rotating Shaft Cut Weeds from Between the Rails

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

Keeping Waste Under Journals

A COMMON type of journal box cover is held in place by a single bolt at the top, about which it rotates, while a spring between the top of the cover and the bolt gives the required tension to hold the cover in position. Trouble is frequently experienced by the waste in the journal box working forward and forcing the cover out of position. This allows the waste to hang outside the lower part of the journal box and oil is thus fed out of the box leaving the rear end empty. This results in hot bearings.

The accompanying illustration shows a bent sheet-iron plate attachment to fit inside the journal box cover and hold the waste in position under the journal. This design was originated by H. C. Mason, lubricating engineer for the Texas Oil Company. A shelf or lip is provided on the bent plate attachment which projects inward toward the axle. When in place the working of the waste forward under this shelf holds the cover more firmly in position, and with the journal properly packed this shelf will press on the waste and hold it under the journal, and the

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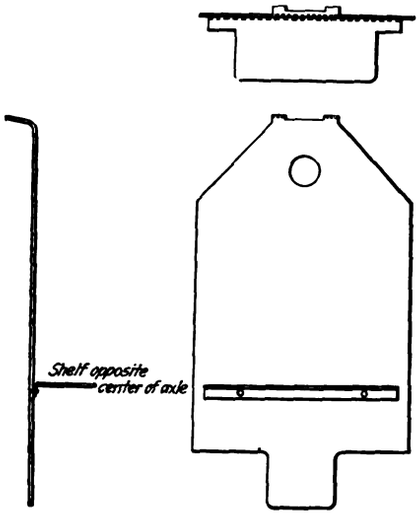
waste cannot get out or change its position. It is also impossible for the cover to change its position to any extent, as the attachment comes in contact with the housing and prevents it.

In the usual maintenance of waste in bearings it is quite common practice to force the waste in place up against the journal, at frequent intervals by a packing iron as the waste works forward. Every time that the oiler uses the packing iron it cuts some of the threads of the waste, which decreases its value as a medium for conveying oil to the surface of the journal to be lubricated. Also, if proper care is not exercised the waste may be pressed so hard that the oil will run out the back end and on to the wheel, so as to cause the housing to overflow. By using this attachment it is unnecessary to press back waste at such frequent intervals, so that there is a considerable saving in labor and a reduction in the amount of oil wasted. The device is a good insurance against hot journals.



Bent Plate Attachment to Journal Box Cover for Retaining Waste in Place Under Journal

Lighting the Fare Box on One-Man Cars*

SINCE the development of the one-man car, the necessity of some better kind of illumination near the fare box for the convenience of the operator, so that he could more readily punch transfers and make change, has been realized by railways. Also, with the ordinary lighting, it is sometimes difficult to see whether or not the proper fare has been deposited in the box. The El Paso Electric Railway has equipped one car with a lighting unit as shown in the accompanying illustration. A condulet of the VD-33 type was installed on the fare box stanchion, making a shade to cover the light globe and cutting an inverted V on the edge of the shade so that the light would reflect into the fare box. The operators were so well pleased that this device is now being used on all of the company's one-man cars.

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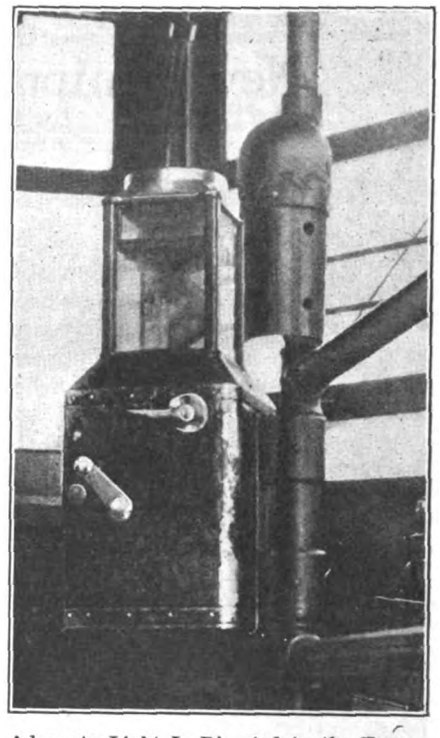

Adequate Light Is Directed to the Fare Box by Means of This Unit

A Ray of Light Strikes the G. M.

William Redfield, general manager of the Jinxville Railway, gets a tip from a lawyer friend from the South. Decides a few things can be done to brighten up his machine shop with a view to the comfort and safety of the men and improvement in the work.

AN air of gloom pervaded the machine shop of the Jinxville Railway on this December morning. There was no sensing of the Christmas cheeriness on this day. The rain was beating down outside and Ole Olsen, Dick Singer and the rest were trying to do their work with the aid of a few dingy carbon-filament incandescent lamps, which hung by long cords from the ceiling. It was enough to give anybody the blues. Even Singer, usually referred to as "Whistlin' Dick," was glum.

Into this depressing atmosphere William Redfield, the general manager, brought a visitor, a lawyer from West Virginia.

"Hello, what's this dark hole?" asked the visitor, as they stepped in.

"Machine shop, Sam," replied Redfield; "it is a bit forbidding, but it's a dark, wet December day outside; you can't expect much brilliance on a day like this."

"I suppose not, William; not being a railroad man I don't feel like criticising. I'm a lawyer, though, and handle a lot of accident cases. I'll bet it would cost you a pile of money if one of your men got hurt from not being able to see clearly.

"Our men don't complain, Sam; but now that you've called my attention to it the place does look mighty dark."

"I'll say it does, Bill. I don't see how you expect to turn out good repair work in a shop like this. Seeing your shop reminds me, by contrast, of one down where I live, in Huntington. Say, old man, that's one of the most cheerful places you can imagine. Our little railway is a crackerjack, anyway; but the shop is one of the best parts of the outfit. You ought to have a look at it. The walls are all coated—some kind of a shiny paint—and the windows are big enough to let in some light. Then for dark days they've got some worthwhile lamps. Of course, you'll say I'm always boostin' Huntington. Well, it's worth it. If I didn't know you so well and what you've done in a little over a year to rejuvenate this run-down property I wouldn't say anything. I know you won't take this amiss. No charge for the advice either. I usually collect about $25 for a suggestion like that."

"No harm done, Sam, and maybe some good. You've opened my eyes a bit. I see several things we could do here for a little money. We could get some good paint on the walls; we could hang some decent fixtures and lamps; we could put in two or three skylights, and we could clean our windows. Bill Jones, our foreman here, is a good fellow but kind of slack. I'll put him wise to this matter and I think the men will appreciate it. Let's go over to the paint shop. It's more cheerful over there."

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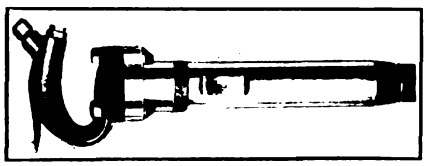
New Equipment Available

New Type Riveting Hammer

THE Ingersoll-Rand Company, New York, N. Y., has developed a new type of pneumatic riveting hammer with many added improvements. The outstanding features of this new riveter include bolted construction for holding the handle to the barrel, heavy section valve with liberal bearing surfaces, combination poppet and piston type throttle valve, power in excess of ordinary requirements, low air consumption and easy operation.

The new hammers are manufactured in three styles, A, B and C,



Rivet Hammer with Features for Easy Handling

and are available in a complete range of sizes from a 5-in. to a 9-in. stroke. Each size of this riveter can be purchased with any one of three types of barrels and with either outside or inside trigger handles.

The standard "A" type has a barrel machined to accommodate a rivet set clip only; three alloy steel bolts, fitted with lock washers, hold the handle to the barrel. This enables the hammer to be taken apart anywhere for inspection or cleaning with the aid of only a wrench; no vise, crowbar or other tools are necessary.

The throttle valve, except on inside trigger handles, is a combination of the piston and poppet types, having the control of the piston valve and the freedom from leakage of the poppet type. The beveled seat will remain tight and prevent leakage. The throttle lever or trigger is made in one piece from special heat-treated spring steel and has a long bearing in the handle, making it capable of withstanding abuse. The control is sensitive, ranging from a light tap to a heavy blow, entirely at the will of the operator.

The valve is a sleeve made from special alloy steel. It has liberal bearing surfaces and its walls are free from holes or ports which so often are the starting points for checks or cracks. It operates in a valve box of strong construction, located in the head of the barrel. The valve box is constructed with a solid end which enables it to be easily taken apart by the use of a piston for the removal of the valve, without recourse to the use of a screwdriver or similar instrument. This construction also insures a compression chamber in the valve box which cushions the piston on the return stroke and prevents the piston from striking the handle.

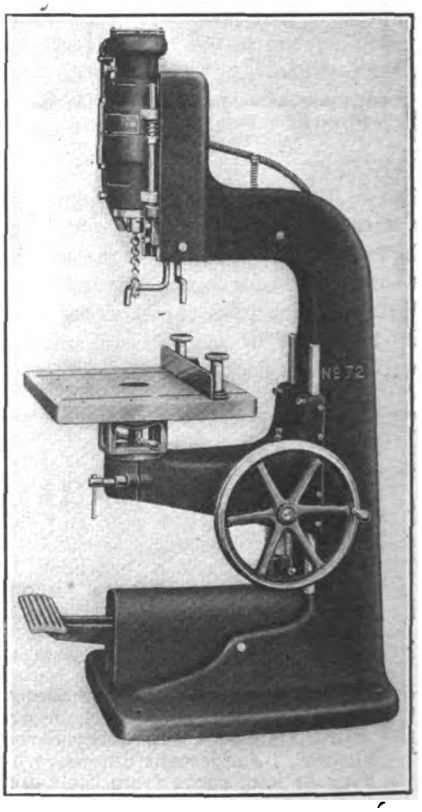
The handles are of high quality steel, drop-forged to a shape that fits the hand and are sand blast finished to give an excellent grip. Either outside or inside trigger handles can be furnished, although the outside type is standard. The exhaust is through the side of the barrel near the handle and can be deflected in any direction desired by the operator, by merely turning the deflector.

Due primarily to the bolted handle construction, the hammers are lighter in the handle end and are better balanced and easier holding, especially when used in a horizontal or inverted position.

Boring Machine with Motor Armature on Spindle

A SINGLE-SPINDLE borer with several new features is being placed on the market by the Oliver Machinery Company, Grand Rapids, Mich. This machine has been given the name of "Motor-in-Head Vertical Borer" because the rotor of the motor is mounted directly on the spindle of the boring machine. This eliminates all belting, countershafts, pulleys and a number of bearings. It also saves floor space and makes a simpler machine. Another interesting feature of this machine is the blower, which is also mounted directly on the spindle at the top of the machine. This blows the dust or borings away from the work.

This machine has a capacity for boring holes up to 2 in. diameter and up to 6 in. depth with one stroke. The distance from the center of the spindle to the column is 18 in. and the vertical movement of the table 14 in. The maximum stroke of the motor head is 6½ in. The table swivels completely around and tilts up to an angle of 45 deg. in any direction. The column is a one piece casting, with a wide flange base, measuring 24 in. by 31 in. A counterbalancing weight is provided inside the main vertical portion of the column, which also forms the connecting link between the foot lever and the head lever. A hood cast integral with the column deflects chips away from the foot lever. The motor is fully inclosed and the housing consists of two halves clamped together by large bolts. The motor's stator is clamped concentrically inside of these two halves with an air passage for ventilation. The rotor, together with the spindle, is provided with ball bearings at the outer ends. The lower half of the motor head has a lug at the back through which a connecting link and a counterbalance



Single-Spindle Boring Machine

lever system reaching to the foot lever supplies the downward motion of the head. A coil compression spring provides the necessary return movement.

A funnel type pressure blast fan is mounted at the upper end of the motor head. The blades are one-piece aluminum castings pinned to the upper end of the boring spindle. The air blast is directed downward toward the boring point, so as to blow the chips away and cool the boring bits.

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Association News & Discussions

Way Problems Occupy New England Club

Progress in Methods of Snow Removal, Systematized Methods of Track Repair and Electric Freight Opportunities Discussed at Boston Meeting—Machinery Playing Larger Part in Way Maintenance

THE advance of machine methods into the field of way maintenance featured a well-attended meeting of the New England Street Railway Club at the Copley Plaza Hotel, Boston, Dec. 6, President Ralph D. Hood occupying the chair. A number of addresses were given on the subjects of snow removal, trackwork and interurban freight. Following the usual dinner, Chief Photographer Jones of the Boston & Maine Railroad gave an illustrated lecture on the "Scenic Attractions of Maine."

In an early issue an extended account of the Eastern Massachusetts Street Railway Company's planning and control of way maintenance will be published by courtesy of R. B. Stearns, vice-president, and F. B. Walker, enlarging upon the material presented at this meeting in a paper by Mr. Walker on the subject "Track Machinery."

Snow Removal by Machine Methods

C. F. Reuter, engineer Eastern Tractor Company, Cambridge, Mass., pointed out in his talk on "Snow Removal" that the demand for snow removal has attained such proportions that this year an effort will be made by the Massachusetts Department of Public Works to keep open a number of the major trunk line highways, although not as much work will be done as though the proposed tax on gasoline had passed the last Legislature. Monopolization of street railway tracks by highway traffic is to be done away with on these trunk lines. It is proposed to try out the use of buses equipped with a form of plowing apparatus on some branch highways, but this, in the speaker's opinion, will be chiefly experimental.

The tractor, with its concentrated large power, appears to offer the best solution of the snow-removal problem, declared the speaker. It has been successful in Dakota, Montana, Michigan, New York, New Hampshire and other states. Despite the high power present in the modern tractor, a representative unit described by Mr. Reuter has a bearing weight of only 4 lb. per square inch upon the highway and does no damage to the road. Drifts 8 to 10 ft. deep can be handled with ease. A plow with a 10-ft. blade run by a 5-ton truck will remove 40,000 sq.ft. per hour as compared with 70,000 sq.ft. by tractor. The tractor costs less to operate than the truck and the average expense of "bucking" snow with a tractor of from 5 to 10 tons rating is about 92.4 cents per mile of route cleared.

The latest development in snow-handling equipment, the speaker stated, is the rotary plow-tractor combination. A 5-ton tractor unit is equipped with a 60-hp. gasoline engine, driving a rotor plow at 1,000 r.p.m. Two inverted V-blades lead to an opening with an area of 4¼ sq.ft. at the throat of the plow, the scooped in snow being drawn through the rotary blades and thrown to one side for disposal. The machine adjustments permit throwing the snow 100 ft. off-side, or the outfit can be designed to deposit the snow in a gondola car behind the tractor. If desired, the snow can be thrown off at intermediate distances. Loading into another vehicle continues while the plow and tractor are moving with traffic at a speed of from 1 to 6 m.p.h. The snow is pulverized finely so that a 5-ton truck will carry away about 4 tons of dry snow instead of 1 tons of loose, lumpy snow.

A new plow to be used by the Boston Elevated Railway will carry rotor blades of 2-in. x 18-in. x 36-in. chrome-nickel steel. The rotary end costs about $6,000. A 5-ton Holt tractor with auxiliary equipment costs about $4,750, or a Best tractor, including cab, heating coil, radiator and complete lighting outfit, $4,250.

In clearing the Champs de Mars, Montreal, Canada, of snow the job was done by tractor for $25, whereas an appropriation of several thousand dollars had been thought necessary for hand shoveling. This field was 1,000 ft. long, 125 ft. wide and had snow on it 18 in. thick. The rotor runs in ball bearings and will turn four minutes after receiving an impulse by hand. The latest rotor has four blades, which means 4,000 cuttings per minute. The cutter can be dropped from 8 in. above the rail to the rail top. The intake blades are lined with ⅝-in. metal reinforcement and can be reversed after wear. The minimum width of the machine is about 6 ft. 9 in. to 7 ft. The overhang over curves covers about 5 ft. of street width. Estimated yearly depreciation of the tractor is 12½ per cent, and repairs 6¼ per cent, of the first cost. The engine is the only part which is likely to give trouble.

Experience with Rotary Snow Brooms in Greater New York

W. B. Kelley, head of the division of operation and maintenance, Department of Plant and Structures, city of New York, described the failures of old-style sweepers and plows on Staten Island, N. Y., during heavy storms three years ago. Grades on this system run from 6.5 to 10 per cent maximum, curvature reaches 28 to 33 deg. and there are many hills and valleys, with great exposure. In 1921 the trackless trolley system was installed and in the fall of that year a Fox rotary snow broom was tried out by the city. Twenty-six snowstorms with a minimum of 6½ in. of snow were overcome without tying up traffic, and in one case 56 miles of track were cleared in 3¼ hours, when all other sweepers had failed. "I tried every known mechanical stunt to make the outfit fail," said Mr. Kelley, "but the machine merely laughed at me and came up for more punishment!" The Staten Island lines were operated when all other surface lines in New York were tied up. The Fox outfit is run in summer as an emergency truck and tower. The broom will remove more snow from a paved street than any two sweepers. A nine-track terminal with two automobile thoroughfares was cleared in 43 minutes compared with hours' work by 200 to 300 men in older days.

Mr. Kelley said that the broom can be removed in 25 minutes. Rattan is used instead of steel for the brushes. Only three sets of brooms had to be purchased in the twenty-six storms. The railway has gone through 7 ft. of snow with this broom and the Public Service Commission of New York highly praised the road's efforts to keep open during the past winter. The outfit can be mounted on a chassis and removed in about an hour. The New York Street Cleaning Department now has fifty-six of these brooms; the trackless trolley system has two and four more on order. There is a 24-ft. roadway on the trackless trolley system and the trolley runs from side to side like a bus. About 26 miles comprise the trackless trolley system. The broom operates when going up grades, as it has a separate engine drive, and this is not the case with an electric sweeper. Four or five of these outfits went a long way toward keeping the International Railway lines in Buffalo open during severe winter weather. The Department of Plant and Structures of New York proposes to purchase ten

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more rotary brooms for use on the trackless trolley lines. All the Staten Island sweepers were to be sold last week.

Interurbans Making Progress in Freight Haulage

That remarkable progress has been made in the business of handling freight on interurban lines was the conclusion of T. H. Stoffel, Westinghouse Electric & Manufacturing Company. This has taken place particularly in the Central West and even there only the surface of possibilities has been scratched. Data have been gathered, he said, which indicate that approximately $50,000,000 will be received by electric lines for handling freight and express for the years 1923, and that a total of more than 1,000,000,000 ton-miles will have been handled before the end of the year; that electric lines now have in regular freight service more than 13,000 freight and express cars, and more than 475 electric locomotives are employed.

The fourteen or fifteen electric lines, operating over 4,000 miles of track in the Central States, are not confining their efforts to the handling of merchandise or less than carload freight, but in the past two years have consistently broadened their field and are gradually adding facilities permitting them to move all classes of tonnage, including carload consignments of live stock, cement, stone, building material, coal, lumber, logs, canned goods, etc., at rates which are competitive with those in effect on steam lines.

As a result, these lines are finding it difficult to take care of the demands made upon them, through lack of rolling stock and adequate terminals. Shipments are handled over this group of lines for distances up to 350 miles or more, and the service rendered is from forty-eight hours to eight or ten days better than can be secured through any other means of transportation.

The lines centering in Indianapolis handled more than 8,000 carloads of live stock into the Indianapolis stock yards in 1922, which was three-quarters of the total received at those yards. The indications are that they will do much better during the current year, as stock raising has been taken up by many farmers who formerly thought that the effort was not warranted by results. Another line handled 2,500 carloads of cement up to Nov. 1 this year, and has contracted to move more than 3,500 cars during 1924. These cases are cited merely to indicate the extent to which freight business has been developed in the Central West.

What is probably of the greatest importance is that the lines in the territory referred to are showing a net profit in their freight operation of from 15 to 35 per cent on the investment in freight facilities and equipment. This balance appears after deducting from freight income all expense directly chargeable to freight operation, and in addition an equitable proportion of the cost of maintenance of roadway, track, distribution system, power plant, administration, taxes, etc.

Possibilities of conducting a remunerative freight business in the New England district are as good as if not better than in the Western territory, according to the speaker. New England is primarily an industrial section of the country, and there is hardly a town that does not produce tonnage, and of the class which can readily be handled with interurban equipment. It is realized that some of the lines in the New England district are carrying freight, but it is obvious that full advantage is not being taken of the possibilities.

While the motor truck is becoming an exceedingly important factor in the transportation of the country, it is handling tonnage every day which should be better and more economically moved by electric lines, and at much less cost to the public. Steam carriers are also beginning to realize that their equipment and facilities, which were necessarily designed and constructed for the movement of long hauls and heavy, bulky tonnage are not suitable for the economical handling of the comparatively short-haul tonnage, and this tonnage, particularly less than carload merchandise, is less profitable for them. As a result, some of the large trunk lines are giving serious consideration to ways and means of relieving themselves of the burden of transporting such tonnage of congested terminals for destinations 100 to 150 miles distant, thus relieving both terminals and rolling stock for use in the more remunerative and desirable long-haul traffic. One of the main trunk lines is also experimenting with the motor truck to relieve terminal congestion, while other roads are asking shippers at large terminals to consider shipping via electric lines where available, or to use esablished motor truck lines.

Experience has demonstrated, concluded Mr. Stoffel, that it is not impracticable or unreasonable to superimpose the operation of freight on the passenger service rendered by electric lines. Much of the road work can be done at night, or during off-peak hours when the power demand is low, and therefore no additions are necessary to power generating and distributing equipment. Practically the only added expense attached to the transportation of freight is to provide motive power, rolling stock, terminals and a competent and experienced traffic department, the cost of which is comparatively small. The net returns invariably more than warrant the effort.

Rotary Snow Broom of Type Used by Department of Plant and Structures on Staten Island Lines in New York

A.I.E.E. Midwinter Convention

TWO sessions will be devoted to national transportation problems at the midwinter convention of the American Institute of Electrical Engineers, to be held at Philadelphia Feb. 4 to 8. These will be held at the Metropolitan Opera House the afternoon and evening of Feb. 5. Among the speakers will be Ralph Budd, president Great Northern Railway; N. D. Maher, president Norfolk & Western Railway; C. H. Markham, president Illinois Central Railroad; Edward G. Buckland, vice-president New York, New Haven & Hartford Railroad; and L. G. Coleman, assistant general manager Boston &

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Maine Railroad. Other speakers will be announced later.

A wide range of subjects will be discussed at the convention, including such topics as the superpower system and other transmission subjects, power-plant operation, insulation, generator design, radio telephony, and miscellaneous subjects. Monday evening will be devoted to a celebration of the fortieth anniversary of the founding of the Institute.

Proposed Motor Vehicle Statute

At Convention of Utility Commissioners, Committee on Motor Vehicle Transportation Recommends Regulatory Law and Sets Forth Its Advantages

AT THE annual meeting in Miami, Fla., last week of the National Association of Railway & Utility Commissioners, the committee on motor vehicle transportation suggested a "model motor vehicle statute." It is based somewhat on the present regulation in the State of Washington, and the report was presented by E. V. Kuykendall, chairman of the committee and director of the Departmnt of Public Works, Washington. According to this law all companies and individuals engaged in auto transportation would be divided into two classes, namely, Class A, embracing all supplying auto transportation between fixed termini over a regular route, and class B, those not operating between fixed termini or over a regular route.

Class A companies are required to take out a certificate of convenience and necessity, file quarterly reports with the commission and pay a fee, not to exceed 1 per cent of their gross revenue, to cover the cost of supervision and regulation.

Class B operators are those which in the past have usually escaped regulation, but are now forbidden to operate for the transportation of persons or property for compensation without having obtained a permit from the commission to do so. For such permit they will pay an annual fee of $10 for the vehicle, a fee of 50 cents per passenger seat, provided that the passenger seating capacity exceeds eight, and $2 per ton for weights over 3 tons.

The commission has power to supervise and regulate all such companies, whether in class A or class B, to fix, alter and amend just, fair, resonable and sufficient rates, various charges and classifications, require the filing of reports, describe rules and regulations for their service.

The law declares that an occasional accommodative transportation service by a person not in the transportation business shall not be construed as a service for compensation. Operation within a city or town, school buses and vehicles engaged exclusively in hauling farm products are also excluded.

Reasons for Statute

In explanation and support of this bill the report, said in part:

We realize that there are a number of states in which motor vehicle regulation is administered under general statutes authorizing regulation of the rates, service, and facilities of common carriers, but there are so many peculiar phases of motor vehicle regulation which are inapplicable to other modes of transportation that better results can be obtained through special statutes covering that subject alone.

The first question which would probably suggest itself is: Why divide auto transportation companies into two classes? The original auto transportation acts in several states undertook the regulation of companies operating between fixed termini or over a regular route only. Practical experience has disclosed that freight trucks and for-hire passenger cars, maintaining stands in the various cities and towns, are operating over the routes covered by the certificates of convenience and necessity issued to the auto transportation companies and are keenly competitive therewith. These independent operators do not come within the purview of most of the regulatory acts, for the reason that they do not operate between fixed termini or over regular routes. They escape all regulation. They are not put to the expense of fees nor the furnishing of bonds required of regulated concerns to protect the public against negligent operation. They frequently engage in cutthroat competition with each other and with certificate holders to their own detriment and to the injury of regular certified operators and ultimately to the detriment of public service. All auto transportation companies transporting passengers and/or property for compensation would be embraced either under one of the two classes mentioned in the act.

The proposed act does not go into detail as to the manner of regulating these operators. To do so would be impracticable. The details must be worked out by the regulatory body, based upon practical experience, and under the broad provisions of the proposed law, which require all rules and regulations to be just, fair and reasonable as to said two classes of companies in their relations to each other and to the public.

Certain Carriers Are Excluded

The proposed act excludes from regulation motor-propelled vehicles operated wholly within the incorporated limits of any city or town. This, of course, is a matter resting within the discretion of the legislature in enacting the law. We believe a majority of states now engaged in regulation of motor-propelled vehicles do not undertake the regulation of companies operating exclusively within city limits. This is a matter, of course, to be determined by the legislative policy of each state. If it is desired that such power be exercised, this exception should be stricken from the definition of auto transportation companies contained in the proposed act.

It will also be noted that motor-propelled vehicles, operated exclusively in the transporting of agricultural, horticultural, dairy or other farm products from the point of production to market, are excluded. This is a wise provision, particularly in the Western states, where the movement of bulky crops, such as apples or wheat, requires the use of every available truck in the vicinity for a short period of time. To require every truck engaged in hauling wheat or apples from the field or orchard to the railway station or local market to secure a certificate of convenience and necessity, furnish a bond, and conform to other regulatory details, would place a needless burden upon producers, operators, and regulatory bodies alike. School buses are also excluded. There may be a difference of opinion as to this exclusion. We are inclined to the view that they should be excluded but that some legislation should be enacted requiring such buses to be insured or bonded so as to provide indemnity for careless operation.

Certificates for Class A Only

Another question might be asked: Why require Class A companies to secure certificates of public convenience and necessity and at the same time authorize the granting of permits with very little restriction to Class B companies? It would be impracticable to apply the certificate of public convenience and necessity to Class B companies as they are not limited to any definite route or schedule, and often operate in a wide stretch of territory. To determine whether public convenience and necessity requires an additional operator in this class would be a hopeless and impossible task. The fares, character of equipment, and method of operation can be properly regulated, and competition will largely eliminate the unfit. The regulation of fares will prevent the elimination of the smaller operators by the more powerful concerns through rate wars.

Insurance

That portion of the act relating to insurance should be drawn in harmony with the insurance laws of the particular state. Some legislatures have made the mistake of requiring too large a bond or insurance policy, compelling the payment of premiums almost prohibitive to many small operators. This provision should be flexible so as to permit the regulatory body to make reasonable regulations under which a small operator in a sparsely settled territory would be required to pay a

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much smaller premium than a large operator in a densely populated district.

Reasons for Proposed Fee Schedule

The proposed act undertakes to make regulation of auto transportation self-sustaining by requiring payment of certain fees by the companies. We believe this to be wise policy; first, because auto transportation companies enjoy certain privileges in the use of the public highways which other transportation companies do not enjoy, and, second, because the regulation of auto transportation is much more expensive in proportion to its volume than is the regulation of any other kind of transportation or any other public utility. Furthermore, it is doubtful, in view of the heavy burden of general taxation already existing, if the regulation of auto transportation would be undertaken by many states without some provision requiring operators to pay the cost of such regulation. The fee system which is proposed in this act is based largely upon the experience of the Department of Public Works in the State of Washington. It is believed that not to exceed 1 per cent of the gross operating revenue of auto transportation companies, together with the miscellaneous fees provided in the act, will yield a sufficient fund to finance the regulation of auto transportation companies in any state.

Taxes for Use of Highways

The fees so far discussed are those accruing to the state regulatory body for the sole purpose of covering expense of regulation. Some states are exacting certain taxes from motor vehicle companies as compensation for the use of the highways built and maintained at public expense. It is very likely that exactions of this character will ultimately be made in all of the states. There is a growing sentiment in favor of such a tax and a feeling upon the part of the public that stage and truck competition as now permitted is unfair to rail carriers, who are compelled to purchase right-of-way, construct grades, lay ties and steel, and maintain such structures at their own expense and pay taxes thereon.

While the exaction of taxes from auto transportation companies other than a sufficient amount to cover the expense of regulation is more properly a function of the taxing authorities of the states, it may not be improper briefly to discuss the same in this report. The statute which we have proposed places trucks and for-hire cars under regulation so that it will be possible to require such concerns to furnish statistical information upon which a reasonable tax may be formulated. To impose a gross revenue tax upon the earnings of vehicles operating between fixed termini and over a regular route without imposing an equal tax upon truck and passenger vehicles not so operating would work an injustice.

For instance, in the State of Washington, 36,323 truck licenses have been issued thus far in the year 1923. Only 284 of these are subject to regulation under the statute, which applies only to operations between fixed termini and over a regular route; 2,098 licenses have thus far been issued in 1923 for stages and for-hire cars, of which only 656 are subject to regulation.

About a year ago, the Department of Public Works of the State of Washington placed inspectors at strategic points on the highways who kept a check day and night for a limited period of all traffic being handled by trucks over the highways. This check disclosed that only about 20 per cent of the traffic passing such points was being transported by regulated freight carriers. No doubt a similar state of facts exists in other states.

If the proposed act should become a law, all of the concerns engaged in the transportation of either persons or property for compensation would come under some form of regulation and could be required to make such reports and furnish such statistical information as would enable a proper tax to be imposed.

There is still another class of vehicles, such as trucks engaged by private industries in transportation of their own products, such as oil companies, logging and lumber companies, creameries, and so forth, in relation to which difficulties would unquestionably arise in the imposition of a tax as compensation for use of the highways. It is also true that trucks so operated, though likely to escape the taxes imposed upon common carrier operators, are usually more heavily loaded and more injurious to the highways than those of any other class.

Gasoline Tax

At the present time the only form of taxation that operates equitably upon all users of the highways is the gasoline tax. Such tax would, of course, affect all who use the highways in proportion to the use they make of the same. The heavier the load, the more gasoline required to transport it. The only difficulty is that the gasoline tax must be paid by those who use the highways for pleasure as well as those who use them for profit. A number of states now impose a gasoline tax of two cents per gallon, which yields a handsome revenue. To increase this tax would work no injustice to the operators who use the highways for commercial purposes but, in the opinion of many, would be unjust to private car owners, who do not use the roads for gain and who have borne their share of taxation for the construction of the same. In any event, it is doubtful if legislatures will be inclined to increase the gasoline tax beyond the 2-cent limit unless the excess over the two cents could be made to apply to commercial users of the highways only; and, to make such distinction, would result in great difficulty and uncertainty of administration.

In imposing any form of taxation based on gross operating revenue, care should be taken not to destroy small operations in isolated regions. If it can be legally done, a reasonable return might be permitted tax-free to each auto transportation company, such return to be based on the value of the property devoted to public use. The rate of return might properly be prescribed by the state legislature and the value upon which it is based determined by the state regulatory body. All revenues in excess of such reasonable rate of return could then safely be taxed for the purpose of building and maintaining highways. In this way, the small operators, whose rate of return is usually low, would not be eliminated; and the larger concerns in thickly settled communities, whose operations are usually in competition with established rail and boat lines and whose earnings are usually ample, could be more heavily taxed without injustice.

Accommodative Service Excluded

In defining the words "for compensation," the following exception is made:

"An occasional accommodative transportation service by a person not in the transportation business, while on an errand for himself, shall not be construed as a service for compensation, even though the person accommodated shares in or pays the cost of the service."

The purpose of this provision is to save the kindly disposed individual and the regulatory body the annoyance occasioned by complaints arising from the occasional accommodative transportation of an article or of one person by another. In other words, regulation should not be so hidebound that a man could not accommodate a neighbor without violating the regulatory statutes.

Unions Must Develop Responsibility

DR. WILLIAM STARR MYERS, professor of politics Princeton University, was the principal speaker at the annual dinner of the New York Railroad Club, held at the Commodore, New York, Dec. 6. Dr. Myers' address was entitled "Thoughts on Our Present Discontent." Expressing himself as favoring the existence of labor unions, he also advocated the open shop—not "a shop open to none but non-union men, but to union and non-union men without distinction." He advocated making the unions really democratic by breaking up the "close corporations" of union leaders who control policies and finances, and the incorporation of the unions. He declared that they should assume the legal responsibilities commensurate with their rights and that if the unions did not reform themselves, it might be necessary for the government to step in and control their elections and their finances. The difficulty of today, he said, is not primarily with the rank and file of labor, but with the leaders, who seldom are

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elected by really democratic methods, who have control of the policy of the organization, are practically a self-perpetuating and "close corporation" in many cases, and are totally irresponsible for the administration of the finances.

The dinner was the largest ever given by the club and about 2,600 were said to have been present.

Resolutions and Further Committee Reports of Commissioners

Would Clarify Jurisdiction of State Commissions and Interstate Commission and Have Latter Value Railroads by States—Conference to Be Called on Crossing Accidents

AT THE closing meetings in Miami last week of the National Association of Railway & Utilities Commissioners, the following were elected officers for the ensuing year:

President, Henry G. Taylor, chairman Nebraska State Railway Commission; first vice-president, W. D. B. Ainey, chairman Public Service Commission of Pennsylvania; second vice-president, A. G. Patterson, president Alabama Public Service Commission; secretary, James B. Walker, secretary New York Transit Commission; assistant secretary, Lewis G. Thompson, Florida Railway Commission; general solicitor, John E. Benton.

Resolutions of Interest to Electric Railways

Resolutions passed, of interest to electric railway companies, included the following:

That Congress be urged to make such amendments to the existing transportation law as shall clearly exclude from the jurisdiction of the Interstate Commerce Commission the regulation of the rates and service of electric railroads carrying on local street railway transportation.

That the president of the association call a national conference, consisting of representatives of the carriers, state regulating commissions, governors, highway commissioners, municipal officers and national automobile associations, to see what can be done to reduce accidents to automobiles at railroad grade crossings.

That Congress be urged to supply the Interstate Commerce Commission with sufficient funds so that it may report valuations of railroads by states, as well as by entire systems, the commission having reported that it has been unable to make this division in the past because of lack of funds.

That Congress so amend the interstate commerce act as to remove all question of continued power of the state authorities to require common carriers to make additions and betterments to their plant and facilities reasonably necessary for the safe and proper service of the public; that no intrastate rates may be changed or set aside without proof by competent evidence that such rate seriously affects interstate commerce, and that Congress amend the transportation act of 1920 so as to restore to the several states all the rights, powers and authority enjoyed by each state relative to certificates of convenience and necessity prior to the enactment of that act.

The report of the committee on valuation related principally to the Great Northern and Rock Island (steam roads) valuation cases. It is pointed out that the theory of the Great Northern Railway is that for the purpose of valuation it is assumed that the railroad is non-existent and therefore no portion of it available for the transportation of men or materials for the construction of other portions, and that the entire 7,000 main track miles will be reproduced in from two to three years. Under this theory, material would necessarily be transported over foreign lines of railroads and no part would be hauled over the lines of the Great Northern Railway itself, and the freight on the material hauled would be paid for at class rates. Such an assumption, the report says, is illogical.

A supplement to the report considers the question of valuation of ill-conceived railroads, in connection with one or two recent decisions on this subject on steam road valuations by the Interstate Commerce Commission. The committee believes that for such properties the method of determining value by means of the cost of reproduction is not appropriate.

Other Reports

The committee on uniform regulatory laws submitted an extended study of the railroad and utility laws in the different states. It makes up a printed pamphlet of more than 300 pages, the statutes on the same subject, as in existence in the different states, being grouped together. Many differences are found.

The committee on motor vehicle transportation submitted a report, of which an abstract appears in another column.

The committee on statistics and accounts of public utilities reported on a uniform classification of accounts for electric, gas and water utilities.

Further report on the proceedings at Miami will probably be published next week.

Subway Car Design Topic at A. S. M. E. Meeting

"MODERN Subway Cars and Their Operation," a paper by Selby Haar, assistant electrical engineer with the Transit Commission of the State of New York, was the principal topic at the meeting of the Railroad Division of the American Society of Mechanical Engineers, Dec. 5. E. B. Katté, chief engineer electric traction, New York Central Railroad, acted as chairman.

The paper by Mr. Haar gave various details of the steel car construction and equipment of trains used by the rapid transit lines in New York. These details have been published from time to time in various issues of ELECTRIC RAILWAY JOURNAL. Mr. Haar also referred to measures undertaken to overcome congested conditions in the subway so as to bring about a reduced time for loading and unloading passengers, thus reducing the time for station stops. This has enabled the operation of trains on more frequent headway, and the length of trains has also been increased, this latter requiring increased length of platforms. Ten-car express trains are now operated and six-car local trains.

Mr. Haar also referred to the development of the articulated train and declared that this type was being considered among other new designs for future equipment of the New York subways. According to the tentative designs, four units of this type will be substantially as long as eight of the standard cars. Each unit has a body of three sections, articulated and supported on four trucks. A special feature is that no intermediate end doors will be used, and there is but one guard for each unit and he is located at the end of the unit. Preliminary designs have wide single side doors instead of pairs of narrower doors.

The discussion following the presentation of Mr. Haar's paper showed the attention which has been given by designers of cars and equipment intended for New York subway service toward increasing schedule speeds, decreasing the length of station stops, and providing for the comfort and safety of passengers.

F. M. Brinckerhoff, who as a member of the L. B. Stillwell firm of engineers has devoted considerable time to the design of cars for New York subway service, described some of the features of the Brooklyn-Manhattan Transit Corporation's cars which were mentioned in Mr. Haar's paper. Mr. Brinckerhoff brought out the fact that in the development of this design considerable attention has been given to rapid interchange of passenger movement and to produce as light a car body construction as was advisable, in view of the extreme service to which this equipment is subjected.

Joseph C. McCune, district engineer Westinghouse Traction Brake Company Company, New York, described some of the advantages of the electro-pneumatic brake equipment and the empty and load brake device as installed upon the Brooklyn-Manhattan Transit Cor-

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poration's cars. He brought out the fact that the improvements in air-brake equipment had done considerable toward decreasing the congestion of rapid transit operations by providing increased rates of retardation, quick release of brakes and rapid recharge of the air-brake system. He said that the distance for a stop of the Interborough trains from a speed of 40 m.p.h. has been more than cut in two by improvements in air-brake equipment and that the time taken to stop from this speed has been decreased one-third. Mr. McCune also described the features of the automatic air and electric couplers as used on subway equipment, and gave some illustrations of the saving in time that resulted in making up trains for service.

Fred Butt, of the equipment department of the New York Central Railroad, gave some figures of the detentions in multiple-unit train service on the New York Central and asked several questions as to the value of certain equipment used on subway cars. H. L. Andrews, railway engineer General Electric Company, told of the efforts which his company had made to reduce the fire hazard on subway equipment by adopting flameproof and heat resisting insulation. He also spoke of the advantages of articulated units for train operation, and as evidence of the economies effected he declared that a three-car unit would have but four trucks and four motors, while three individual motor cars would require six trucks and at least six motors. The recently constructed two-car articulated unit used in Detroit has a weight of but 550 lb. per passenger seat.

George L. Fowler, consulting engineer, New York, told of the reasons for removing the coupler centering devices on the Brooklyn-Manhattan Transit Corporation's cars. The supporting attachment to the truck used to keep the couplers accurately centered produced large strains with danger of derailment. He also spoke of an investigation which he had made into the excessive nosing of these cars, which was found to be due to too free oscillation of the car body.

American Association News

Midyear Dinner Committee

THE committee on arrangements for the midyear meeting to be held in St. Louis, March 4, met in St. Louis on Dec. 11. It was decided to hold the meeting at the Hotel Chase, and E. B. Meissner, E. D. Payne and H. D. McBride were appointed a sub-committee to conclude negotiations with the hotel management.

The committee plans to engage the Chase Hotel orchestra, which is said to be one of Paul Whiteman's best. There will be special entertainment during the dinner. It was decided to print menu cards suitable to the occasion. It was planned to have a definite assignment of tables and places for all those whose reservations are received by Monday noon, March 3.

On the question of entertainment for the ladies, the committee thought that they could be well taken care of without the association making any special arrangements.

B. W. Frauenthal was designated to take up the matter of transportation to determine whether arrangements could be made for fare at one-half rate, as was done for the Atlantic City convention.

A hotel reservation sub-committee was appointed to follow all details of giving each member the rooms he wanted in so far as available. It was brought out that all attending the meeting can probably be taken care of within a radius of three blocks of the Hotel Chase. Frank O. Grayson, St. Louis, was appointed chairman of the hotel reservation committee.

It was suggested that an informal get-together meeting be held on Monday night, just prior to the midyear meeting, and it is probable that this will be handled by the Birney Club, St. Louis. An organization committee was appointed for this purpose as follows: C. O. Birney, chairman; B. W. Stemmerick, R. W. Williams, Herman Spoehrer and B. W. Frauenthal.

The committee on arrangements will probably not hold another meeting until February of next year.

The following members of the committee were present: W. H. Sawyer, chairman; E. B. Meissner, F. G. Buffe, V. W. Berry for G. H. Clifford, L. E. Gould, H. J. Kenfield, C. E. Allen for M. B. Lambert, A. T. Perkins, Ernest Stenger, E. D. Payne for E. P. Waller.

In addition, Fred A. Kehl, H. D. McBride, J. A. Laird, Mr. Johnson for W. A. Layman were present from the St. Louis Electrical Board of Trade. From the Birney Club of St. Louis, C. O. Birney, Frank V. Cook, Otis E. Turner, F. A. Richards, R. W. Williams, B. W. Stemmerick, F. O. Grayson, and B. W. Frauenthal were present. Fred C. J. Dell represented association headquarters.

Way Committee

A TWO-DAY meeting of the committee on way matters of the Engineering Association was held in New York, Dec. 6 and 7. Those present were H. H. George, chairman; E. M. T. Ryder, C. F. Gailor, W. W. Wysor, W. R. Dunham, J. H. Haylow, E. B. Entwisle, C. A. Alden, R. B. Fisher, V. Angerer, R. C. Cram, sponsor, and G. C. Hecker, special engineer.

The first day was taken up entirely with meetings of sub-committees.

The committee voted to recommend the use of seven standard frogs for all radii of 130 ft. or less, using association standard spirals through the frogs. It was voted to use intermediate radii at even degree angles so as to make them coincide with the length of the curved heel arms for iron bound construction. Standardization of the length of frogs was referred to a subcommittee composed of Messrs. Angerer and Alden.

On the design of substitute ties, sub-Chairman S. C. Baker was directed to secure from the tie manufacturers or elsewhere a list of railways using such ties, extent of use, and particularly how many were placing repeat orders from time to time. It was also decided that a questionnaire should be sent out to all companies using substitute ties with the idea of developing data relative to this subject.

Mr. Wysor reported on the progress of the investigation by the welded rail joint committee. He outlined the status of the schedule of tests and research work recently adopted.

A preliminary report by Mr. Angerer on the design and specifications covering solid manganese crossings was approved.

The subject of standardization of switches and mates was discussed quite extensively. The committee requested each manufacturer member of the subcommittee to prepare and submit drawings showing a specified switch, so that a study can be made to ascertain the possibility of designing a composite switch. On the subject of standard design of narrow groove guard rail, Mr. Entwisle submitted a preliminary report and the sub-committee was instructed to continue the study of this subject.

A progress report was made by Mr. Haylow on the design of a standard hook-head spike, and each member was requested to furnish him with such additional data as they have on this subject.

A report by Mr. Spencer on surface hardening of rails was read, which described the results of recent experiments with this process in Toronto. Various data on this subject were submitted by different members.

Mr. Dunham reported progress on the subject of specification and design of tie rods.

It was voted to refer Specification Ws 10a to a sub-committee for action in accordance with the recommendations of the 1923 way committee.

It was decided to hold the next meeting at Easton, Pa., Feb. 13 and 14.

State Committee Men to Meet

ARRANGEMENTS are being made to have a round-table discussion of all directors of state committees on public utility information at the time of the midyear meeting of the American Electric Railway Association at St. Louis, March 4.

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The News of the Industry

Mr. Mayo Discusses Transit

General Manager at Detroit Regards Construction of Underground Lines Downtown as Imperative

William B. Mayo, general manager of the Detroit Department of Street Railways, has issued a statement relative to the plans for rapid transit for the city of Detroit. Mr. Mayo analyzes critically some of the provisions outlined in the Rapid Transit Commission's report and states that in his opinion the conditions to be met in Detroit make it appear that the first logical step to be taken toward rapid transit is the construction of an underground tube in the central district, built first in short sections for surface car operation, but so designed that it can be converted to rapid transit operation.

Definite Enabling Act Needed

The first consideration is to secure passage by the Legislature of a clean-cut enabling act. After that assistance and thought should be given to the question of the extent of the rapid transit system required in the next five or ten years. Mr. Mayo says that what the city really needs most is increased terminal facilities.

Mr. Mayo believes that careful consideration should be given to the relation between the Street Railway Commission and the Rapid Transit Commission, if the latter is to be a permanent feature, as unified operation can not be guaranteed unless one or the other is made definitely responsible for the transportation of the city's population.

A serious thing to be considered in connection with rapid transit development is the matter of fares. The surface lines must have at least a 5-cent rate of fare until the purchase contract is completed, Mr. Mayo believes, and rapid transit lines cannot operate for less than 10 cents until a ten-year period has passed or the total annual traffic has grown to somewhere near the billion mark.

Financing Details Discussed

In regard to the report of the Rapid Transit Commission outlining proposed methods for financing, Mr. Mayo is of the opinion that it is very unfortunate that the present enabling act retains the double column assessment plan. This he thinks should be eliminated. The bill referred to provides for a special assessment district along established routes by a so-called double column assessment. The first column would represent the value of a given parcel of land without a subway; the second column would represent the increase by reason of the subway's construction. The same city tax rate would be levied against both columns, but the proceedings of the column due to alleged increased property value following subway construction would constitute a so-called special assessment fund to be used to pay for the subway work. This, Mr. Mayo believes, would entirely relieve the property owners of any real special assessment for a subway and conflicts with the apparent intentions of the Rapid Transit Commissioners.

If the second plan in the new act were adopted, he cites, the general assessment would be the same as the sum of the two columns suggested in the first plan, but would provide a genuine special assessment against the entire property value.

The new financial plan provides for an assessment at large of 17 per cent and a local assessment of 51 per cent, the balance of 32 per cent being the equipment cost which is to be financed by the car rider from the fares. This plan is not objectionable to Mr. Mayo except in the detail of its application.

Serious consideration of the metropolitan area and the Port of Detroit plans are recommended because the present transit plans contemplate the whole proposition as a local one.

Another feature of the enabling act to which Mr. Mayo called attention is the fact that the act seems to assume that all of the costs of changing gas and water pipes, telephone conduits, etc., shall be considered part of the cost for the subway. Inasmuch as a tremendous strain would be put upon the taxing power by the cost of the subway, it is apparent to Mr. Mayo that the settlement of this question should be a discretionary one instead of compulsory.

Moving Pictures to Tell Story.—Motion pictures are to be used in telling the story of the growth and development of many public utilities properties in the Central West, knit together in the Illinois Power & Light Corporation, formed last June by the merging of the McKinley and Studebaker interests. Pictures of the various properties and industries served will be taken in Illinois and Missouri. The pictures will show the tremendous growth of the public utility business and particularly the development of the many properties now under the management of the Illinois Power & Light Corporation, which operates a very large trunk line interurban railway and numerous city railway systems in seven states.

Recent Session of Union

One-Man Cars, Seniority and Other Matters Discussed by Amalgamated at Oakland Meeting

W. D. Mahon, international president of the Amalgamated Association of Street & Electric Railway Employees of America, reiterated his stand for the eight-hour day at the recent meeting of the association at Oakland, Cal. Mr. Mahon advocated one day rest in seven. Among other things he said that contracts covering labor agreements should be for two years instead of one and that there should be arbitration without suspension of work.

Seniority Rule Discussed

During the proceedings a delegate from Vancouver suggested changing every two or four weeks between the day and the night men. The present association rule calls for seniority in selecting runs. The association voted for a pension plan for men members of more than twenty years' standing who had reached the age of sixty-five.

Mr. Mahon indicated that the one-man car was here to stay. The attitude of the officers of the association toward the one-man car was that the locals should try to get as much extra wages as possible for operating this type of equipment. It was recommended that the locals should be permitted to handle this matter. With further regard to the operation of these cars, Mr. Mahon said the men should be protected at crossings.

Would Fix Size of One-Man Car

A recommendation was adopted favoring the passage of a law against one-man cars except those not more than 25 ft. long, with seats for not more than thirty passengers, equipped with an emergency exit door and automatic emergency control and brake, and on which the operator is not required to collect fares while engaged in operating the car.

It was further voted to increase the dues of the association.

In a talk which he made on the situation affecting the former employees of the International Railway, Buffalo, Mr. Mahon said:

> Members of the Amalgamated throughout the country stood by the men in Buffalo and I want to say to their everlasting credit that they have helped to preserve the Amalgamated, and "Mittenism" is as dead as a door nail in the United States and Canada today.
>
> My friends, what we have done in Buffalo has set a lesson; it has shown what we can do; and if all our members will only be as true and loyal as the men of Buffalo, and stand as they have stood, they will never defeat the Amalgamated Association on this continent.

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Massachusetts Towns Worried

Begin to Fear for Their Future at Prospect of Withdrawal of Railway Service—Review of Affairs Affecting More than 80 Miles of Road

HOPE has been shattered that the Massachusetts Supreme Court would prove a modern Moses in showing the Northern Massachusetts Street Railway a way out of its sea of financial difficulties, enabling it to continue operation of its lines. Foreclosure by bondholders on Dec. 31 has been ordered unless the property has been disposed of as a whole, or in part, prior to that time. D. P. Abercrombie, the receiver, has been authorized to continue or discontinue service on all or any lines of the corporation at any time he may see fit, but it is anticipated that he will operate the greater part of the road until Dec. 31.

Public Shows Its Concern

Threatened with the loss of virtually their only public means of transportation the residents of the possible trolleyless territory are beginning to show real concern. Gardner, one of the principal centers of the system, has asked its City Council to take action to provide transportation for residents, Templeton residents complain the town will be hard hit by the suspension of the lines, storekeepers and patrons in Athol are disturbed, and in the other towns served by the railway there is a growing realization of what the loss of the trolleys will mean.

The Northern Massachusetts serves far-flung territory, not very populous, it is true, but territory with a network of trackage that has knitted together a big section of the northern part of Worcester County. Even so, the facilities afforded by the railway have been at the command of approximately 125,000 persons, if not more. Nevertheless, in this territory there lives the type of suburban resident who believes in the convenience, yes, and even the necessity, of the automobile. The discontinuance of the lines will be no great hardship to this class of patrons except possibly during the winter months. The automobile owning class, however, is restricted in numbers. On the other hand, many daily wage workers will suffer who have not acquired the wherewithal for maintenance of motor cars.

At Orange, one of the extremities of the line, there is not much call for transportation of workers. It is a small town and few live sufficiently far from employment to find the trolley a convenience. It is, however, a necessity in travel to other towns. Starting there, the line runs to Athol, another thriving manufacturing town, spread out more and with greater need for adequate transportation facilities. This branch was formerly the Athol & Orange Street Railway. At one time, the travel between Athol and Orange was heavy.

The largest center beyond Athol for the Northern Massachusetts is Gardner, a city of population estimated at close to 20,000. Big chair factories and other industries abound. While the working forces at Gardner are recruited largely within the city, the suburban territories send no small number of laborers. Gardner has two central villages and the travel between them is heavy. It has more modern stores than have surrounding towns and over the weekends draws throngs of shoppers, many of whom have found the trolley a necessity. The shopkeepers are the persons who really are worried at the passing of the trolley. They fear it will affect business, but are hoping there will come a way to meet the emergency.

Gardner is the center for the lines that pass through Templeton and its villages, where are virtually no trading centers. From Gardner there is also a branch that runs to Winchendon, another large town, the residents of which find the trolley very useful in traveling to the larger trading centers. There is a summer park between Winchendon and Gardner, maintained by the railway, that enjoys large patronage.

From Gardner the Northern Massachusetts main line runs through Westminster and into West Fitchburg, connecting with the lines of the Fitchburg & Leominster Street Railway. Fitchburg is an industrial city of 43,000 with up-to-date stores. It is the objective of residents living in towns and cities to the northwest, the very territory which the railway serves.

No Help from Steam Lines

The railroads offer no avenue of escape to the residents confronted with the prospects of losing the trolley. There is passable steam service between Gardner and Fitchburg, but that is the extent of the railroad convenience offered. Between the other towns and cities now served by the trolley trains are few and far between and offer little inducement for travel by that means. They have not been a convenience and in many of the towns the railroad station is an impossible distance from the main village.

Other inconveniences are threatened. Three of the post offices, Templeton, East Templeton and Otter River, all receive mail by trolley. The accommodating trolley has also carried books between the branch libraries. Students attending the high school in Baldwinville, one of the villages of Templeton, are transported by trolley, as are many children attending elementary schools.

Residents of Templeton, overlooking their own patronage of the bus, place the blame for the predicament of the trolleys on the selectmen and the Gardner City Council. They declare the decrease of the trolley receipts is mainly due to issuance of jitney licenses.

In fact, Templeton is taking the trolley passing more to heart than most of the towns. Leading residents fear the discontinuance will seriously hurt the few industries in its various villages as virtually all of the manufacturing plants get their fuel by way of the trolley. The discontinuance of such service will mean a long haul of coal as well as increased expense.

At a meeting in Athol on Nov. 26 it was voted to institute steps for the purchase of the section of the Northern Massachusetts Street Railway running between Athol and Orange, with a view to maintaing this line in operation after retirement of the Northern Massachusetts on Dec. 31. A committee composed of representatives of the two towns was appointed to canvass for subscriptions for the purchase of the line. Although sentiment favored the electric railway, a proposal has been made to put on several buses between the two towns.

Gardner's next move is, perhaps, the most eagerly awaited, for the trolley abandonment will be of direct concern to a larger number of people there than any other place. Already experts from a bus company are preparing a survey and report for the installation of a permanent bus line to take care of every possible transportation need. There are buses now in operation between some sections of the city drawing their chief patronage from the workers in the factories. There is no dearth of taxicabs operating almost on a jitney fare level between the Gardner railroad station and the center of the city known as West Gardner. They claim patronage is encouraging.

The only possibility of Gardner retaining permanent railway service is for the city or private interests to take over a part of the corporation's lines and operate them. This possibility is considered remote.

Similar Situation on Connecticut Valley Line

Judge DeCourcey of the Massachusetts Supreme Court on Nov. 16 ordered a decree entered directing D. P. Abercrombie, receiver for the Connecticut Valley Street Railway, to cease operating all lines of that system by March 1, 1924. The receiver is empowered to issue $10,000 on a receiver's certificate to pay bills. Petitions for foreclosure of mortgages on lines of the Amherst and Turners Falls divisions have been filed. The court advised attorneys to confer concerning the sale of the company's properties and report to the court.

The Northampton Chamber of Commerce has considered how to keep the line from Northampton to Amherst in operation, and it is hoped that the Holyoke Street Railway will take over that line and also the line running from Northampton to Hatfield, operating these lines and allowing the section farther north, through Whately and Deerfield to Greenfield, to be discontinued. It seems probable that the service between Greenfield and Turners Falls will be replaced with a bus service.

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Rental the Question—Report Praises P. R. T. Activities

After making a study of transit development in Philadelphia and the question of what rentals the Philadelphia Rapid Transit Company should pay, the transit committee of the Real Estate Board recently submitted a report saying that the issue, so far as new lines are concerned, is up to the new administration.

The report states that the size of the transit property the city will build depends on the amount of rent the Philadelphia Rapid Transit Company can afford to pay. This in turn resolves itself into the question whether it is better for the city to build a small transit property to serve a comparatively small number of people with rapid transit and get a high rent, or whether it is better for the city to build a larger transit property supplying rapid service to greater numbers and accepting a lower rental, but getting the additional interest on the investment through increased real estate values. In the opinion of the Real Estate Board's committee that is the question that will have to be settled in working out an operating agreement.

The report reviews the activities of the company during the present year in the matter of track extensions and new equipment saying that the company spent more this year than in any other year in this respect. Horace Groskin, chairman of the committee, said that this was proof that the Philadelphia Rapid Transit Company had not only kept faith with the worker in higher wages and with the stockholder in dividends, but also with the people of Philadelphia in the matter of service.

Removal of Part of New York Elevated Suggested

Julius Miller, Borough President of Manhattan, has proposed that the Sixth Avenue elevated structure be torn down and that a subway be constructed along its route without incurring the obligation of one cent on the city. His suggestion was contained in a communication to the Board of Estimate. Mr. Miller set forth that owners of property amounting to $20,000,000 along the proposed route from the Battery to Fifty-ninth Street had agreed to submit to an assessment to bear the cost of removing the elevated and building the subway, which is estimated at about $25,000,000. He expressed the hope that the owners of all of the property involved, which totals about $260,000,000, would agree to the project.

At an assessment of one-tenth of the value of the property, Mr. Miller pointed out, the financial burden would be lifted from the city and shifted to those whose property would benefit. He also proposed that the assessment be spread over ten years, which would result in a 1 per cent assessment a year.

Mr. Miller brought his plan up at this time because the Board of Estimate had called a public hearing on Dec. 14 on relocating the columns of the Sixth Avenue elevated structure. He has already asked the Corporation Counsel to frame a bill giving the city the right to go ahead with his project.

Main Entrance at Wilson and Broadway to New Uptown Station, Chicago

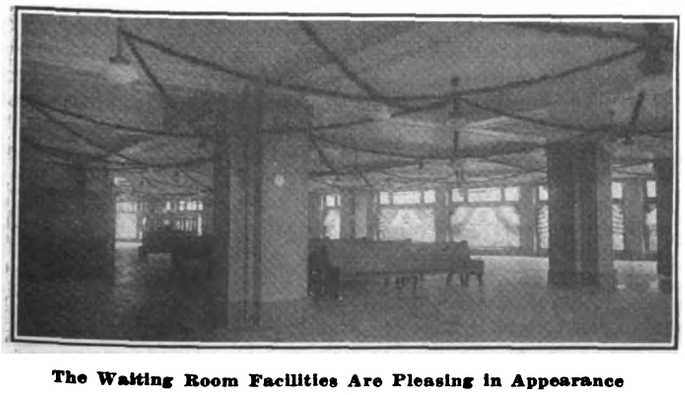
Orders Physical Connection in Tulsa

The Oklahoma Corporation Commission has issued an order requiring the St. Louis-San Francisco Railway and the Sands Springs Railway to make physical connection with the Oklahoma Union Railway at Tulsa so as to facilitate the handling of freight in carload lots and less over the lines of the Oklahoma Union Railway. The Oklahoma Union Railway operates an electric interurban line between Tulsa and Kiefer, Okla., a distance of 18.84 miles.

New Uptown Electric Station in Chicago

The Chicago Elevated Railroads and the Chicago, North Shore & Milwaukee Railroad have augmented the station facilities at Wilson Avenue, formerly laid out primarily to serve the elevated, by the construction of a new depot underneath the elevated structure. The new station is of quite imposing appearance, both inside and out. It is located on the north side of Wilson Avenue at the intersection with Broadway, which is at the center of the uptown district on the North Side. It will serve the through passengers of the North Shore line and the Evanston division of the elevated. Local passengers from and to Wilson Avenue will be handled from the station on the opposite side of Wilson Avenue, and therefore the local and through passenger business will be separated.

The building is of brick and tile construction with terra cotta facing. The interior is decorated with art marble for flooring and side walls up to the height of the wainscoting. The grand staircase leading up to the track level is exceptionally attractive and provides a generous passageway for passengers. The total cost of the building, including the cost of removing the building which previously occupied this site and was owned by the elevated railroad, was approximately $200,000.



The Waiting Room Facilities Are Pleasing in Appearance and Generous

The Grand Stairway Leading to the Platform Above; Ticket Booths and Comfortable Waiting Benches Near By

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Wages Advanced 1.65 Cents in Philadelphia

As was reported in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 8, the Philadelphia Rapid Transit Company has granted a wage increase to its trainmen, effective Jan. 1, 1924 amounting to about 1.65 cents an hour over the 1923 average scale. Under the new agreement the men will receive 67½ cents and of that 2½ cents will go into the dividend fund. At the end of the year each employee will be credited with 10 per cent of his year's earnings. The new basic rate is placed at 65 cents and with the 10 per cent wage dividend it will amount to 71.5 cents. In 1923 the average rate has been 63.5 cents with a 6.35 wage dividend. Employees of the Philadelphia Rapid Transit Company are paid by agreement according to the average paid in Cleveland, Chicago and Detroit. The increase involves an outlay of approximately $550,000 to the company.

Discussing the wage matter President Dunbar said:

> At the beginning of 1923 the wage based on the trainmen's 62.5 cents per hour was thought to be as high as wages would go. This, with a 10 per cent co-operative wage dividend thereon, was considered possible of accomplishment. When the three-city average wage brought up to 64 cents an hour on May 1 the wage dividend was still thought possible of accomplishment, but when the three-city average went to 67.5 cents June 1 it was at once seen impossible to pay this large increase and in addition pay a 10 per cent co-operative wage dividend.
>
> Upon the explanation being made that the continued purchase of P. R. T. stock for the workers' account depended upon the payment of the full 10 per cent wage dividend, all employees at once agreed that the equivalent of 3.5 cents per hour should be deducted from the three-city average wage, to which they were entitled, and paid to the trustees of the wage dividend fund, the wage of 64 cents per hour being thereby continued.

President Dunbar referred to Mr. Mitten's desire to have the basic wage at 65 cents an hour. He said that the company, however, would have to make up the $50,000 which it was short in the full earning of the present year's $1,850,000 wage dividend, but that even with that in mind he strongly approved increasing the basic wage to 65 cents and endeavoring to earn and pay a 10 per cent co-operative wage dividend during 1924.

Rockford Traction Applies Again for Franchise Grant

The Rockford City Traction Company has made a second application to the City Council of Rockford, Ill., for a franchise grant. The last franchise application was voted down in a referendum on Dec. 12, 1922. In the present application the company proposes not to pay for any new paving or repaving of any street upon which its tracks are now or shall later be laid. It proposes, however, to pay for repairs to pavements within the length of its cross ties, with such materials as may be ordered by the City Council.

With the exception of the paving clause the franchise application is practically the same as the original one, including the rate of fare, double tracks on Seventh Street, relaying of rails on State Street in business districts and extension of lines to city limits on East State Street and to Black Hawk Park on Fifteenth Avenue.

The new traction application makes no provision for a referendum. Early action on the franchise application by the Council is expected.

The company's franchise expired on Oct. 3 last, and the company has been operating since that time on a special permit granted by the Council.

Would Compel Railroad to Halt Cars at Crossing

A hearing was held before the Public Service Commission on Dec. 5 on a complaint filed by the State Bureau of Highways against the Hudson Valley Railway, Glens Falls, N. Y., asking that the crossing at grade at the Waterford-Mechanicsville county highway and said company's railway shall be protected. The crossing in question is located immediately north of Waterford on the highway leading from Albany, Troy and Cohoes to Saratoga and points north. The highway will be reconstructed next season. The State Highway Bureau at the hearing asked for an order directing the cars of the railway to come to a dead stop before crossing the highway. It was shown that there are nineteen passenger trolley cars and four express cars that cross this highway daily, together with about 1,500 automobiles. The automobile traffic will be heavier when the highway is rebuilt of concrete.

The decision of the commission will be announced later and will be received with more than ordinary interest, as the request itself "to bring transportation to a stop before crossing a highway" marks a departure from the accepted practice of a railway crossing a highway, almost since the inception of the railway itself.

Recent Booklets Furnish Excellent Examples of Publicity

Three examples have recently been presented of real efforts by utilities to tell their story to the public through the printed page. The corporations issuing the booklets are the Public Service Corporation of New Jersey, the Middle West Utilities Company and the United Light & Railways Company. The Public Service booklet is one of eighty pages. It covers the twenty-year period of the company from 1903 to 1923. Twenty years of real service furnishes the text. More than 60,000 copies of the booklet have been distributed. The Middle West booklet is one of sixty-four pages. It is entitled "Essential Service in Fifteen States." The United Light & Railways has seized upon the results secured by it during the year 1922 to tell its story. This is essentially an annual report, but it is excellently arranged and has been made most readable by the presentation of considerable material not until recent years regarded as suitable to be introduced into such matter of fact affairs as an annual report.

Full Operation Restored in Saginaw

Full operation has been restored by the Saginaw Transit Company, Saginaw, Mich. It is believed that in this respect a record has been established. It was on Sept. 26 that the car shops were opened and repairs to equipment started. New switches were laid, track and overhead repairs made. Cars were made ready for operation, and twenty-five buses were ordered. Twenty are at Saginaw and in service. Thirty-two street cars are at present available for service.

During the first month's operation with competition from jitneys and only 25 per cent of the equipment in use, the company carried 466,800 passengers. Of these, 393,307 were revenue passengers, 73,027 transfer pasengers and 466 rode on passes. On Dec. 8 the company carried nearly 30,000 revenue passengers. This is much better business than was expected, Charles S. Kressler, general manager of the company, said.

The company has ninety-two operators, nearly all of whom knew little or nothing about street car or bus operation prior to Nov. 1.

The return of street cars has caused a traffic problem. The City Council wants two men on the double-truck cars to facilitate loading and unloading. Mr. Kressler says this means receivership for the company. He advocates the construction of loading docks in the business district to relieve the congestion. The Council will probably follow his suggestion.

Maine Company Seeks Relief from Reconstruction Order

The Public Utilities Commission of Maine will hear the appeal of the Androscoggin & Kennebec Railway, Lewiston, from certain regulations and requirements made by the municipal officers of Brunswick relative to the reconstruction and resurfacing of Main Street in that town. The regulations ordered the railway to reconstruct a certain portion of Main Street and stipulated that the expense of resurfacing the track location should be paid by the company, and the expense of the cement surfacing of the remainder of the street should be assumed and borne by the town of Brunswick. It is the contention of the railway that the municipal officers acted entirely beyond their authority, for it claims that about one-half the total distance named in the order is entirely covered in, and constitutes the subject matter of an order of the Public Utilities Commission, dated July 11, 1921, which is still in force and with which the town of Brunswick has neglected to comply. The company also maintains that the requirement that the company bear the entire expense is unjust and unreasonable, and that the character and kind of paving and resurfacing ordered are unreasonably expensive and unnecessary.

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Railway Secures Injunction to Prevent Discrimination. — The Waterloo, Cedar Falls & Northern Railway has been granted an injunction against the city of Cedar Falls, Iowa, restraining the city from enforcing an ordinance compelling buses to follow certain routes within the city limits. The road alleged discrimination by the City Council between buses operated as an adjunct to the railway between Cedar Falls and the Iowa State Teachers College on Normal Hill and buses operated by a rival company.

Franchise Granted.—The franchise of the Tri-City Railway asking permission to operate its cars into Milan, Ill., without further hindrance was granted T. C. Roderick, general manager of the Illinois division, by the Milan village board of trustees in session. The franchise is for twenty years.

Elevated Will Be Continued.—Contrary to statements early in 1923 that the Public Utilities Department of Seattle planned to abandon the municipal elevated railway paralleling the waterfront, Superintendent of Railways D. W. Henderson states that the elevated will be continued in use, as at present. In order to reroute the cars so as to abandon the elevated, it would be necessary to build a long trestle, an expensive structure for which the Seattle Municipal Railway has no funds available at present.

Must Explain Failure to Build.—The Wisconsin Railroad Commission, concerned at the thirteen years' delay of the Milwaukee Western Electric Railway to begin construction of its proposed electric railway from Milwaukee to Beaver Dam and from Sussex to Waukesha, has requested executives of the company to appear before the commission at a hearing to present facts, plans and other data involving the building of this line. Certificates granting permission to begin construction and operation of the line were issued in 1910.

Would Reconsider Roof Erection.—The City Council of Youngstown recently passed and later voted to reconsider a resolution authorizing the Pennsylvania-Ohio Electric Company to increase its capital stock to permit the erection of roofs on the loading platforms in Central Square. Council President Backus announced that he had not signed the ordinance because he believed it contained no provision for a decrease in capital stock if later the platforms should be removed. Commissioner Engle added that according to the franchise such increases remain permanent. The amount involved is $3,000.

Will Investigate Accidents.—John P. Stouch, former city commissioner and city controller, has been named as investigator of accidents, in the claims department of the Altoona & Logan Valley Electric Railway, operating in Altoona, Tyrone and Hollidaysburg. The position is a newly created one. Mr. Stouch will investigate all reports, taking over that branch of the work handled by Attorney Samuel B. Hare.

Hearing on Shawmut Branch.—The Public Utilities Commission by an act of this year's Legislature held a hearing recently to determine what price, not exceeding $1,000,000, the city of Boston should pay the New York, New Haven & Hartford Railroad for the tracks, roadbed and other equipment of the Shawmut Branch. The act provides for the purchase by the city of the Shawmut Branch in connection with the new rapid transit extension in Dorchester, which, it is estimated, will cost about $4,000,000. This extension has been referred to previously in these columns. Attorney Joseph P. Lyons, assistant corporation counsel for the city, who attended the hearing, said the city in financing the project would make a profit because the act provided that the Boston Elevated, which is to use the tracks, shall rent the property from the city and shall pay one-half of 1 per cent more than the city pays in interest on the bonds, this amount to be placed in sinking funds and used to pay off the bonds. The city, according to Mr. Lyons, would therefore ultimately get its money back and still own the branch.

Foreign News

Progress Slow on Central American Property

During 1922 some progress was made on the Government railway (Ferrocarril de los Altos) to connect Quezaltenango with the International Railways of Central America at San Felipe. Work was begun on this railway several years ago, but because of the war, the difficult engineering problems involved, and heavy construction costs, progress has been very slow. The motive force is to be electricity. The electric equipment and railway material are being purchased in Germany.

Trolley System as Auxiliary in Salvador

It is proposed to install a trolley system to replace the storage-battery cars now running on the main line of the International Railways of Central America, Salvador Division. This trolley system will be used merely for trips through the main streets of the city of San Salvador to and from the station.

Electrification Progress in London District

Electrification plans of the Southern Railway of England are progressing and construction work is now being begun. This company is a consolidation under the railways act of 1921 of the London & Southwestern Railway, the London, Brighton & South Coast Railway and the Southeastern & Chatham Railway. Each of these companies had electrification schemes for its suburban lines leading out of London, the first two for extensions and the Southeastern for an initial installation.

The accompanying map shows the extent of the electrification ordered. On the southwestern section, formerly the London & Southwestern Railway, plans have been approved for the extension of the electrification to Guildford and Dorking. This work, along with that on the other sections, will cost about £5,000,000, and it is intended that it will be completed by the end of 1925. The arrangements will provide for carrying on the electrified lines 200,000,000 passengers per annum.

Altogether the Southern Railway now has 85 miles of route and 248 miles of track of electrified lines. This will be increased to 145 miles of route involving 358 miles of single track.

The following figures give the estimated cost of the electrification.

LONDON, BRIGHTON & SOUTH COAST SECTION	
Line equipment	£276,600
Motors and trailers	395,000
SOUTHEASTERN SECTION	
Conductors and rails	£786,000
Electric equipment of rolling stock	730,000
Substations and d.c. feeders	720,000
Conductor rails and track bonding	515,000
Electric light and supply system	200,000
High-tension feeders	315,000
Repairs to stations	300,000
New car sheds	100,000
Repair and inspection shops	110,000
Signaling, permanent way, drainage, etc.	324,000
SOUTHWESTERN SECTION	
Extension to Guildford and Dorking	£840,000

The "Underground" Extension to Hendon

The London Electric Railways has opened its extension from Golders Green to Henden, Central, together with an intermediate station at Brent. The new portion of railway is 1.63 miles in length. The work includes, in addition to the two new stations at Brent and Hendon, an enlargement of the Golders Green Station, a fine girder bridge across the Golders Green Road, and a viaduct, 30 ft. high, over the River Brent. An extension, 3.05 miles in length, is also under construction forward to Edgware, with intermediate stations at Colindale, 1.31 miles, and at Burnt Oak, 2.21 miles from Hendon. From the terminus at Edgware to that at Clapham Common will be 16.44 miles, which will be covered, without any change of carriage, in 49 minutes.

Line Under Construction in Bolivia

An electric line in Bolivia, 56 miles in length, is under construction. It will extend from the town of Cochabamba toward Chemore.

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Financial and Corporate

Reorganization Affairs Reviewed

Committees Representing Kansas City Railways Holders Issue Appeals and Consider Prospects

A circular dated Dec. 8 has been addressed to the noteholders of the Kansas City Railways to inform such holders regarding the status of affairs of the Kansas City Railways. Accompanying the circular is a preliminary report of the reorganization committee. It is explained that the reorganization committee was formed recently through action taken by the committee representing the noteholders and by the committee representing holders of first mortgage bonds.

The membership of this committee is composed as follows: Melvin A. Traylor, president of the First Trust & Savings Bank, Chicago, chairman; H. L. Stuart, Halsey, Stuart & Company, Inc., Chicago; J. K. Newman, Newman, Saunders & Company, Inc., New York; J. F. Downing, president of the New England National Bank, Kansas City, Mo., and P. W. Goebel, president of the Liberty National Bank, Kansas City, Mo., and the Commercial National Bank, Kansas City, Kan.

Committee Reports Progress

The reorganization committee explains that it is doing everything possible to expedite reorganization. It says that it has made a tentative settlement of the litigation, controversies and claims arising as a result of personal injuries and damages prior to the receivership. This settlement contemplates that a plan of reorganization will be submitted in the near future for approval by the various security holders and other creditors. The committee says, however, that in the event an adjustment of the various claims against the company is not secured the first mortgage upon the property will be foreclosed.

So far as the operation of the property is concerned, the committee explains that for the first ten months of 1923 the total income from all sources was practically the same as for the similar period of 1922. Net earnings, however, showed an increase. Revenue passengers for the first ten months of 1923 numbered 112,436,921, as compared with 112,325,578 for the first ten months of 1922. In view of the very intense jitney competition at the commencement of the receivership, the elimination of the jitney as a factor in transportation at Kansas City is regarded as a very important accomplishment.

On Dec. 7 the holders of the second mortgage bonds, Series A and B, of the Kansas City Railways were addressed in regard to the affairs of the company. At the suggestion of a number of holders of these bonds a committee has been organized consisting of Eugene V. R. Thayer, New York, chairman; Frederick J. Horne, vice-president of the New York Trust Company, and H. P. Wright, H. P. Wright Investment Company, Kansas City.

The original protective committee represented all issues of the funded debt. As the circular to the holders of the second mortgage bonds explains, there were apparent certain conflicts of interest between the issues of securities represented with the effect that the protective committee found it advisable to discontinue representing the bond-secured notes and the second mortgage bonds. The original committee, changed somewhat as to personnel, continued to represent the first mortgage bonds. A separate committee was formed to represent the noteholders. No committee was formed at the time to represent the second mortgage holders. In making its plea for deposits the committee representing the second mortgage holders said:

> Recently, in anticipation of a reorganization, the committees representing the first mortgage bondholders and the secured noteholders appointed from their number a joint reorganization committee. This committee has entered into negotiation with various classes of creditors claiming priority, including the personal injury judgment creditors and claimants, in an attempt to work out an amicable solution of the controversies and accomplish a reorganization without the delays and expense incident to final judicial determination of the issues involved in the litigation. Conditional agreements have been arrived at between certain of the interests. The court has indicated a desire, and it is obviously essential, that representatives of the second mortgage bondholders be constituted and empowered to negotiate and, if found advisable, conclude amicable agreement with reference to the second mortgage bonds, or, as an alternative, to continue the litigation if need be.

As has been indicated previously in the ELECTRIC RAILWAY JOURNAL, the court has set Dec. 27 as the day for hearing and passing upon such agreements as may have been made between the various claimants and has stated that, in the event substantial progress toward amicable adjustment has not been made at that time, the matter will be set down for judicial determination on Jan. 7.

Receiver's Duties Extended

A. L. Reynolds, general manager of the Washington-Virginia Railway, has been appointed receiver for the property of the company in the District of Columbia by Justice Hitz in the District Supreme Court. Mr. Reynolds had previously been appointed receiver for the company in Virginia by Judge Brent in Circuit Court at Fairfax.

Provides for Expansion

United Light & Railways Company Arranges for Larger Capitalization —Special Dividends Declared

Changes in the corporate structure of the United Light & Railways Company, Grand Rapids, Mich., to provide for prospective growth and development have been announced.

At the present time the combined debt and capital stock of the company, at face value, total $55,917,253, the capitalization of outstanding stock of the United Light and subsidiary companies in the hands of the public amounting to $23,120,453 and the fixed debt totaling $32,796,800. The new capitalization will be "substantially larger," it is announced.

The corporate title of the new company will be the United Light & Power Company. It will be organized under the laws of Maryland. The present company is a Delaware corporation. Elimination of inheritance taxes for non-resident stockholders, issuance of stocks of no par value, and distribution of more profitable securities to stockholders are listed as some of the major advantages of the new plan.

All of the assets of the old company, subject to mortgage liens and indebtedness, will be sold to the new United Light & Power Company, and the securities of the latter will be distributed in equitable proportion, according to classes and preferences, to the stockholders of the United Light & Railways Company, the present corporation.

It is announced in the same connection that the old company will acquire in the near future all of the common capital stock of the Iowa Electric Power Company, which will construct, own and operate a large power plant on the west bank of the Mississippi near Davenport, Iowa. Erection of this power station has already been announced in this publication.

The Grand Rapids, Grand Haven & Muskegon Railway, the Mason City & Clear Lake Railroad and the Tri-City Railway are among the railways controlled by the company.

Dividend Declarations Announced

At a meeting of the board of directors of the United Light & Railways Dec. 6 the regular quarterly dividend of 1½ per cent was declared on the first preferred stock of the company, payable Jan. 2.

There was also declared the regular quarterly dividend of 1¾ per cent on the participating preferred stock of the company, payable Jan. 2. A special dividend of one-quarter of 1 per cent on the participating preferred stock, payable Jan. 2, 1924, was declared at the board meeting which was held on March 8 last.

There was also declared the regular quarterly dividend of 1¼ per cent and an extra cash dividend of three-quarters of 1 per cent on the common stock of the company, payable on Feb. 1, 1924, to common stock holders.

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Selling Stock Part of Employee's Job in Quincy and Peoria

All divisions of the Illinois Power & Light Corporation, Chicago, are actively engaged in the campaign for selling the 7 per cent preferred stock which is being offered only in the State of Illinois. Large cards advertising this stock will be placed in the interurban cars, and folders describing the stock and how it may be purchased will be carried in all the cars. The cars in Peoria and Quincy are now carrying front-end banners reading "7 37/100 per cent with Safety—Ask the Conductor." Here it is that the conductor has the advantage of explaining in detail how it is possible to invest in the preferred stock of the Illinois Power & Light Corporation on a basis that gives a liberal and regular return. In many cases, according to "Current Topics," the official publication of the company, sales of stock have been traced directly to the conductor. This method of advertising is being used in Peoria and Quincy first, as these divisions furnish transportation service only and the employees there do not have the advantage of talking to their customers over the counter as do the employees of the electric and gas properties. Employees of the Illinois Power & Light Corporation are still privileged to buy its 7 per cent preferred stock on the same basis that has prevailed since the stock was first offered. Up to the present time about 61 per cent of the members of the company family are owners of the securities of their company.

Increase in Passengers Carried in Baltimore

The Industrial Bureau of the Board of Trade, Baltimore, has issued a report showing the number of passengers carried by the United Railways & Electric Company, Baltimore, for the first ten months of 1923 as compared with the corresponding period of 1922. The report follows:

	1923	1922
First six months	119,847,962	115,160,811
July	19,701,606	19,653,996
August	19,377,492	19,379,492
September	19,143,158	19,346,983
October	20,586,863	20,360,456
	198,657,081	193,901,738

Interurban Reorganization in Michigan Completed

Reorganization of the interurban system connecting Jackson, Lansing, Battle Creek and Kalamazoo, Mich., has been completed, according to announcement made on Dec. 10 by the reorganization committee. The system was formerly owned by the Michigan United Railways, which went into receivership in December, 1922. Former holders of the bonds of the Michigan United Railways are receiving under the reorganization plan $500 face amount of the bonds of the new company and $600 par value of its Class A preferred stock for each $1,000 face amount of the old bonds. Holders of debentures and preferred stock of the predecessor company are entitled to participate in the issue of Class C preferred stock of the new company.

As has been indicated before in the ELECTRIC RAILWAY JOURNAL, John F. Collins, the Federal receiver, will be operating manager of the Michigan Electric Railway, the successor company.

Auction Sales in New York

At the public auction rooms of A. H. Muller & Sons there were sold on Dec. 12 the following securities:

200 shares of Tennessee Electric Power, second preferred, $47 per share.
$55,000 of Boise & Interurban Railway first mortgage 5 per cent gold bonds, $100 lot.
200 shares Interborough Consolidated, $1 lot
100 shares Interborough Consolidated Corporation, preferred, $7 lot.

Court Suggests Settlement of Mortgage Liens.—Judge Moynihan in the Circuit Court at Detroit, Mich., has handed down a decision that an allocation of responsibility between the city and Detroit United Railway must take place for the purpose of settling a $5,000,000 mortgage executed by the railway with a number of trust companies Jan. 24, 1922. The mortgage is one of a number of liens on the city lines of the Detroit United Railway when the latter were purchased by the city. Judge Moynihan invited attorneys for the city and the company to come before the court and agree to an equitable solution of the difficulty.

Loss Sustained.—The Dubuque Electric Company, Dubuque, Iowa, in the operation of its traction lines sustained a loss for operations during 1922 and 1923. Although figures show a book profit depreciation, replacement and other costs have not been figured. According to the report, the gross operating revenue in the railway department for the twelve-month period ended Oct. 31 last, was $368,392, with total operating expenses of $357,150.

Receiver Appointed.—Fred Alderman has been named receiver for the Hocking-Sunday Creek Traction Company, Nelsonville, Ohio. Mr. Alderman is an Athens, Ohio, banker.

More Lighting Properties Taken Over by Chicago Interests.—Properties of ten operating Missouri public utility companies in the central part of the state have been acquired by the newly organized Missouri Power & Light Company, Mexico, Mo., the common stock of which is owned by the North American Light & Power Company. The North American Light & Power Company is closely associated with the Illinois Power & Light Corporation in the ownership and management of public utility properties in Illinois, Missouri, Iowa, Kansas, Nebraska and Oklahoma. Another Illinois public utility property, that of the Monmouth Public Service Company, Monmouth, Ill., has been purchased by the Illinois Power & Light Corporation.

Another Hearing on Abandonment.—A further hearing will be held before Commissioner Pooley at Buffalo on Dec. 17 in the matter of the application of the International Railway for approval of a declaration of abandonment of part of its line in Niagara Falls.

Faces New Problem.—A new problem in finance confronts the Boston Elevated Railway. Having taken over the West End Street Railway, which formerly constituted the surface lines as distinct from the elevated lines of the company, it is now trying to fund some of the indebtedness and encounters a peculiar limitation. Under the laws of Massachusetts the Elevated can issue bonds equal to the stock plus the premiums paid into the treasury in connection with the sale of stock; but now it develops that the Elevated cannot issue bonds against the premiums that were paid in connection with the issuance of West End Street Railway stock. In the early days of railway operations in Boston high premiums were paid for both Elevated and West End stock, and if the Elevated today were permitted to take advantage of the West End premiums it could issue new bonds. The Elevated board of public trustees has petitioned the Legislature for legislation to remedy this situation.

Elected to Executive Board.—Travis H. Whitney, the Transit Commission representative on the board of directors of the Brooklyn-Manhattan Transit Corporation, has been elected a member of the corporation's executive committee.

Extra Common Dividend Declared by Canadian Road.—The Ottawa Traction Company, Ottawa, Ont., has declared an extra dividend of 2 per cent in addition to the regular quarterly dividend of 1 per cent, both payable Jan. 2, to stock of record Dec. 15. The stock is all of one class.

Mortgage Gold Bonds Offered. — A syndicate, headed by Harris, Forbes & Company, New York, N. Y., is offering $8,500,000 of the Northern States Power Company first lien and general mortgage gold bonds, known as series A 6 per cent. The bonds are offered at 97½ and interest, yielding about 6.20 per cent. They are dated Nov. 1, 1923 and are due Nov. 1, 1948. Upon completion of the present financing the company will control practically all of the common stock of the Wisconsin-Minnesota Light & Power Company.

Foreclosure Action Against Interurban Averted.—Possible legal action by bondholders against the Oregon Electric Railway, operating in the Willamette Valley in Oregon, whose earnings have been below operating expenses, has again been averted by the announcement of the parent company, the Great Northern and the Northern Pacific, that the semi-annual interest due Nov. 1 on the $2,000,000 of outstanding 5 per cent first mortgage bonds would be paid. The bond interest is $50,000. The deficit for the current year is estimated by W. F. Turner, president of the Spokane, Portland & Seattle Railroad, the holding corporation, at $300,000.

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Traffic and Transportation

Startling Station Statistics

More Than 53,000,000 Fares Collected at Times Square Station in New York in One Year

The rapid transit traffic center of New York is for the first time at an uptown point. It has shifted to Times Square from Brooklyn Bridge during the past fiscal year. According to figures compiled by the Transit Commission from the reports of traffic at the various stations on the lines of the Interborough and B.-M. T. systems, the number of rapid transit fares collected at the Times Square stations went ahead of the number at the downtown traffic center by nearly 1,250,000. The figures just compiled are for the fiscal year ended June 30 last.

The fares collected at the Times Square station during the year were 53,835,135, as against 49,036,746 in 1922. At the Brooklyn Bridge center there were 52,613,113 passengers, as against 51,758,609 the year previous. Thus Times Square, with a gain of 4,798,389 passengers, forged ahead of the Brooklyn Bridge center, which gained only 824,504 passengers. The Times Square figures, moreover, include the fare collections only at the stations of the Interborough West Side subway and at the Broadway B.-M. T. stations, while at the Brooklyn Bridge the figures include collections for the Brooklyn elevated lines at the City Hall station of the Second and Third Avenue elevated lines, at the Brooklyn Bridge station of the Interborough East Side subway and at the B.-M. T. terminal beneath the Municipal Building.

Of the fares collected at Times Square, 34,678,063 represented traffic to the Interborough, and 19,157,072 to the B.-M. T. Incidentally, these figures show that these two stations are the largest from the standpoint of passenger traffic upon either of the individual systems. The Interborough traffic represented an increase of 2,711,826, while that on the B.-M. T. showed a gain of 2,086,563. Up to two years ago the traffic on the Interborough at Times Square was practically equal to that at Grand Central Station. While it has grown at the latter point, it has not grown at the rate which marked the increase at Times Square. The great bulk of the B.-M. T. line traffic has been developed in a little less than six years, the B.-M. T. station having been first placed in service on Jan. 5, 1918. The present Times Square station of the Interborough was opened to traffic on Aug. 2, 1918. The fare collections of both systems at Times Square were greater than those upon the entire length of several of the branches of both systems, exceeding for instance, combined totals of stations on the Queensboro subway, the Pelham Bay Park Branch, the Jerome Avenue Branch and the Lenox Branch on the Interborough, and of several of the elevated and subway branches of the Brooklyn system.

Among the important Brooklyn traffic centers, together with the figures of passengers, are the following:

ATLANTIC AVENUE	
I. R. T. Atlantic Ave. Station	15,620,943
B.-M. T. Pacific Street Station	7,555,989
B.-M. T. Atlantic Ave. (Brighton Line) Station	2,050,452
B.-M. T. Atlantic Ave. "L" Station	1,581,205
	26,808,589
FLATBUSH AVENUE—FULTON STREET	
B.-M. T. Dekalb Ave. Station	10,681,184
I. R. T. Nevins St. Station	8,918,708
B.-M. T. Fulton St. Line Station	3,125,835
B.-M. T. Fifth Avenue "L" Line Station	1,496,376
	24,222,103
BOROUGH HALL	
I. R. T. Station	13,467,607
B.-M. T. Court St. Station	4,343,488
B.-M. T. Boerum Pl. "L" Station	1,143,919
B.-M. T. Myrtle Ave.-Court St. "L" Station	964,081
	19,919,095

Of the above stations, Atlantic Avenue gained approximately 641,000 over last year; Flatbush Avenue and Fulton Street about 1,665,000, and Borough Hall about 450,000.

The most important stations, from the standpoint of traffic, on the Interborough system are the following, with the figures of fares collected in both the fiscal years 1922 and 1923:

	1923	1922
Times Square	34,678,063	31,966,237
Grand Central	33,137,199	29,938,128
Penn. Station	27,772,768	25,009,851
14th St. (E. S. subway)	18,430,910	16,966,522
Atlantic Avenue	15,620,943	15,545,431
Brooklyn Bridge	15,162,584	14,984,289
Borough Hall	13,467,607	13,845,912
Fulton St. (E. S. subway)	13,663,465	13,530,045
14th St. (W. S. subway)	11,840,502	10,949,399
86th St. (E. S. subway)	10,516,093	10,266,701

The most important stations on the B.-M. T. subway and elevated lines are as follows:

	1923	1922
Times Square	19,157,072	17,070,509
34th Street	16,434,286	14,723,077
Union Square	15,936,475	14,721,993
Coney Island Terminal	14,908,399	13,868,226
Brooklyn Bridge ("L")	13,886,717	13,908,471
Chambers Street	13,808,395	13,238,249
Essex Street	11,776,459	11,126,708
Cortlandt Street	11,459,474	10,466,274
DeKalb Avenue	10,681,184	9,552,077

The total Interborough subway traffic last year was 676,650,431, a gain of 31,674,957, while the elevated traffic was 348,524,700, a gain of 7,484. The total B.-M. T traffic, which is not segregated as to subway and elevated lines, on account of joint operation, was 480,900,869, a gain of 36,153,641.

Taxpayer Wants Cincinnati Fare Kept to Five Cents

Raising the new point that the Cincinnati Traction Company could not be permitted by the city of Cincinnati to charge more than a 5-cent fare, Attorney Robert S. Alcorn, as a taxpayer, has filed suit in the Hamilton County Superior Court against the traction company seeking to enjoin it from charging the present rate of fare, which is 8 cents, or any fare other than the 5-cent fare stipulated in the enabling act which was passed by the Ohio State Legislature and under which the railway system was leased to the traction company by the Cincinnati Street Railway.

At the time the lease was made the Cincinnati Street Railway had no other authority than was contained in the act, the petition declares, and it further sets up that no other authority different from that contained in the act ever has been procured or enacted by the Ohio Legislature. For this reason, Attorney Alcorn contends the Cincinnati Traction Company now can have no authority to charge more than the maximum fare charged by the Cincinnati Street Railway, its lessor, which was 5 cents for a continuous ride in the same direction.

It is the contention of Attorney Alcorn that, notwithstanding the city ordinances passed by Council under which the Cincinnati Traction Company increased its rate of fare the traction company could receive no authority so to do, because of the fact that such acts by the Council were inconsistent with the enabling legislation by the state, which never has been changed, he avers. Attorney Alcorn asks that the court enjoin collection of more than a 5-cent fare from passengers. City Solicitor Saul Zielonka was asked to bring the suit, but refused, Alcorn says.

Preliminary reports of the Cincinnati Traction Company for the months of October and November indicate the receipts of the company will not equal the amount necessary to meet the various items of the service-at-cost franchise, and that another increase of one-half-cent in fares is in prospect, Jan. 1. This will make the rate of fare 8½ cents. If the increase is determined upon—and that appears probable—official notice of the increase will be posted by the traction company on Dec. 15.

Railway at Youngstown Protests Jitney Licenses

The Youngstown Municipal Railway filed a protest on Dec. 4 with the Public Utilities Commission against the issuing of certificates under the new motor bus law to sixty Youngstown operators of "jitneys" who have made application for authority to operate. The applications are set for hearing Dec. 12.

Ross Raymond, head of the jitney men, filed the applications in Columbus. He is to file other applications

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within a few days that will bring the number of jitneys licensed by the State to operate in Youngstown above the 100 mark, if the applications are granted.

The commission recently refused to grant Mr. Raymond a blanket franchise for all the jitneys and instructed him to make separate application for each.

The ordinance prohibiting jitneys from entering the congested district was passed by City Council of Youngstown Dec. 3 as an emergency measure.

Councilman Parrock fathered the ordinance at the request of Street Railway Commissioner Engle, who said that the "jitneys must go if the street railway is to exist."

The ordinance provides for a fine of not less than $5 or more than $10 for the first conviction and from $10 to $25 for subsequent convictions.

Allentown Employees Give Advice to Auto Driver and Owner

The Lehigh Valley Transit Company, Allentown, Pa., through its general safety committee is carrying on a campaign for the reduction of accidents between automobiles and its cars. The general safety committee called on patrons who owned and drove automobiles and talked to citizens relative to highway accidents in order that cooperation could be had between the drivers of automobiles and the trainmen of the transit company. This committee is composed of motormen and conductors of the Lehigh Valley Transit Company, who have compiled a few thoughts which they have printed in pamphlet form and are distributing to auto owners and drivers. The pamphlet gives in detail statistics of grade crossing accidents and general news of automobile accidents. It warns against careless driving especially in the coming holiday season. The pamphlet states that the committee is trying to do its part and is urging Mr. Auto Owner and Auto Driver to do their part. In the opinion of the committee 99 per cent of all accidents could be eliminated by respect for the rights of others and strict observance of road rules.

Another Employer in New York Staggers Hours

In an attempt to "stagger the peak" of subway traffic congestion, the Brooklyn Edison Company announced on Dec. 11 that it had reorganized the schedule of 1,000 employees in the office of its auditing department at the main office in Pearl Street, Brooklyn, so that they would arrive at work at 8:30 and 8:45 a.m. instead of 9 o'clock. If the system shows beneficial results it will be extended to all the 6,000 employees of the company. This is the third instance of a large business organization in New York City following the recommendation of the Transit Commission for improving transit traffic conditions pending the construction of new subways The others are the Texas Company and Corn Products Refining Company.

Special Christmas Shoppers' Service Put On by Chicago Elevated

Special express service throughout the day for the convenience of Christmas shoppers was started on all of the divisions of the Chicago Elevated Railroads early in December. This service is designed to encourage use of the elevated during the shopping period and is made particularly convenient by operating these trains around the loop structure which embraces the heart of the shopping district.

Time-tables announcing the new service have been distributed at all elevated stations and have stimulated travel during the non-rush periods. The "Shoppers' Specials" are scheduled from 9:18 a.m. to 4:13 inbound and 9.55 to 4.50 outbound. They carry conspicuous signs at the front ends of the trains. On the backs of the time cards is printed an announcement of the new service and a list of the benefits to be derived by the public.

Safety Order Effective. — Accepting the proposition made voluntarily by the Rockford & Interurban Railway, designed as a safety measure to protect auto traffic at dangerous crossings, the Wisconsin Railroad Commission will enter an order effective at once requiring all interurban cars running between Beloit and Janesville to slow down to 5 miles an hour within 100 ft. of the town line bridge and after sundown to stop at points where the tracks cross the adjoining concrete highway.

Fares Increased. — The Mississippi Valley Electric Company operating in Iowa City with both trolley and buses, recently increased its fare from 5 cents to 7 cents, according to J. O. Schulze, president. No opposition to the increase was entered by the city or by citizens.

More Truck Lines for D. U. R.—The Detroit United Railway has organized the Detroit United Railway Trucking Company to operate between Jackson and Sturgis, Mich. The truck line will serve as a feeder for the electric lines, connecting with them at Jackson. It will afford freight service to and from Detroit to a territory which has hitherto been difficult to reach.

Will Hear Increased Fare Request.—The State Railroad Commission of Florida, will hear in the City Council chamber of Jacksonville, on Dec. 17 the petition of the Jacksonville Traction Company for an increase in fares. The company now charges 7 cents for fares in the city, with concessions to school children. It does not ask for any fixed increase.

Additional Parlor Train Car in Service. — The Milwaukee Northern Railway placed in service recently an additional parlor train car between Sheboygan and Milwaukee, which is known as the "Sheboygan Limited." It will be a sister car to the one that is now running as the "Lake Shore Limited."

Fare Bills Appear at Washington.—Bills have again begun to appear in Congress directed against the local railways operating in the District of Columbia. A bill by Mr. McKellar, referred to the committee on the District of Columbia, would prohibit the local Public Utilities Commission from fixing rates of fare for the street railways of the District in excess of those that are stipulated in their charters. A bill introduced in the House would provide one-half fare for children riding on the street railways within the District of Columbia, "and for other purposes."

Veiled Prophet Brings Business.—All previous records for the United Railways, St. Louis, were broken on Oct. 2, the day of the visit of the Veiled Prophet to that city, when 1,007,615 revenue passengers were hauled, and the receipts totaled $70,533. In addition there was 869 children's fares and 473,674 transfer passengers, the grand total being 1,482,158 passengers. A total of 1,465 cars was in service, twenty-eight more than were put into service on a similar occasion last year. There were no serious accidents on the record day. The previous record was set on Oct. 5, 1920, when the gross receipts were $69,595. On that occasion a visit of the Veiled Prophet again brought out the record business.

Will Readjust Zones. — Despite the fact that the Virginia State Corporation Commission granted it permission to increase its revenue by 5 per cent on the Richmond-Petersburg Interurban line, General Manager John E. Harvell of the Richmond division of the Virginia Railway & Power Company stated recently that no increase in fares would go into effect, but that a readjustment of zones would be substituted. He said that in accordance with the orders of the commission the company would arrange to correct what the commission considered inequalities in the fare zones by making the mileage of the respective zones more uniform. Further, he stated that the company would simplify its commutation tickets by issuing only one form or one fifty-trip book. Heretofore the company issued four different kinds of tickets, and five different kinds of books. The changes go into effect Dec. 16.

Eight-Cent Fare Continued. — The Nebraska State Railway Commission has continued indefinitely the 8-cent fare on the lines of the Lincoln Traction Company and fixed a valuation of $2,824,000 for the company's property. The valuation is about $100,000 less than the total outstanding capitalization of the company.

Another Aid to Safety.—The Portland Railway, Light & Power Company, Portland, Ore., has placed safety islands, made of strong timbers, at various points along congested street railway lines, with the view of lessening traffic congestion at these points, and adding to the safety of the patrons of the lines it operates.

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Personal Items

Barron Collier Subject of Magazine Sketch

Barron Collier is the subject of a personal sketch in a recent issue of the *National Magazine* which brings out forcefully the multifarious activities of the man. The work of Mr. Collier in the railway field is too well known to need reiteration here. Except to his intimates, however, it appears unlikely that all the various activities and interests of the man are known. Mr. Collier was born in Memphis, Tenn., in 1873, and there laid the foundation for the present nationally known Collier service. Some pertinent quotations from the article follow:

"One of the most graphic, dynamic charts of the business of the United States is the great panoramic display in the street cars containing the Collier advertisements. These cars run night and day. Think of it, 50,000 cars—and there are some advertisers who appear in these cars continuously.

"Barron Collier sees things quickly and acts decisively and works as hard in public service, without salary, as in his own business.

"A small list of his activities today would cover a page or two of 'Who's Who.'

"Mr. Collier owns, among other great properties, famous Luna Park, the most original place of amusement in the world.

"American to the core, he has been pointed out as a true type of one of the eminently successful men in this great age of business expansion primarily through the magic of advertising.

"The genius of Barron Collier as an executive is reflected in his talents as a toastmaster and entertainer.

"It is recognized, even in the swirl of busy activities in New York, that Barron Collier is about the busiest man in the metropolis. He seems to have a masterful grasp of what to do today to make things go on tomorrow."

In conclusion the writer says that all the multifarious Collier activities keep right on moving and developing under the magic and forceful leadership of Mr. Collier, who, after all is said and done, "is just a great, big human, full of the spirit of constructive helpfulness for his fellowmen."

C. A. Brooks Manager Again in Poughkeepsie

Charles A. Brooks has again been made manager of the Poughkeepsie City & Wappingers Falls Electric Railway, Poughkeepsie, N. Y., from which position he resigned about a year ago to go into the automobile business. He succeeds the late R. J. Morrisson. Mr. Brooks is well acquainted in the territory served by the company with which he has again become identified. It was a little more than ten years ago that he entered its employ. Prior to that time he had been engaged in similar activity with the Third Avenue Railway, the South Shore Traction Company and on properties in the Central West.

F. R. Phillips Heads Pennsylvania Association

Official of Pittsburgh Railways Elected President at Meeting in Harrisburg on Dec. 4

F. R. Phillips, acting general manager of the Pittsburgh Railways, was elected president of the Pennsylvania Street Railway Association at the meeting held in Harrisburg on Dec. 4. Mr. Phillips was formerly superintendent of equipment of the Pittsburgh Railways. This position he held from 1910 until July, 1923, when he was appointed to succeed the late P. N. Jones. Before

F. R. Phillips

going to Pittsburgh Mr. Phillips was master mechanic of the Cleveland Railway. He entered the employ of that company in 1894 after leaving high school in Cleveland. When the Cleveland City Railway and the Cleveland Electric Railway were consolidated in 1903 as the Cleveland Electric Railway Mr. Phillips accepted the position of master mechanic of the Cincinnati, Newport & Covington Railway. Subsequently, he became chief engineer in charge of all but the transportation department of the Michigan United Railway, in Lansing. In 1906 Mr. Phillips entered the employ of the Ohio Brass Company, Mansfield, as designing engineer in charge of railway overhead work, and made a study for that company of the electric railway conditions of most of the large cities of the United States east of the Mississippi River. In July, 1908 he became master mechanic of the Cleveland Traction Company, in charge of buildings, shops and equipment. Mr. Phillips is the inventor of a number of railway devices and has appeared before several railway commissions as an expert.

Mr. Phillips has been very active in the activities of the American Electric Railway Engineering Association, serving not only as a member of committees but as chairman of important committees. From 1916 to 1919 he was president of the Engineering Association. During 1922-1923 he served as a member of the committee on standards and also as a member of the special committee to study methods of voting on standards on the unit basis.

Obituary

Sir William Mackenzie

Sir William Mackenzie, one of Canada's empire builders, died in Toronto on Dec. 5. Sir William's name is inseparably linked with the building of both the Canadian Pacific and the Canadian Northern Railroads. He was one of the foremost Canadian promoters of electric railway, light and power companies. For thirty years he was head of the Toronto Railway.

He was also one of the promoters of utility enterprises in South America and had a large interest in the Brazilian Traction, Light & Power Company, which operates the tramway and power properties at São Paulo and Rio de Janeiro. Sir William was also interested in the Winnipeg Electric Railway and was a director of the Shawinigan Water & Power Company and the Canadian General Electric Company. He was president of the Monterey (Mexico) Railway, Light & Power Company for years. He was the senior partner of the well-known building firm of Mackenzie & Mann. With the changes wrought by the war Sir William was forced, as he grew older, to drop many of his responsibilities and the chief enterprises in Canada with which he had been concerned passed to others and the group of so-called Mackenzie financiers was dissolved. Sir William was born in Kirkfield, Ont., in 1849.

William V. Brumby, head of the publicity department of the United Railways, St. Louis, Mo., died in St. Louis, of pneumonia, on Dec. 7. As head of the publicity department of the railway for the last six years, Mr. Brumby was editor of the *United Railways Bulletin* and also *Trolleygrams*, published periodically by the company, to keep its patrons advised of company activities, etc. For a time he was also editor of *Know St. Louis*, a weekly journal dedicated to boosting St. Louis. Prior to his connection with the United Railways, Mr. Brumby was city editor of the St. Louis *Republic* and later was managing editor of the St. Louis *Star*. He was born in Atlanta, Ga., forty-seven years ago and had resided in St. Louis about sixteen years. He was one of St. Louis' best known newspaper men.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Reconstruction in Japan

Rolling Stock in Tokio Is Being Replaced Rapidly by the Local Car Builders

Although no accurate statistical figures are yet available concerning the extent of the damage done by the recent earthquake to the Japanese railways the report of American engineers who were in the country at that time gives a rough idea of the resulting destruction. In the municipality of Tokio there were formerly about 2,500 electric railway cars. The rolling stock was being added to at the rate of approximately 200 cars a year, of which two-thirds were double-truck cars and one-third single truck. It is said that upwards of 1,000 cars were destroyed by the earthquake and the fire which followed it. Orders have already been placed for 500 new cars to replace those demolished. It is understood that these orders have been given to Japanese firms who will build the equipment in Japan. Only the air-brake material is being purchased in the United States, and the car bodies, trucks, motors, etc., all will be made in Japan.

In the Yokohama district even less is known concerning the extent of the damage and subsequent plans for replacement. It is likely, however, that practically all of the rolling stock was destroyed.

Electrification Work Will Probably Continue

A great deal of damage was also done to the Imperial Government Railway and its substations. Orders for the replacement of much of this material have already been given and described on these pages in the previous issues. It is expected that no change will be made on account of the catastrophe in the plans to continue the electrification work.

Just what effect the earthquake will have on plans for subway construction in Tokio is problematical. Before the calamity occurred, three companies had been organized to build subways in that district. Plans for financing this work had been almost completed and actual construction would probably have commenced within a short time. The earthquake, however, has focussed a great deal of engineering attention on the comparative merits of various types of construction in Japan. It seems doubtful whether the subway plans will be carried out until a careful study has been made to show how different structural designs withstand such shocks. If it is found that the usual methods of subway construction are unsuitable for conditions in Japan and that more expensive methods will have to be employed it may cause the curtailment or even the abandonment of the project.

Satisfactory Year for General Electric Predicted

According to latest available estimates, the General Electric Company at the end of the current year will have finished one of the most satisfactory years in its history with production at top speed and orders near to a record rate. The company should show at the end of the current year new orders booked well over $300,000,000 and goods billed of about $270,000,000. For the first half of the year new business reached the record volume of $164,000,000, easily exceeding production. Subsequent orders declined some 20 per cent, but of late an upward trend has taken place. More than $90,000,000 in unfilled orders will be carried into 1924 as compared with $76,000,000 this year. Working capital will be somewhat reduced compared with the approximate $180,000,000 at the close of 1922. Cash and government securities should amount to around $80,000,000 at the end of 1923, a reduction of $5,000,000 being explained by increased business and new plant construction. It is generally expected that the company's business will hold up at about the same level as this year. No recent large orders for railroad electrification have been placed, but several important railroads are contemplating electrification.

Price of Bituminous Coal Is Steady

No marked change has occurred in the price of bituminous coal at the mine during the past eight weeks. During this time the cost per ton has ranged between $2.20 and $2.25. Prior to that there was a steady decrease in price from an average of $3.66 per ton during the first quarter of the year to $2.66 for the second quarter and $2.41 for the third quarter.

The present price level is below that of any recent year. In 1922 the average for the first three months was $2.18 per ton but thereafter the price level was much higher, reaching the maximum of $5.35 during the third quarter. In 1921 the price ranged between $2.89 in the early part of the year and $2.31 in the latter part of the year. The average price for the year 1920 was $5.64 and for the year 1919 it was $2.59. It is interesting to compare the present price of $2.25 per ton with that of 1913, when bituminous coal at the mine cost $1.23.

Railways Are Buying Larger Trolley Wire

A somewhat general tendency to use trolley wire of larger diameter has been noticed by the Bridgeport Brass Company in its recent orders from electric railways. In the past the No. 00 size has been the wire in greatest demand, although the No. 0000 size has been used to some extent by the street railway systems in the larger cities, and the No. 0 wire has been in some demand for the smaller properties. Lately, however, the number of orders for No. 000 wire has shown a marked increase. The smaller sizes are still being bought for replacement work where such sizes are the standard and for lines where the traffic is very light. But for ordinary conditions of city service many railways seem now to require the larger sizes.

U. S. Economic Prosperity Certain

Analyzing the situation in the United States in regard to its susceptibility to the influence of European misfortunes, it would seem that this country is so strongly buttressed by its natural advantages and so largely self-contained as an economic and financial unit that it is likely to be comparatively immune from the serious conditions in other countries. This is the opinion of F. H. Sisson, vice-president of the Guaranty Trust Company, delivered in an address on the economic outlook in Europe before the Economic Club of New York. In referring to the United States foreign trade, which has the most direct interest, he said that when the markets in Great Britain and on the Continent were in normal activity they absorbed between 60 to 70 per cent of American exports. In comparison with pre-war averages of exports to Europe the volume of the present trade is not diminished, while the value has increased materially. Considering the extremely adverse conditions that have existed these facts indicate that the United States is likely to retain a fairly satisfactory volume of trade with the Continent. It was his belief that American economic stability was a fact. To emphasize this he pointed to the almost unlimited production of raw materials, food and manufactures.

Metal, Coal and Material Prices

Metals—New York	Dec. 11, 1923
Copper, electrolytic, cents per lb.	13.15
Copper wire base, cents per lb.	15.75
Lead, cents per lb.	7.25
Zinc, cents per lb.	6.61
Tin, Straits, cents per lb.	46.375
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.50
Somerset mine run, Boston, net tons	2.125
Pittsburgh mine run, Pittsburgh, net tons	2.05
Franklin, Ill., screenings, Chicago, net tons	1.70
Central, Ill., screenings, Chicago, net tons	1.45
Kansas screenings, Kansas City, net tons	2.00
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.65
Weatherproof wire base, N. Y., cents per lb.	17.00
Cement, Chicago net prices, without bags	$2.10
Linseed oil (5-bbl. lots), N. Y., per gal.	$0.94
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	11.25
Turpentine, (bbl. lots), N. Y., per gal.	$0.93

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Rolling Stock

Cleveland, Southwestern & Columbus Railway's twelve new lightweight interurban cars are equipped with four General Electric No. 265 35-hp. motors and single-end K-35 control with straight airbrake equipment and CP-27 compressors. The purchase was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 17.

General Electric Company, Schenectady, N. Y., has announced some of the details of the order received by it from the city of Detroit for 100 four-motor car equipments for use in new cars to be operated by the Municipal Railways of that city. They will be installed on Peter Witt double-truck type cars, duplicates of 250 such cars now in use. The order calls for No. 265 motors with K-35 single-end control and CP-27 compressors. Fifty complete air brake equipments were also ordered.

Morris County Traction Company, Morristown, N. J., suffered the loss of a car shed at Dover on Dec. 9 as the result of a fire which destroyed the building, two safety cars, two 400 class steel cars and three 310 class semi-convertible. One steel car and one snow sweeper were slightly damaged. There was also some damage done to the sand drying house. A storeroom containing a part of the regular supplies was also destroyed. The total loss of the building and supplies amounted to approximately $65,000, largely covered by insurance. Full service on the entire line was restored within three hours after the fire. No plans for replacement have been discussed.

Montreal & Southern Counties Railway, Montreal, Canada, ordered during 1923 one trailer for suburban use and one baggage car from the Ottawa Car Company.

Track and Line

Durham Public Service Company, Durham, N. C., during 1923 rebuilt 2,100 ft. of single track.

Lafayette Street Railway during 1923 built 1,500 ft. of track extension and rebuilt 832 ft.

Aurora, Elgin & Chicago Railroad, Fox River Division, rebuilt during 1923 3 miles of city track and 4½ miles of interurban track.

Cincinnati Traction Company during 1923 built 5,764 ft. of track extension and rebuilt 24,254 ft.

El Paso Electric Railway, El Paso, Tex., will complete shortly the laying of new steel on the Sheldon "loop." The new steel cost $70 a ton for ordinary and $300 to $400 a ton for special work. About $19,000 was spent on special work steel.

Clinton, Davenport & Muscatine Railway, Davenport, Iowa, has received authority to lay a service track over the combined tracks and right-of-way of the Burlington, Milwaukee and Davenport, Rock Island & Northwestern Railroads east of Davenport in order to ship in materials for the new $12,000,000 superpower plant which the United Light & Railways company is erecting at that point. The Clinton, Davenport & Muscatine Railway is a subsidiary of the United Light.

Iowa City Electric Railway, Iowa City, Iowa, is making an extension on its North Dodge Street line.

Manitowoc & Northern Traction Company, Green Bay, Wis., during 1923 laid 1,110 ft. of new rail.

Eastern Wisconsin Electric Company, Oshkosh, Wis., has completed track repair and improvement work to the southern end of the north and south divisions of its system in Sheboygan.

Des Moines City Railway will be able to put into operation before Christmas the new Crocker Street line as far as Thirty-third Street.

New York, N. Y.,—The Transit Commission has announced that a public hearing will be held on Dec. 21 at its office upon the draft form of contract for the construction of the crosstown subway. Plans are now practically completed for the section extending under Bedford Avenue from DeKalb Avenue to Keep Street. Commissioner Harkness stated that unless substantial changes were needed in the contract, the advertising for bids for this section should promptly follow the holding of the public hearing which is required by the rapid transit act. The advertisement for bids might be looked for possibly the latter part of this month, but surely the first part of January.

Power Houses, Shops and Buildings

Los Angeles Railway recently completed its Fifty-fourth Street substation building. It was built at a cost of approximately $21,000, and will house machinery to improve the power facilities in the southwest section of the city.

Ottawa Electric Railway, Ottawa, Canada, is constructing a building adjoining its Albert Street carhouse which will contain a modern substation. The building will be 200 ft. long and 35 ft. wide. It will be of reinforced concrete, steel and brick construction and fireproof throughout. A Westinghouse commutating pole synchronous rotary converter of 2,000-kva. capacity, six-phase alternating current, 600 volts direct current will be installed in the substation next month. This is one of the largest of its type in Canada. The 600 volts direct current will be carried in underground conduits in lead cable to the overhead trolley and feeder circuits and rail returns. The garage will be used for the storage of the company's motor cars and trucks and will also contain the linemen's quarters as well as workshop and stores for the line department.

Pacific Electric Railway, Los Angeles, announces work is to commence at once on two additional automatic substations to take care of increased traffic on its Long Beach, Newport Beach, Hollywood and Glendale lines, involving an estimated expenditure of $245,000. The substation to take care of increased traffic on the company's Hollywood and Glendale lines will be erected at Second and Toluca Streets, Los Angeles, and will provide the increased power requirements for 100 new cars soon to be placed in service on the company's Hollywood lines. The second automatic substation is to be erected at North Long Beach, where traffic has rapidly increased due to the development of the Long Beach industrial district. During the past year more than $800 000 has been expended by the company for increased power facilities.

Trade Note

Pantasote Company, Inc., New York, N. Y., has been changed from a partnership to a corporation. It is now known as the Pantasote Company, Inc.

New Advertising Literature

Westinghouse Electric & Manufacturing Company, East Pittsburgh, has issued three descriptive leaflets dealing with railway motors and electric locomotives. Leaflet Number 20,124 gives specifications for the Class B-1 50-ton locomotive, including ratings of hourly continuous and maximum capacity. The particular application of the locomotive is described and the details of its construction are enumerated. Leaflet Number 20,125 contains specifications for the No. 562 railway motor. It gives hourly and continuous capacity ratings, as well as a descriptive paragraph of the application of the motor and a table indicating the performance of a 50-ton locomotive equipped with four of these motors. The third, Leaflet Number 20,047, gives specifications for the Number 557 railway motor. This contains essentially the same information regarding the No. 557 motor as leaflet No. 20,125 regarding the No. 562 motor. The only difference is that the table on the first page of this publication is one to determine the suitability of the motor for a desired schedule.

Oakite Chemical Company, New York, N. Y., in its November-December issue of "News Service" has some interesting information with illustrations on how to clean cars. The company has also available a new sixteen-page booklet, entitled "Cleaning in Railroad and Car Shops," which will no doubt be of use to railway executives.

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New York, Saturday, December 22, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
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Remedial and Other Measures for Unraveling Traffic

EVERY city has a traffic problem these days. This fact is generally recognized by most every one, and there is unanimous agreement that something ought to be done about it some time by somebody. Ask any city official what he thinks about traffic congestion. "Isn't it awful," he will say. "But what can we do about it? The streets of this city were not laid out to meet the demands of modern conditions." As far as that goes, none of our cities was laid out to cope with such a situation as exists today.

But that does not mean that nothing can be done about it. There are several remedies available if any one has the courage to try them and to see them through. The trouble often is that as soon as a little opposition develops against any particular plan its proponents weaken and the plan is abandoned or the regulations are not enforced.

It is not necessary to solve the traffic problem for the next ten years at a single stroke in order to get some relief. One step at a time is enough. The thing is to make a beginning. An anti-parking regulation, a one-way street rule, the prohibition of left-hand turns—all these are helpful if enforced. Parking limited to thirty minutes or an hour has generally proved unsatisfactory, as this regulation is easily evaded though it does help some. Complete anti-parking in the business district is really necessary, however, to get any substantial relief. Even then the loading and unloading of trucks and wagons offers considerable obstruction to the free flow of traffic and it may be necessary to limit such use of the street space to the light traffic hours.

In all measures of traffic control the railways should make certain to have a voice, for their interests are those of a considerable proportion of the population. These interests extend beyond the streets on which cars are operated. Often a measure for expediting traffic on one street, or at least with that as its object, may seriously impede vehicular movement on another street.

An example of this is the block signal system installed recently on Michigan Avenue, Chicago. On that boulevard it has brought about a more orderly movement of automobiles and has no doubt contributed to safety. But it has slowed up the speed of vehicles along Michigan Avenue so that many drivers leave the boulevard and take to Wabash Avenue and State Street, the two adjacent parallel streets, as they can make better time. It is said that if you ask a driver of the Yellow Cab Company—the concern which paid for the installation of the signals in Chicago—to get you somewhere quickly, he avoids Michigan Avenue. It is also amusing gossip in Chicago that the signals so slowed up traffic that the Yellow Cab Company got back the cost of the traffic towers the first day they were in operation. Of course this is not true, for the taxi meters run up faster on a distance basis than on a time basis if they have free running, and faster running was what was hoped for as the result of installing the towers.

This shifting of traffic to Wabash Avenue and State Street is now seriously interfering with the movement of street cars, particularly on Wabash, which is an exceptionally heavy rail route. This illustrates how vitally interested the railway company is in all traffic control measures. It is as competent as any one to judge of the suitableness of a proposed measure and it should be prepared to take the lead in a constructive effort to improve the situation generally.

A Constructive Talk to the Industry

RECURRING all through the interview with the new president of the American Electric Railway Association, published in this issue, are suggestions urging improvement of electric railway facilities and operation, and better methods of selling the service. Modernize and merchandise—these are his principal messages. They represent the two major opportunities of the electric lines today. Both are closely coupled, however, with the matter of building good will, which seems ever to be to the forefront in the mind of Mr. Budd in any consideration.

The railway that is doing things, he has found, is the one whose business is growing. That is borne out by experience the country over. The road that has "gone to seed" loses all attraction to people, who then ride only as necessity requires. On the other hand, with progressiveness and a true spirit of service in evidence, a railway can create new riding; that is, more rides per capita.

The interviewer's admonitions, in a plea for old-time enthusiasm in embracing and developing new kinds of service and new kinds of traffic, are well taken with respect to the spirit of many managements, though it has been encouraging to observe that there has been a notable change in some quarters during the past year. No doubt this more active interest will spread rapidly this next year and beyond as more and more roads show black figures on their balance sheets. Particularly is this true in view of the impetus that Mr. Budd's administration will give to these matters. It is to be regretted that there has not been greater courage and more aggressiveness in utilizing the improvements which have become available. These would have contributed materially to an earlier return of prosperity to roads that are still struggling along in red ink. As a matter of fact, the most readily available means of placing most roads on a satisfactory earnings basis is the extensive adoption of such modern practices as one-man operation, use of light-weight cars, automatic substations, and other economy measures.

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Signs Should Explain Irregular Operation of Cars

FEW things annoy the average man more after waiting for a street car than to have the first one go by him without stopping. This annoyance is mitigated but little even when the destination sign is marked "Special" or "No Passengers." That there are sufficient other cars on the street to carry the passengers has no weight with the car-riding public. Neither does the contention that the following car will get the passenger to his destination almost as quickly as the first one would have. The mere fact that a car goes by him without stopping while he is waiting for transportation is cause enough for ill temper. This the railway should spare no reasonable pains to avoid.

There are several reasons why it may not be desirable to have a car carry passengers on a particular trip, as any transportation man knows. Frequently, however, investigation will show that more trips of this sort are run than necessity demands. A defective car that is bound for the carhouse should carry a sign with some such wording as "Car out of order" rather than a "special" sign, which carries vague meaning if any to the man on the street corner.

Cars pulling out of the carhouse or going back to it frequently can carry passengers to advantage on the way to or from their regular routes. But this calls for the use of some sign wording more meaningful than "Carhouse," "Barn," "House," etc. To have a sign of universal application would make this wording difficult, but in so far as cars are operated continuously from one carhouse, a single sign for them can be given some such wording as "Irving Carhouse via 10th St."

Even if it is the policy of the management to carry passengers on irregularly operated cars where possible, much follow-up work is necessary to see that the orders in this respect are enforced.

Safety Stops for the Railway or Common Sense for the Motorist?

AN IMPORTANT question is raised by the action of the New York State Bureau of Highways in asking that the Public Service Commission compel the cars of the Hudson Valley Railway to come to a full stop before crossing one of the state highways. The reason given for this request is that the automobiles crossing the intersection daily outnumber the interurban cars.

If no better argument than this can be advanced in behalf of the proposal, it hardly merits very serious consideration. The disastrous wreck on Dec. 9 of the Twentieth Century Limited, which resulted indirectly from an accident at another grade crossing in New York State, serves to emphasize the meaning of such a proposal as that made by the Highway Bureau. How ridiculous it would be to propose that one of the crack trains of the country be required to stop at every important grade crossing. That of course is the *reductio ad absurdum* of the bureau's proposal, but it falls within the same principle that the bureau would apply to the Hudson Valley Railway. Obviously the question is not a matter of the relative number of vehicles.

Grave doubts may well exist concerning the ultimate benefit in the direction of public safety which would follow the adoption of the policy sponsored by the New York State Highway Bureau. If one highway crossing is made a safety stop, why not every highway crossing? This would result in a situation intolerable and most unjust to railway passengers, and dangerous even for the motorists, for it would tend to make them more careless than at present. Their best safeguard is in their own caution. A special situation may exist to make desirable a safety stop at a particular point, but the mere fact that automobiles are more numerous than the electric railway cars is not a sufficient reason. This is said of course on the assumption that the railway has used every reasonable means of safeguarding its operation, which it must do in self-preservation.

It is believed the highway bureaus would do better to take steps to impress upon motorists the importance of observing the rudimentary precautions before crossing railroad tracks, either steam or electric. Coupled with some form of examination and registration of all drivers to eliminate those obviously unfit, the annual loss of life and limb due to the grade crossing could be reduced to a small fraction of what it is today, and accidents of the character of that of Dec. 9 could be eliminated entirely. Not only would this apply to grade crossing accidents, but the idea of greater care should reduce traffic accidents of all types.

New Type Committee Activity May Speed Modernization

THE recently formed committees of the American Electric Railway Association on city operation and interurban operation represent a distinct innovation in the methods of that body. In the past committees have had quite definite assignments, and have held strictly to their tasks. Here, however, are two committees whose function is to expedite modernization of railway operation by investigating first hand the advance practices of various companies and passing these on as suggestions to other companies. The field is so broad that only the most general instructions can be given in advance.

In general, the scheme of these committees is to have the entire country divided into seven regions, with a vice-chairman of each committee in each region. These men, who are really the key men of the entire plan, are to devote a portion of their time to visit and investigate the properties in their respective territories, with a view toward finding out what each property excels in that is applicable to other properties. This is to apply not only to the physical elements, but also to organization, publicity and public relations, and financing.

The possibilities from the work of these committees is very great indeed, the measure of accomplishment depending very largely on the interest, intelligence and time devoted to the work by the vice-chairmen. If they succeed in fulfilling the ideas of President Budd in creating the plan, they will appreciably speed up the modernization program throughout the industry.

There is no question that there is plenty of room for improvement in this direction. One trouble with the railways is their procrastination in adopting modern methods, even though it may be shown conclusively that they are advantageous. These committees can commend or criticise existing practices and thus perhaps stimulate managements to greater activity in putting their houses in order. But if the suggestions of the committees accomplish nothing in this direction, one thing is certain—the traveling vice-chairmen will themselves get a lot of good out of their work by virtue of taking time off their own jobs to study the practices and facilities of other companies.

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Modernize and Merchandize

An interview with
Britton I. Budd

President
American Electric Railway Association

By Harry L. Brown
Editor Electric Railway Journal

IF ONE wanted to follow the charted course for published interviews, Britton I. Budd, the new president of the American Electric Railway Association, would make an excellent subject. His personality and position would lend themselves to a colorful exposition of the traits and ideas which have enabled this self-made man to attain such great heights of responsibility. For Mr. Budd is as good a fellow and as interesting and capable a man, and has been entrusted with such responsibilities as would delight the literary genius looking for a story—a human interest story of a big man.

But further than to remind you that Mr. Budd is president of the Chicago, North Shore & Milwaukee Railroad, the Chicago Elevated Railroads and the Public Service Company of Northern Illinois, it is preferred here to omit all reference to those things which would reveal the character of the man and his pre-eminent fitness for leadership, appealing as they are, and devote the entire available space to the unadorned statements which express the views of the head of the electric railway industry on many of the more important problems confronting the railways today.

Suffice it to say that something of the personality of Mr. Budd, and some idea of the reasons why he occupies so prominent a position in the field, will be better appreciated after a reading of what follows. Submitting to my questioning, he has here contributed his views on the bus, on the general philosophy of selling transportation, on personnel training, modernizing equipment, especially interurban equipment, on publicity and advertising, on future rapid transit development, freight handling, results of one-man operation of modern cars, and so on.

The bus seems to be about the uppermost question in every electric railway man's mind these days, so I started in on that subject. The record of the interview follows:

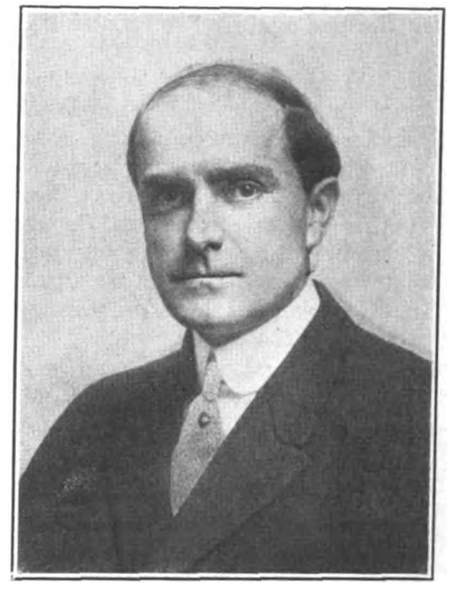
THE BUS NOT A PROBLEM BUT A USEFUL TOOL

QUESTION: Do you consider that the bus is about the biggest new national problem confronting the electric railway industry?

MR. BUDD: I do not think that I would call it a problem. It seems to me it is an added feature of transportation that is going to be utilized by the electric railways.

QUESTION: To what extent do you think the industry will extend its present bus operations? Will it buy a good many more buses in the near future than it has in the past?

MR. BUDD: I think that the electric railways will find it to their advantage to use buses in a good many different fields. Of course, the amount of bus operation is going to increase very largely. The usefulness of the bus has been demonstrated and its use extended in so many different ways that I believe we can look for a very large increase in the number of passengers transported by means of buses. Furthermore, this is a development of the immediate future. It is right here at the moment.



Britton I. Budd

QUESTION: Do you think the railways ought to go into the bus field with a downtown service, or merely connect up with existing rail lines at outside points?

MR. BUDD: It depends entirely upon the character of the city. If there are certain sections of the city where the territory is able to support it, there is no reason why there should not be a bus service delivering the people to the heart of the city, predicated of course on the streets having sufficient capacity and the bus service not contributing seriously to congestion.

QUESTION: Even though such operation might be competitive to a certain extent with existing rail lines?

MR. BUDD: Well, that of course is something that cannot be answered in an off-hand way. I can conceive that in certain areas of a city which might not be conveniently served by an electric railway a bus service could be utilized to good advantage.

QUESTION: To what extent do you think the motor bus can actually be made a monopoly? We speak of maintaining the monopoly of transportation, co-ordinating the service and keeping the bus in the hands of the railway people, but is the bus actually subject to monopoly? In other words, because of the small investment required to get into the bus business, by individuals, can it actually be made a monopoly?

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MR. BUDD: It should be made a monopoly, because if it is not, it will be a most unprofitable thing to the individuals or companies who operate it, and the service will be unsatisfactory to the people. It should be co-ordinated with the other transportation facilities of the city and protected from competition. It would only produce chaos to have a lot of bus companies operating in one city.

QUESTION: In other words, it is partly a matter of protecting the bus against itself as well as the railway against the bus?

MR. BUDD: Absolutely. That was illustrated in London, where the Underground people have 5,600 buses. Through some mistaken notion on the part of the Parliament, a great many others were allowed to go into the bus business, and the inroads that they are making in taking the cream off certain routes have presented a serious problem to the big bus company and made what was a profitable venture almost a doubtful one. In other words, they are jeopardizing the main service supplied the people.

QUESTION: What further steps can be taken to emphasize the public need for co-ordinating all means of transportation and utilizing the existing traction corporations for the purpose?

MR. BUDD: Of course, I have no doubt that co-ordination of all transportation in the community would be the best from the standpoint of the cost to the rider, and it would also insure the municipality of meeting the demand for any kind of service, or any extension of service, because this one agency would be able to furnish whatever transportation was needed at any point in the community.

QUESTION: Then, what is your idea of the position the bus will occupy in transportation. Is the field for it largely in the outlying sections of cities and in interurban territory or in the congested sections of cities too?

MR. BUDD: Well, in the smaller communities it may be that bus service, assuming that a community has no service of any kind, will meet the needs and help the growth. Beyond this, necessarily the city ought to have electric railway service, and there the extensions that are needed from time to time can be first instituted by the bus until the territory will support the electric railway. There can also be feeder lines, or lines of a supplemental character where electric railway service will possibly never be supported. A bus can be operated at certain times of the day to serve certain needs and discontinued the balance of the day. It is flexible for serving a small number of people with infrequent service.

QUESTION: Is any railway company making any money on bus operation?

MR. BUDD: Why, I think there are instances where the bus is profitably operated by an electric railway. There are a good many considerations that enter into the matter, so that it is not to be judged purely on the basis of whether it is profitable. Take the case of a feeder to an electric railway, and it is pretty difficult to segregate the income that the railway will get for its portion of the haul and the business that is delivered to it which it probably would not otherwise get if it were not for the bus. Then there is the other feature, where buses are used for pioneer work. If the electric railway had to invest in tracks and facilities and wait for the territory to build up, that might be a very considerable factor. So, as I look at it, bus operation may or may not be profitable, but where the electric railway has need of it, it is a useful tool. It serves certain purposes due to the modern changed ideas of the people and also due to the fact that practically all communities in the country territory adjacent to cities are changing.

People are spreading out. They are getting farther and farther away from transportation. They do not regard it as necessary to be right close to existing transportation any more. The bus comes in to fill a need in connection with these new living habits. I know that is going on all around Chicago. People are locating out in the country considerable distances away from the existing means of transportation in locations that would not have been thought of five or ten years ago. Now, there will be no possibility of serving those people with a railroad, and yet they can be served with a bus and at such times and to such an extent as may be necessary. But as a general answer to your question, as a rule the bus operation by itself has probably not been profitable.

QUESTION: Do you think we are moving in the right direction by setting up the general policy of charging the same rate of fare on the bus that we do on the railway and issuing free transfers between the two?

MR. BUDD: No, I think that the bus operation should be made as nearly self-supporting as it can be. There may be exceptions to that rule, as for example where an extension is contemplated on the end of a railway line, and preparatory to that a bus line is put on. The company might be able to afford that bus service and give a transfer, which would be perfectly all right.

QUESTION: I would like to have your ideas about the advisability of publishing bus matter in ELECTRIC RAILWAY JOURNAL. Do you think we would be aiding the electric railway industry more now by discussing railway operation of buses in articles in the JOURNAL?

MR. BUDD: I have thought of that a good deal, and I am inclined to think that the time is getting around to the point where the ELECTRIC RAILWAY JOURNAL could incorporate bus features as part of the JOURNAL. I do not know whether the time is here now or whether it should be done in six months or nine months. But as soon as the electric railway industry gets to the point—and I think it has reached that point now—where it will utilize the bus to the extent that seems advisable and necessary, then the JOURNAL would be helping along the idea that it is an accepted practice of electric railways to utilize the bus. And it will be in the best interests of the industry when that idea is generally accepted. It was too bad it was not accepted, in my opinion, two or three years ago. I think it would have saved a lot of grief and trouble that we may be a long time in remedying.

THE OUTLOOK FOR THE CITY RAILWAY

QUESTION: What, in general, do you think is the future of the street railways with regard to increase or decrease of traffic?

MR. BUDD: I think the street railways will continue always to handle the mass of the people, and the increase of traffic will go on the same as in the past. I do not think there will be any effect upon the street railways by any bus operation. The street railways of this country, however, have got to deal with vehicular inter-

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ference in congested portions of cities through some means of rapid transit or underground transit. That is not altogether their problem. It is the problem of the cities. The vehicular congestion due to the enormous increase in the number of automobiles is fast approaching the point where there is insufficient street capacity. Space off the streets has got to be found for parking these machines. The electric railway will have to find some solution of present congestion in order to make reasonable speed. Whether that will be done underground or overhead will depend on the community. It ought to be treated in such a manner that the expense will be borne by all the city, not alone by the company or the car rider, because the necessity for subway or elevated is simply a development that has come with modern conditions. The only other way to get more street capacity would be by materially widening the streets. This could be done, probably, in some communities, and in others it could not. But in any case it should not be done at the expense of the railway company.

QUESTION: Is there any prospect of getting some measure of rapid transit service with street cars by giving them the right-of-way on the main routes, at least during the rush hours, and thus avoid the heavy investment required in subways?

MR. BUDD: That may be a possibility if there are enough entrances and exits to a business district so that some streets could be used exclusively for railway traffic. But in most cities, a good deal of the business is done through the medium of people driving around in automobiles, and to exclude them from certain streets would make it an impractical proposition because it would require people desiring to shop on that particular street to walk. Even then it might possibly be worked out.

QUESTION: You are convinced then, I take it, that there really is not much hope of having rapid transit systems unless the public does come in for a share in the investment?

MR. BUDD: No, because there is an enormous outlay, and there is no good reason why the property owners affected should not bear that expense. Due to the growth of motor vehicles and the height of buildings, the street capacity is no longer able to accommodate business. Consequently it becomes necessary really to build another street underground or overhead, and that is in the interests of the city; it is in the interests of facilitating business. If things go on indefinitely, nobody will be able to transact business. An automobile won't even be able to get to a place. A truck won't be able to deliver goods or take goods away. And the time element will be such that business can only be conducted at a tremendous loss. It will have the effect of driving business out into the less congested sections. There is no doubt but that will be one of the developments to come in the modern city. There are a lot of business concerns now doing business in the heart of the city where there is no need of it at all. They can just as well be 3 or 4 or 5 miles out. There is talk here in Chicago now of certain large concerns like insurance companies, moving out of the Loop district. Their business is largely conducted by mail. They have thousands of employees. They can get them right around in the neighborhood that they live in and get away from all of the congestion.

But still with all these developments there will be need of getting more street capacity. If it can be obtained by new streets, that is one way; if it can be obtained by wider streets, that is another way; if it can't be obtained by either one of these means, why then it is a question of going under ground or over head.

QUESTION: Is there any possibility of impressing the public with the necessity of so regulating vehicular traffic as to give the street railways more freedom in their operation?

MR. BUDD: A great deal can be done that way, by eliminating parking and by proper traffic regulations and by diverting as much traffic as possible from the streets on which the railway operates. There is no reason why that should not be done.

QUESTION: Mr. Budd, what do you think of the weekly pass as a seller of service and a creator of good will?

MR. BUDD: I think it is a fine, equitable means of affording low cost transportation to people who frequently use it. It is the only process that I know of in a city where with a fixed rate of fare you can give a wholesale rate for a wholesale use. That use is spread out; it is not confined to the rush hours, so it is not inequitable. There is no unfairness toward the other car riders by reason of it. It encourages a more frequent and greater use of railway service. By encouraging the use of transportation you are increasing the good will. Transportation is like anything else; it is a habit and it can be cultivated. We think the pass makes that possible.

In addition, it allows the interchange of business and occupation all over the community. It does not confine it to any one particular spot and therefore it is a good thing for the merchants. It is a good thing for the different parts of the community to have a free and easy means of intercommunication. It also allows merchants in one part of the city to feel that the people in another part of the city are easily accessible to them. The same way with entertainment houses, theaters, restaurants, stores, lodges—any kind of community activity that depends upon the attendance of people is

New Traffic Can Be Created

I BELIEVE that it is possible to create new traffic. We fellows in the transportation game are very prone to think that the traffic available is only that where the rider is required to travel. We think when business is increasing that it must be due to the fact that everybody is employed, that the weather is fine, and all that. But back of all that is the question of whether the service is encouraging travel. I tell you, you can just as well increase the quantity of travel as you can increase the sale of some class of goods by proper merchandising and proper standards.

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benefited by the use of the pass. Therefore, the pass, making all this more readily possible, reacts favorably on the transportation company, and the people and stores and others who are benefited feel that the railway company is performing a very useful service in the community. Therefore, it engenders good will.

QUESTION: Are you satisfied it brings more money to the railway company?

MR. BUDD: I am. From my experience with the pass as applied here, I regard it as a very satisfactory method of selling transportation. We have no criticism to make of it at all. It has brought a great many people to use the service who might otherwise be using automobiles, which would cost them a great deal more money and a great deal more time.

Rail Transportation Should Be Up to New Standards

THE American people, all said and done, will not be satisfied with anything but the best of service. They are willing to be liberal where that service satisfies them, and they like luxury. Standards of living have changed a great deal in the last five or six years and transportation ought to be changing with them. Consequently, I think that our track ought to be better maintained, our speed ought to be materially increased, and the exterior of our cars ought to be made attractive and the interior more luxurious. All this will tend to sell the thing that we have to sell, and that is transportation.

The great problem of transportation in a large city is continually to increase the volume of business so that the unit cost can be reduced, and anything that tends to increase the riding habit will ultimately tend to lower the cost of performing the service. If you can lower the cost of the service and make it attractive, you can increase the volume, and volume is the desirable thing, because it means the greatest convenience to the public.

LOW FARE FOR SCHOOL CHILDREN BUILDS GOOD WILL

Just another thing in connection with that question of the rate of fare. I believe that the rate of fare for school children should be made just as low as it is possible to make it, to encourage the use of railway service by the young people. This should be done not only as a matter of performing a useful service to the community, but also to cultivate the good will of the parents. They will intrust their children to the railway company and feel that they are safely and carefully looked after by the crews.

Another element is that the good will and satisfaction of people in the communities is increased where they have large families. They want to take those children out, maybe in the evening to visit friends, maybe take them shopping, maybe to go to church, maybe to go to the parks and amusement places. Well, the parents of large families find it burdensome to take the children. They probably would not be very happy if they had to leave them at home on account of the expense of taking them along. Therefore, the low fare serves a very useful purpose there and makes friends. I do not know of any class of business that can be increased in a more substantial manner than in making it possible for the children to use transportation, and at the same time it means good will.

Now, on the North Shore Line, although we have increased our rate of fare a number of times, each time I have held firm on this question of the rate for school children. And I believe that this was one of the things that did much initially to make the people in that territory feel that we are the right sort and have the right ideas; whereas if the rate of fare for those children had been raised, we probably would have had every parent up in arms against us.

What does it mean to us? It is a little service that you perform of an auxiliary character compared to your regular services—the handling of those children at a small rate of fare and having all your crews give them special attention. Why, one of our trains coming down here in the morning is like a party, the conductors and the motormen looking after the children and calling them by name. Nothing is to be gained by the thought that you cannot carry school children except at a certain rate of fare. Whatever you obtain in income by an increase would be more than offset by ill will.

SEES EQUIPMENT DEVELOPMENT COMING

QUESTION: Mr. Budd, what can the manufacturers and the railways do to promote more rapid development of electric propulsion apparatus for railway service? I know that is a subject you are interested in.

MR. BUDD: Well, they probably could do a great deal, and they are doing a great deal. With the more prosperous condition of the electric railways I expect to see a great many developments in the next few years, not only in improved apparatus, more efficient and more economical apparatus, but also I expect to see marked improvements in car design. My own thought is that the electric railways, during the times of decreasing income and increasing expenses in the past years, have followed strictly a program of what was absolutely necessary to perform the service, eliminating everything that was in the nature of luxury or refinement. There they made an error, and a very considerable error, because the American people, all said and done, will not be satisfied with anything but the best of service. They are willing to be liberal where that service satisfies them, and they like luxury. Standards of living and the standards of thought have changed a great deal in the last five or six years and transportation ought to be changing with them. Consequently I think that our track ought to be better maintained, our speed ought to be increased where it is possible, and it is possible in most cases—it ought to be materially increased, and the exterior of our cars ought to be made attractive and the interior ought to be made more luxurious. All this will tend to sell the thing that we have to sell, and that is transportation.

QUESTION: You are thinking of city as well as interurban service in that, are you not?

MR. BUDD: Everything. To my mind we ought

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to be striving for innovations, changes, rather than simply sticking to something that seems to be an accepted practice, because whether we realize it or not, all our ideas have changed. Ten or twelve miles an hour won't satisfy us any more. We are irritated at the loss of time. The ordinary luxuries in travel that we thought were all right a few years ago are no longer acceptable to us.

We look with more or less scorn upon a tarnished or old fashioned car on the better through trains. We turn up our nose almost instantly. In a measure that is the reaction that the average rider gets when he sees the same stuff day in and day out, and there is never any change and never any innovation. So I think it is something that we can do constantly—strive for something in the way of improvements. The American people like to see changes. They like to see new ideas, and if they do see them, why they are keenly interested.

It has been a revelation to me on the North Shore to see what a lot of interest people really do take. Everything we do is of just as much interest to the people as to us. They talk about it, are enthusiastic about it, and act as though they themselves were personally interested. So monotony in any kind of business, I don't care what it is, is bad. The merchant who has the same window display every day in the year is going to lose your interest. You are going to go to the fellow who is giving you something in the way of a change, setting up new goods in the window, not the same old stuff. You have seen that and you have tried it and you know all about it, and there is no thrill in it. But the merchant who is changing his windows all the time is going to attract your business. The business of transportation is like anything else. People are not forced to use our method of transportation.

There are many instances that will illustrate that. We put observation cars on the North Shore. There is a very rich man who had never ridden on our line, though he had often seen it as he traveled up and down along side of it. But he hopped on one of those observation cars one day and rode to Lake Forest, and he said: "That is something like it. I have been hearing all these people talking about this electric road. I never could see anything in it, but now you have got something that appeals to me. I am for the electric and after this I am going to use it."

Well, now, you might question whether there is any money in those observation cars. I do not think there is. There are only twenty-six seats in them and we get fifty cents a seat—that is, $13 if we get them all filled, as against a coach with fifty-two passengers in it. You cannot figure out any money in that. But how much collateral good and how much drawing power has it? It is advertising our service and encouraging the use of it, the frequent use of it—so much so that we have ordered some more of these cars. We will have six trips out of each city every day with observation cars on the trains. If those are well patronized we will put on three more. If it is necessary in order to attract a certain amount of business to have an accommodation of that kind, why not furnish it? It is this volume from all sources that creates the business.

So, on this general idea of equipment, it seems to me we ought to tend toward more comfort, and depart from the plan we have had of just simply using whatever will last the longest, like wooden or slat seats, cane seats, and a certain type of frame, whether it is comfortable or uncomfortable, as long as it is a seat.

We know in the automobile business that a family will buy first a machine at $1,000 and then, because they want something more comfortable, something with a little more style to it, they will buy one for $2,400 and they will feel it is money well invested, and it tends to make life a little more pleasant and a little more worth living. Why isn't the same thing true of the railroad problem?

Take the example on the Elevated here of our getting a paint color for the exterior of the cars that would, when dirty, be just the color of dirt. That was the reason for our selecting that color years ago as it would require less cleaning. We totally excluded all idea of pleasing appearance, of getting a good reaction from our passengers, having them say, "Well, there is a nice looking vehicle. I am glad to ride in it." The only consideration was that it would cost less to clean that car and that the paint of that color being near dirt would last the longest without repainting.

Well, now that was undoubtedly the theory that a great many of us were working on, and that is a back number. It won't do. We have got to get the railway fellows to get away from that idea. We want speed—good looking exteriors and comfortable interiors, with speed. That is what the people want nowadays.

Get Something New—Monotony Is Bad

To my mind we ought to be striving for innovations, changes, rather than simply sticking to something that seems to be an accepted practice; because, whether we realize it or not, all our ideas have changed. Ten or twelve miles an hour won't satisfy us any more. Ordinary luxuries in travel, all right a few years ago, are no longer acceptable.

It has been a revelation to me on the North Shore Line to see what a lot of interest people really do take. Everything we do up there is of just as much interest to the people as to us. They talk about it, are enthusiastic about it, and they act as though they themselves were personally interested. So monotony in any kind of business, I don't care what it is, is bad.

FINANCING NEW WORK

QUESTION: In the matter of making improvements that show substantial economies or offer possibilities for increased earnings, isn't there usually some way to finance that work if the railway has the will to do it? We hear a good many railway companies, especially interurban railways, which recognize there are many directions in which they can economize and improve, always answer with the same thought—that they haven't any money.

MR. BUDD: Well, that is a pretty hard question to answer, but where they have obsolete equipment and equipment that is unsuited to modern conditions, heavy,

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unnecessarily large, extravagant in power consumption, extravagant in maintenance, still may have years of life, there ought to be some means found of replacing that equipment with modern equipment; if not all at once, gradually. The economies in many cases through the purchase of that new equipment would be so great that those companies ought to be able to buy it even if they did not have the money, because it could be easily shown to the manufacturer or banker that within a very few years the cost of it could be paid in lower operating expenses. Some of these interurban companies that are operating these great battleships, due to some preconceived notion that simply because it happened to be an interurban it had to be a car with a certain contour, a certain formidable appearance and weight and so forth, regardless of the service, all that class of cars the railway companies could well afford immediately to replace. I think they would find they would have the co-operation of the manufacturers in doing so.

I know of a case where equipment of that type could be replaced with modern equipment and the entire cost of it saved in operating expenses in five years. Some of this stuff we are now running is ridiculous.

QUESTION: Between car trust certificates, and employee and customer stock ownership, then, there ought to be some way to finance good improvements, don't you think?

MR. BUDD: Surely.

QUESTION: What are your ideas about this whole question of valuation and capitalization and relations between the two, and what ought to be done with the financial structure of many railways?

MR. BUDD: Well, I do not know. Of course it is very easy to say that the total securities should not exceed the value of the physical property. That is an ideal condition; and a further ideal condition to be aimed at is that the bonded debt should constitute less than 50 per cent of the total capitalization.

Some of these companies probably will have to be reorganized and their financial structure recast. Where that is possible it will of course put them on a much sounder financial basis, and when that is generally accomplished, will greatly improve credit and public relations.

QUESTION: On this matter of public relations and publicity, I wonder if you have any ideas of new ways to build sound public relations that might be tried by the utilities. What more can we do than at present?

MR. BUDD: What more can we do? Well, if every company was doing its utmost to give the best service it was capable of and its employees were actuated by an earnest desire to serve and to make friends, and if the facts and information about the company and its service and its problems were being disseminated continually year in and year out, if every company was liberally advertising year in and year out, if it was talking its problems before public bodies year in and year out, if it was seeing to it that every one, including the children in the schools, was informed, then I would say that maybe there was nothing more to do, except to do all that every year, year in and year out. But there are a lot of companies that are not doing a thing.

QUESTION: Then, Mr. Budd, you do not think there is any such thing as overdoing publicity, railroad publicity?

MR. BUDD: No, not if it is intelligently done. I do not think you can do too much of it, and I do not think that you can be too liberal in your appropriations for doing it, within reason, because an uninformed public not only reacts badly upon the credit and the business of the company, but it also has its reaction upon any constituted authorities, the commissions, the juries that try personal injury cases, the municipal authorities. These authorities may want to do the fair thing, but with an unfriendly atmosphere all around them, due to a lack of information, they are either neutral or their hands are tied for they reflect that unfriendly atmosphere, so that your whole structure depends upon it. And if you have to get capital from the people through some customer ownership plan, why your very life depends upon it. You cannot exist, because people who are not informed and are unfriendly certainly will not lend you their money to put into new equipment and plant; that is self-evident.

You have also got to have your employees informed and familiar with the company's affairs or they cannot possibly talk intelligently to the people they meet or their neighbors, and they cannot defend the company even though they may wish to. To inform your employees you must have your supervisory force informed.

QUESTION: Quite a number of railway men have asked me how much a railway ought to put aside as its appropriation for publicity work.

MR. BUDD: Well, generally speaking, I should say that for publicity and advertising they could safely put aside 1 per cent of their gross as a minimum.

RAILWAY FIELD AS OPPORTUNITY FOR YOUNG MEN

QUESTION: Mr. Budd, what can you say as to the opportunity the transportation industry now offers to young college men?

MR. BUDD: I think it offers a great opportunity. The problems of transportation in the big cities and in the country are, if anything, more interesting and call for greater skill and initiative than in the past. And with modern engineering and modern methods, these problems will test the mettle of our college men and afford them great opportunities, not only in connection with the electric railways as they exist and as they will develop, but in the extensive rapid transit development that is bound to come.

Rapid transit development during the next few years is going to be a very great factor because the trend of the population is toward the city, and that means, as the cities increase in area, greater speed will have to be reached in order to reduce the time involved in travel. So that there will be an intense development of rapid transit facilities in all large communities as main arteries to transport the people very considerable distances in a short space of time at a high speed. In addition to that, I believe that all of the steam railroads as they now exist in these big communities will be electrified and that to all intents and purposes they will become part of the rapid transit systems of the great cities. They may even be interconnected or coordinated with the local transportation systems in the communities.

Finally, all these various means of transportation, whatever they may be, steam railroads, rapid transit lines, street railway lines and bus lines, will be utilized to their fullest possible extent for the purpose of serving the people, because transportation in these areas of tremendous population is as essential as the sewer system, as the water system, as the power system. With rights-of-way difficult to obtain, costly, if not

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prohibitive, why the utilization of all existing means of transportation will have to be employed for the common purpose of serving the people with the necessary means of intercommunication. Transportation is going to be more and more a development and a problem due to this tremendous growth of cities, and therefore there ought to be opportunity for advancement and success of young men entering the business far greater than in the more or less pioneering days of the industry.

QUESTION: There seems to be a pretty well defined feeling among undergraduate student bodies that the opportunity to make money in the transportation field is less than in other lines of endeavor. What is the answer to that?

MR. BUDD: Of course, in the electric railway field it is probably true that there is usually less opportunity for individual ownership or part ownership of some railway enterprise, such as there might have been twenty or twenty-five years ago in the days of construction and promotion, where it might be possible for a young man either to have built or become a part owner in a property or some enterprise, but on the other hand those were very small undertakings. Today, these great enterprises must have the more skilled men in the technical and administrative ends, and there will always be a demand for them, and there will be liberal and generous salaries in order to attract those men who can meet these problems of engineering and management. But I believe that if, today, the salaries were examined in the electric railway industry they would compare favorably with salaries paid in any other industry in the country. The percentage of men in high executive positions who have not had the advantage of a college education, but have been technically trained and have natural ability, will also be found to compare favorably with the percentage in banking and other lines of business.

QUESTION: Then, if we really have a good opportunity for young men in the transportation business, what ought to be done to promote courses in public utility economics in the universities?

MR. BUDD: That should be actively instituted in every state in the Union, not only as a matter of getting the technically trained young men into the industry, but also men trained in the schools of commerce or business administration. There is just as much need in the business and financial and administrative side of the business as there is in the technical side, and the opportunities are just as great.

If utility courses were instituted in the universities it would be the means of educating the student body and the faculty and the administrative bodies of the universities in the needs and the problems of the electric railways, all of which would be most helpful to the industry and to the country. There ought to be an effort made in every state to see that public utilities or electric railway courses are included in the curriculum of every university and technical school. And the electric railways ought to interest themselves in a well-defined plan of taking graduates, a liberal number of graduates each year, into their service. They ought also to have some kind of instruction in their individual companies for the benefit of those men who have not had the opportunity to go to college. There are many men in the ranks who, with a little help through instruction and correspondence courses, can so improve themselves that they will of their natural ability make very desirable executives.

QUESTION: I would like to switch for a minute to the matter of wages. What do you think is going to be the wage situation in our industry in the next few years?

MR. BUDD: I do not believe that wages will materially recede from the present standards. There may be some decrease, but as a general thing I think the present standard of wage and living conditions and so forth are going to obtain in this country for an indefinite time.

QUESTION: That does not mean much prospect for lower fares, does it?

MR. BUDD: No, I do not think so. I do not think there will be any opportunity for that except possibly through an increased volume of business and relieving the car riders of some of the burdens of taxation and burdens of paving, and burdens of various kinds that are loaded upon them.

Low Children's Fare Builds Good Will

THE rate of fare for school children should be made just as low as it is possible to make it, to encourage the use of railway service by the young people. This should be done not only as a matter of performing a useful service to the community, but also to cultivate the good will of the parents. On the North Shore Line, although we have increased our rate of fare a number of times, each time I have held firm on this question of the rate for school children. And I believe that this was one of the things that did much initially to make the people in that territory feel that we are the right sort, and have the right ideas; whereas if the rate of fare for those children had been raised, we probably would have had every parent up in arms against us.

MODERNIZATION THE PRINCIPAL AID TO THE INTERURBANS

QUESTION: In general, Mr. Budd, what is the future of the interurban railways? They are the hardest pressed members of our industry now.

MR. BUDD: Well, to my mind, all these interurban roads of every kind and character, if there is any possible justification for it, ought to obtain modern, light, speedy equipment, and meet the changed conditions with like changes of cars, and obtain economical operation and speed.

Now, if they cannot compete with present conditions with those modern means, why, I do not know any other thing for them to do. You know that it is obvious that a good many interurban roads were unwisely projected with no economic reason for their construction. A little competition by the private automobile, taking away the margin above bare existence that did prevail, brings such lines to the point where they no longer can exist, but it does not change the fact that originally they should not have been built.

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We hear a great deal about the abandonment of interurban roads, and that the abandonment is the sign that the automobile is going to supersede the electric railway. That is all fallacious reasoning. We see factories all over the country that at one time were in operation, but due to some changed condition or some reason or other they are vacant. Smoke is no longer coming out of the chimney and they are abandoned. Whatever their activity was, the time is past for it or the conditions are changed so that they can no longer operate. Well, that is the history of many different enterprises, and it has no significance whatsoever.

Public Relations a Continuing Task

WHAT more can we do? Well, if every company was doing its utmost to give the best service it was capable of, and its employees were actuated by an earnest desire to serve and to make friends, and if the facts and information about the company and its service and its problems were being disseminated continually year in and year out, if every company was liberally advertising year in and year out, if it was talking its problems before public bodies year in and year out, if it was seeing to it that every one, including the children in the schools, was informed, then I would say that maybe there was nothing more to do, except to do all that every year, year in and year out. But there are a lot of companies that are not doing a thing.

On interurban lines not having sufficient population tributary to them, it is possible that even with modern equipment and greater speed they would not be able to change the results.

So, as far as the interurbans are concerned, I do not think that, with modern equipment and aggressive business methods, and the use of the bus where it is necessary to use it, they are going to do anything other than improve, and in the course of time expand, if the territory they are operating in has the requisite population to support them.

QUESTION: You think that is true in spite of the competition of the private automobile, which is the most serious factor right now, I guess?

MR. BUDD: Yes. You must recollect that our span of view is kind of short. We are looking at three or five years in the past and maybe two or three years in the future, but this country is growing at a tremendous rate. What may seem a deplorable situation today, in three or four or five years from now will be an entirely changed situation. Cities are growing. Country districts are growing and the automobile is bringing population into the country. We are a great, growing country and we are going to need more and more transportation. We may possibly have periods when we seem to have too much of one kind or another, but in ten years we will wonder how we ever thought about getting along with what we have. We will have to have a whole lot more.

The automobile has done more than anything else to create the restless spirit in the people that keeps them moving all the time. People are not contented to sit at home all day Sunday and holidays like they used to be, and those who have automobiles use them, and those who have not accept auto rides when they can and use other forms of transportation. And then when the use of the automobile grows to such an extent that they cannot make time, they go back to the railroads.

QUESTION: Then do you figure that the building of good roads tends also to build up electric line traffic?

MR. BUDD: Indirectly, yes.

GOOD POSSIBILITIES IN FREIGHT

QUESTION: Should the interurbans go after freight and express business in a good strong way? Is this one of their best fields of endeavor?

MR. BUDD: If the electric railway is going to enter into the field of transporting merchandise it should seek to give this service in a better way, or a faster way than it can be done by any other means; in other words, give a superior service. The company should not go at it half-heartedly, and even if it is only done in a small way, the business should be handled more satisfactorily and more efficiently than it can be done by other carriers. Interurbans can do that by a little organizing and with equipment suited to whatever the necessities may be. But they cannot hope to make any money or build up any very considerable business unless they have the proper tools, equipment and facilities for conducting the business. If they can give this superior kind of service, they not only can do it profitably, even more profitably on a car-mile basis than the passenger business, but they can obtain good will, the friendship and support of the business men and the industries in their territory as well. The freight business is simply another means of giving greater service.

The greater the number of useful services that the interurban can perform, the better its prospects for profit. I think a great mistake of the electric railways in past years, particularly the interurbans, has been a sort of half-hearted, half-organized attempt at performing some kind of a service. Now, then, the thing to do is to get the service on a high plane, if you are going to do it at all, and not permit it to be simply a makeshift, a shiftless sort of an effort.

The merchandise business can be developed very rapidly. Of course, it will bring many problems with it, and as it grows there will be need for additional capital, especially in terminal facilities, which are difficult and costly to obtain. But this is one class of business you must have facilities to do business with or else the cost of operation will just simply exceed all possible income.

Freight is handled economically in proportion to the efficiency with which it is handled, and if the efficiency decreases, the costs mount in a greater ratio than the decrease in efficiency. It is a very peculiar thing. For instance, if a company has terminal facilities to handle 100 tons a day and it attempts to handle 200 tons a day, the rehandling, the delays and the losses mount with tremendous rapidity as the congestion increases. Under such conditions everything is handled probably two or three times over, and this cannot be done with any degree of satisfaction or economy.

QUESTION: What about pickup and delivery service?

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MR. BUDD: Well, I have advocated at various times —we do not do it ourselves—that the electric railways keep out of the pickup and delivery business, because it usually cannot be included in the rate. If it is included in sufficient amount, the rate may be reduced from time to time so that this service will become a burden and possibly make the whole business difficult to conduct profitably. This subject is still an open question in my mind though. If a pickup and a delivery service were possible that would lessen the terminal investment, it might be a desirable thing, for terminal facilities run into vast amounts of capital that have to be constantly increased and you can hardly keep pace with the necessity for expansion.

Now, it seems to me that the problem of concentrating all this freight in terminal freight houses is something that ought to be minimized. It may be that collecting stations or receiving stations at different points convenient to the shippers might form an answer to the problem. From these points the railroad company could truck the stuff to its cars, having it sorted so that there would be little or no delay in loading into the proper cars.

But that whole problem of pickup and delivery and containers and terminal freight houses is such a complicated thing and differs so widely in different communities that I do not know how to express an opinion about it. Personally I am inclined to think that the steam railroads will have to come to some kind of receiving stations, and I do not see why the same thing is not applicable to some extent to interurban roads operating out of big communities, to which the freight will be delivered by the shipper and then the railway company will pick it up at the receiving station and take it to its cars, or its freight houses. That would get away from all this concentration of trucking coming to the freight house and the delay and expense to the shipper trying to get his trucks in and out.

QUESTION: We have not reached the limit by any means, have we, in the application of the one-man car in interurban service?

MR. BUDD: No, nor have we reached it in city service. I think that the one-man interurban and city car —light, small cars with frequent service and low operating costs—is the solution of many difficulties on the part of many companies. They have not realized this to the fullest extent.

We had an example of what the small cars will do in Milwaukee. Some of the fellows thought we were absolutely crazy to put one-man single-truck cars on that city service. We cut the interval between cars in half or better, and increased our gross 50 per cent.

And pleased! Those people up there are tickled to death to ride in those little cars with the plush seats; a great many are riding only a few blocks now.

Take it in Waukegan, a city of 20,000, where we had practically no riding on the old street cars. We had our six-minute rush-hour service and fifteen-minute headway the rest of the day and nobody rode. People did not think about riding. But now I venture to say that you cannot go up there at any hour of the day or any hour of the night up until midnight that you won't find those little cars with every seat taken. A person comes out of the house and they have only got to go four blocks maximum, and there is one of these little cars right in sight, and they simply jump aboard. There is a large amount of riding of four or five blocks in both these cities, showing that people can be induced to ride and make it a fixed habit and pleasure and convenience—a kind of rider we are not getting at all with old equipment. I do not see why there is not a tremendous opportunity for the railways in utilizing these little cars in frequent, fast service if there is any way to avoid duplicating equipment, where it is necessary on heavy routes to use big double-truck cars during the rush hours. The business is there for the frequent one-man operation. In the two places where we have tried it it has just increased the business exactly 50 per cent, and almost instantaneously. Those people must have been walking; I do not know where else the increase in patronage could have come from. They were there. The city has not changed its population. Our Waukegan lines never paid the interest on the investment in all of their twenty years. It commenced new and deteriorated and the track and the pavement and the reputation and everything else went to pieces—and today everybody is riding. I was up there last night and they were coming and going, every car filled, and all of them apparently happy. At least, they looked happy to me; I was happy.

We put a lot of new money into that property and bought a lot of new equipment, and it is earning, after charging about 4 per cent reserve for depreciation, a little better than 7 per cent on the total investment. It has not done that before in twenty years. It has barely paid operating expenses. That little city property ran about $250,000 last year and the population of Waukegan and North Chicago and the Naval Station is approximately 30,000. Over four million passengers in a city of 30,000 is pretty good riding—a riding habit of about 140.

NEW TRAFFIC CAN BE CREATED

About that idea of increasing the business, I am convinced that it is possible to create new traffic. We hear a tremendous lot of talk about the North Shore line getting all the business and taking it away from the other carriers and all that sort of thing. If there

Determine to Give a Superior Service

IF the electric railway is going to enter the field of transporting merchandise it should seek to give this service in a better way than it can be done by any other means. Interurbans can do that by a little organizing and with suitable equipment. But they cannot hope to make any money or build up any considerable business unless they have the proper tools, equipment and facilities for conducting the business. If they can give this superior kind of service, they not only can do it profitably, even more profitably on a car-mile basis than the passenger business, but they can obtain the good will, friendship and support of the business men and the industries in their territory as well.

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were any way of analyzing it I believe it would be found that a very large percentage of the North Shore Line's business never existed prior to our giving this service. It was not there, and if our service were not there now, that riding would not be there. In other words, we have simply made it easy for people to travel, to visit and to do business. It is a natural thing, it is not unpleasant, it is not a fatiguing journey. Consequently, where a man might have taken a trip once in six months formerly, he now thinks nothing of taking it every week.

Now, we fellows in the transportation game are very prone to think that the only traffic available is that where the rider is required for some reason or other to travel, whether it is in the city or whether it is in the interurban field. I tell you, you can just as well increase the quantity of travel as you can increase the sales of some class of goods over here at Marshall Field's by proper merchandising and by proper standards. That is something we do not appreciate. We are inclined to think that when business is increasing it must be due to the fact that everybody is employed and that the weather is fine, and all that. But back of all that is the question of whether that service is encouraging travel. If it *is* encouraging travel, a natural momentum of increased travel is being built up all the time. That is a factor I think we could well pay a lot more attention to, because our people throughout the country do not appreciate that there is a great reservoir to draw from. They do not think of it in terms of possible business, and yet it is there. There is no question about it. The amount of travel tends to be cumulative. As the habit increases it tends again to increase.

I am always convinced of that right here in Chicago with our elevated system. If we had adequate track capacity here in the heart of the city and more express tracks in the outlying districts, I do not think there is any limit to the amount of business that we could get. The only limit would be the extent of our service and equipment.

Supposing you had a customer up in Racine or Kenosha and you were not particularly anxious to go up there because it was a tiresome journey. But on the other hand, that customer could be of help to you, maybe you could sell him more goods or maybe he could help you sell goods somewhere else. Now if it is easy to see him and it is to your profit to see him, you will see him easily twice as often, possibly three times as often as if it were an arduous, tiresome, time-consuming journey. Then, you would be likely to write him letters instead of jumping on the train and going up to see him. I think that is just exactly what has happened in our case.

The same situation exists with this merchandise service. We have a great many cases where men doing business in Chicago no longer keep any stock in Milwaukee. They ship right out of their Chicago stock and fill their daily orders. The same thing is true in Milwaukee. Merchants there ship from their Milwaukee stock to Chicago and do not keep any stock in Chicago because they can get daily delivery. And that seems also to stimulate a greater amount of travel because in a measure it would practically allow for the expense of at least a man's time traveling because it is unnecessary to keep a warehouse in the other city. We have a lot of that kind of business.

QUESTION: What is your motive for putting plush seats in the new cars of the elevated?

MR. BUDD: Well, it is just the idea that I was talking to you about of making the car a little more comfortable and a little more pleasing in the interior—electric fans and shaded lights and plush seats—all with the idea of really making a more comfortable conveyance. Our fellows differed very strongly on this seat proposal, but I am convinced it was the right thing. When we get some more cars next year I am going to put some more new things in. I do not know just what they will be, but I am convinced that they are business getters.

QUESTION: I wish we could spread a little of the optimism of your organization all over the country.

MR. BUDD: Well, you see we have had so many hard knocks that even the faintest kind of smile looks to us almost like sunshine. We have been brought up on adversity and these things make us cheerful.

THE greater the number of useful services that the interurban can perform, the better its prospects for profit. I think a great mistake of the electric railways in past years, particularly the interurbans, has been a sort of half-hearted, half-organized attempt at performing some kind of a service. Now, then, the thing to do is to get the service on a high plane, if you are going to do it at all, and not permit it to be simply a makeshift, a shiftless sort of an effort.

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Eliminating Half the Accidents in El Paso*

In Five Years the Cost of Accidents Was Reduced from 15.7 per Cent of Gross Earnings to 2.5 per Cent—Gold Stars for Trainmen with Clear Accident Records Encouraged Safe Operation—A Breakfast at 3 o'Clock in the Morning a Feature in the Campaign

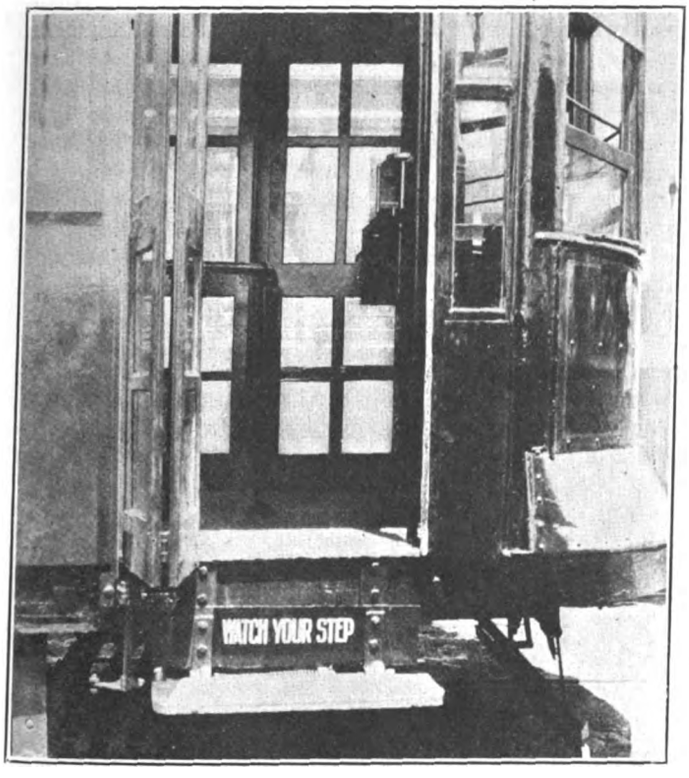
NINETEEN months without a fatality, either in the street, on the cars or to employees, during which time the cars of the El Paso Electric Railway traveled 4,855,000 miles and carried 47,900,000 passengers, is the record of accomplishment under the leadership of Alba H. Warren, manager.

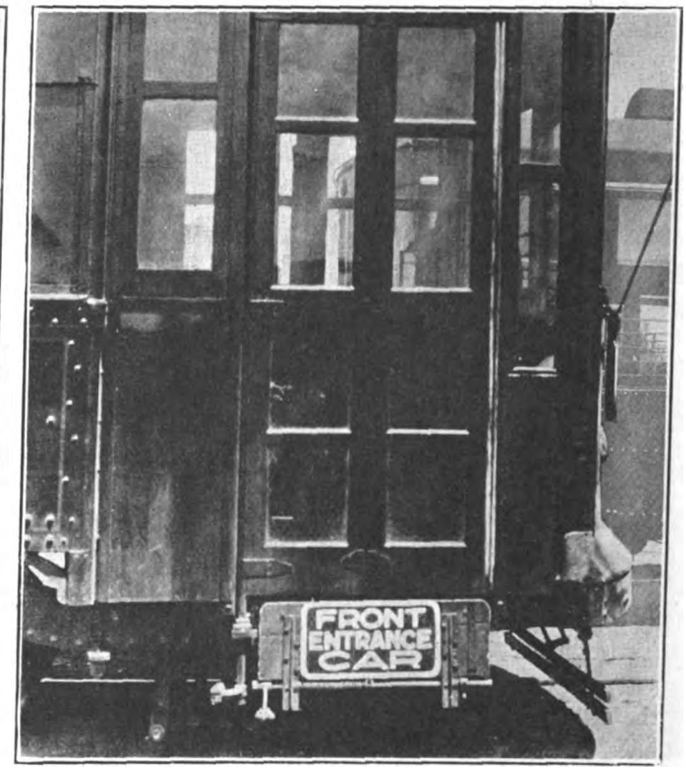
Accidents have decreased from 1,767 in 1921 to 1,401 in 1922 and, based on seven months' operation, to 940 in 1923. The best monthly record is for July, 1923, with only forty-nine accidents, compared with 109 for July last year and 147 two years ago.

The story probably begins with the inception of the "Honor Roll" and "Gold Star" plan, which were put into effect in October, 1919.

Every trainman who operates three months without an accident being charged against his record is given a day off on full pay. A committee, composed of an assistant claim agent, the assistant to the railway superintendent and the chief inspector, passes on each accident reported and if, in its opinion, the accident was one which could not reasonably have been avoided by the exercise of extraordinary care on the part of the operator, he is not charged with it. If, on the contrary, it appears that, even though he was not directly responsible, he could have avoided it by the use of extraordinary care, it is charged against his record.

One of the very beneficial features which the plan has brought out is that every operator is exceedingly anxious to be absolved from blame, and he not only runs his car with the greatest caution but, in the event of an accident, he does everything he can to secure all the witnesses and necessary data to exonerate himself. In a very considerable number of cases the injured party is asked to write a statement absolving the operator from blame. These statements, and the data secured by the trainman to exonerate himself, naturally are of great importance to the claim department and assist it in declining many claims which might otherwise have to be settled.





Even the Car Step Risers Are Used to Direct Attention to Carefulness

Inspectors, and all men in the operating department, are constantly striving to increase the number of men on the honor list, and the co-operation thus engendered has surpassed anything which had been hoped for. A man who stays on the honor list twelve consecutive months is given a gold star, which he wears on his sleeve, and receives an additional gold star for each succeeding twelve months during which he remains on the honor list. A soldier could not be much prouder of a medal of honor than are these men of their gold stars. There were in July, when this article was written, four men wearing three gold stars and likely to receive their

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

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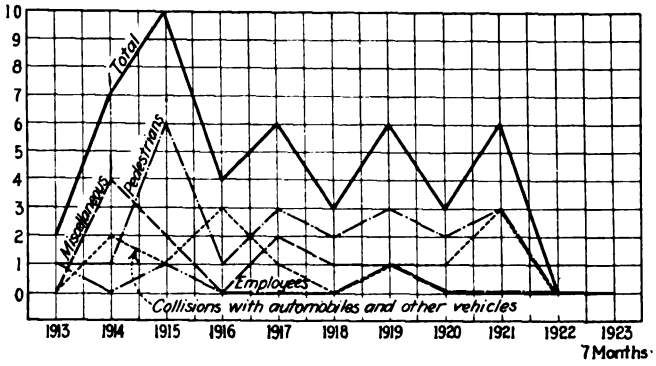
fourth in October, and seven other three-star men; twenty-five men are wearing two stars and thirty-seven one star. Aside from the pride which the men have in them, these stars create a very favorable impression on the riding public. There has been no kick-back of any kind, and it is believed that eventually many companies will adopt some similar plan. From 85 per cent to 90 per cent of the trainmen secure a day off on full pay each month.

This has not only had a tremendous effect on the reduction of accidents but has very materially increased the morale of the men. The cost is but a small proportion of the money saved, and the remarkable effects of the plan have been manifested in many ways aside from the actual reduction of accidents and the consequent cost. One of the local papers ran daily a picture of a gold star man, under the caption "Do You Ride With This Star Operator?" and under the picture was a brief history of the man and his work.



Fatalities Have Been Reduced to Zero from an Average of Five a Year by Means of the Safety Campaign

Bulletin Board Portrays Accident Records

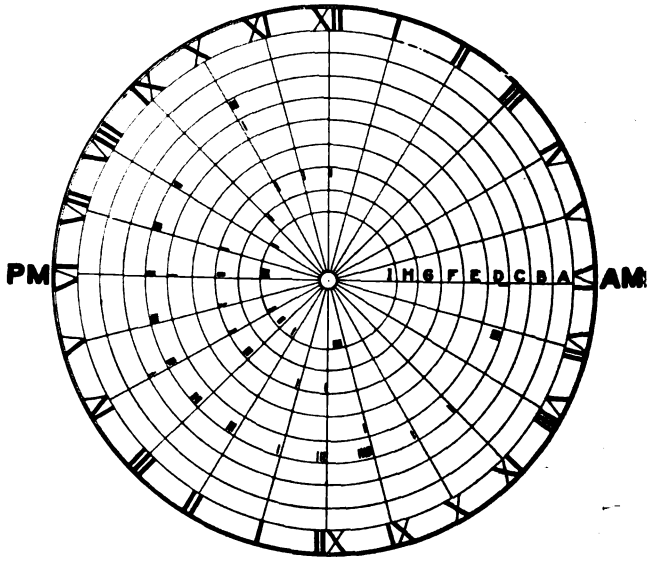
In addition to the monthly bulletins, which are posted showing the names of those on the honor list and the number of months which they have been on it, a very interesting board is kept which affords, in a permanent way, an accurate portrayal of the trainmen's accident records. A large board, incased in glass and illuminated by several electric lights, contains a chart for each trainman in service. On this chart the name of the trainman is given, the date that he entered service and the dates and kind of accidents which he has had. On the first day of the month these cards are all placed on a side of the board bearing the title "No Accidents This Month." As the month progresses and the trainmen report accidents, these cards are moved to the other side of the board under the title "Accidents This Month." These cards show all accidents reported, regardless of whether they are charged against the man's record or not, and also have affixed in one corner a tiny gold star for each year the trainman has worked without an accident being charged against him. The cards are all arranged alphabetically, and every trainman's accident record may be seen at a glance. This record, being kept constantly before the view of all trainmen, has a tendency to inculcate in them a desire to make a good showing before their fellow workmen.

As a result of the enthusiasm in accident prevention aroused in the men, they have held meetings of almost every description, groups from various departments, night men and day men, men from one line with men from another, line inspectors, dispatchers, and, in fact, almost every conceivable combination. Upon their own initiative line meetings are held by divisional inspectors, and the records of that particular line are gone over very carefully and the records of the individuals operating on it are checked up and discussed. An indifferent operator hasn't much chance of success among these men, and pressure is brought to bear on him by the men as well as by the officials.

In the early part of this year the night men challenged the day men to an accident contest covering a period of one month, the losers to pay for a banquet for the winners. The contest aroused a tremendous interest among the men, and the banquet, for which the night men had to pay, was one of the most successful affairs which had ever been held in connection with the company's business. Another contest was held and this time was won by the night men, and again a banquet was enjoyed by the winners.

A Breakfast at 3 o'Clock in the Morning Gets the Entire Organization Together

For a long time the company had tried to devise some plan whereby all of the trainmen could be got together at one time. Meetings, dinners and suppers had been given without number, but were always attended either by the night force or the day force, but never by both in a body. The two contests above mentioned furnished an idea. Mr. Warren, the manager, told the men that instead of their working against each other, he would suggest a contest between the men as a whole and the company, and he proposed that if they could go through the month of April without exceeding ninety accidents, he would give the entire organization a breakfast at 3 o'clock in the morning. The scheme met with instant and enthusiastic reception, and the men set to work with greater zest than they had ever before shown. Every accident reported during the month was scrutinized by almost every man in the organization, and the offender was made to feel the severe displeasure of his more fortunate brothers. The daily newspapers carried articles giving the number of accidents to date, and there was a very general interest in the contest manifested throughout the city. The Automobile Club asked its members to be unusually careful in order to help the trainmen win. School teachers cautioned their pupils and industrial plants cautioned their men. After



The "Accident Clock" Was Used to Indicate for a Month the Hours at Which Various Types of Accidents Occurred

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a contest, almost as exciting and interesting as that occasioned by baseball teams for the world's championship, the men won with a score of 89, just one within the mark set.

The banquet was attended by the Mayor and Aldermen of the city of El Paso, the Mayor's representatives the Aldermen from the city of Juarez, Mexico; United States and Mexican customs and immigration officials, the Chief of Police, the City Treasurer and countless newspaper men and public spirited citizens, and finally, a Major-General of the United States Army. Beforehand it was feared that on account of the hour the program would drag, and it was, therefore, made as brief as possible, with the idea that the breakfast, which actually started at 2 o'clock, would end at a quarter to four. Instead the breakfast lasted until 5 o'clock without any slowing down whatever of the program, and in fact ended all too soon for every one present. Incidentally, trainmen who had been unfortunate enough to have accidents during the month served as waiters.

Other Safety Measures

The honor system has not alone been responsible for this splendid climax of the safety program. Throughout the entire organization every department has brought its best thought to bear on the accident situation, and nothing has been overlooked from the mechanical end and from the standpoint of public co-operation which could assist in carrying out the work. Dashboard signs and posters carry warnings to the public about certain types of accidents, beseeching them to be careful, and at other times pointing out the desirability of the service.

Inspectors make daily checks of cars on the line and impress on trainmen the necessity of caution at all times. They ride with the men during quiet hours, instructing them in making easy stops and starts, how to handle accidents if they happen, how to secure signed statements, etc.

A large personal record book furnishes invaluable assistance in following the work of the trainmen and in affording accurate information as to the individual's capability. Each trainman has a page in the book, and on this page an accurate record is kept of all matters pertaining to his work, the number and kind of accidents, the number and kind of violations, complaints on the part of his passengers, from his passengers, etc. The superintendent may, by going through this record book, tell at a glance the men whose work is below par, and he is able to detect very quickly men who have been reported or cautioned for careless operation. On the theory that a habitually careless man is, in the very nature of things, bound to have serious accidents sooner or later, men who the records show are not operating as they should are, after having been properly instructed and cautioned, dismissed from the service. This is a much better plan than locking the door after the pony has escaped and has been a considerable factor in assisting in avoiding preventable accidents.

Charts are constantly kept before the trainmen showing them the kind and number of accidents which occur each day, giving comparisons with previous months and previous years, and in addition to this a large stand, supplied with pads of paper the size of a double newspaper page, is used to make special pleas to the men, or to call certain matters definitely and forcibly to their attention. Colored crayon is used in writing notices on this stand.

In the clubroom and carhouses, in the shops and in several other places there are "Safety First" suggestion boxes with blank cards in a box beside them. On the face of each box is a statement to the effect that many possible improvements in the company's practice occur to the men before they are discovered by the management, and that each employee who thinks of something that might better the service or eliminate an accident hazard should convey the thought to the management through these cards. A surprising number of valuable suggestions are made and adopted.

In the superintendent's office a large backed map of the city is used to show the kind and location of accidents. Pins of various colors show derailments, trolley breaks, collisions with automobiles, collisions with other vehicles and collisions between cars. This map is of considerable value in locating places where particular types of accidents are occurring, with the result that immediate efforts may be brought to bear to correct the condition. This map is cleaned off and started anew on the first of each month, and at the end of the month a permanent record is made from it. In addition to the map, an accident clock is used, on which the hour in which accidents occurred is designated. This, too, is a monthly record.

A Feature of the Newspaper Publicity Was a Series of Portraits Like This

In case of an accident the divisional inspector is notified at the same time that the attention of the claim department is brought to it, and because of his proximity to the scene of the accident he is frequently on hand and secures valuable information prior to the arrival of the investigator. The report which he makes oftentimes covers information which would otherwise not be obtained.

Various warning signs, including those prepared by the American Electric Railway Association, have been used with good results. When the operator opens his door to take on passengers the step is lowered and a sign bearing the words "Watch Your Step" shows up on the body of the car just above the step, but it is not visible when the door is closed and the step raised up.

The public generally pays very little heed to such signs as "Do Not Talk to the Motorman." It was felt very necessary in the safety campaign to eliminate this practice as far as possible, and a small placard was designed which was placed in the vestibules of cars on the reverse side of the route sign boxes. This sign is worded as follows:

"Please stand back far enough not to obstruct the motorman's view. His failure to see might cause a serious accident.

"The motorman will cheerfully give you all necessary information, but please do not engage him in unnecessary conversation, thereby distracting his attention from his work."

The consent of the superintendent of public schools has been secured to introduce safety as a regular part of the curriculum of all public schools throughout the

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city. Beginning with the September term, a talk on safety will be made each week by every teacher in each school. In addition to this, members of the company's organization and representatives of the Automobile Club will make talks about once a month. The Automobile Club and the daily newspapers also put on a "Safety First" week. The July record of only forty-nine accidents was in part due to the "Safety Week" sponsored by the El Paso *Herald*. Other similar campaigns for civic safety are also being worked out.

In answer to the question as to whether these things have really been worth while, the following figures can be quoted:

TOTAL COST OF CLAIM DEPARTMENT, SETTLEMENTS, FIXED CHARGES, ETC.

Year	Total Amount	Per Cent of Gross Earnings
1919	$111,000	15.7
1920	71,000	7.7
1921	61,000	6.3
1922	31,000	3.5
1923	23,000	2.5*

*Based on seven months' operation.

This means a reduction of from 15.7 per cent to 2.5 per cent of the gross earnings. The figures given include all the expense incident to the operation of the claim department, as well as all settlements, and a feature of the situation is that the total outstanding liability is estimated at only $2,000.

Railway Has Ample Supply of Free Coal

A UNIQUE feature of electric railway operation in the Susquehanna Valley of Pennsylvania is the fact that free coal is available to all. The Susquehanna River flows down from the anthracite mining district and carries with it large quantities of fine hard coal. This material collects at various points along the course of the river and is reclaimed by the use of suction dredges. The Harrisburg Railways avails itself of this supply of free coal and the only expense is that of dredging and hauling to the power house.

Convenient Waiting Station

A SHORT time ago the Boston Elevated Railway had occasion to reconstruct its Park Street division headquarters in Dorchester. At the corner of the lot is a busy transfer point, and the management arranged to install a small but very convenient waiting station for passengers. It is of reinforced concrete one story high and without doors.

Convenient Waiting Station of Boston Elevated Railway on Park Street

Company Helps Employees Buy Homes*

Legal and Financial Aid Afforded—More than 75 per Cent of the Employees Take Advantage of the Opportunity

BUILDING and loan associations organized primarily for the benefit of the employees of an electric railway company are so rare that they are worth mentioning. The Colorado Springs & Interurban Railway has made arrangements with the financial interests connected with that company by which it has been able to assist its employees in buying homes. The plan is very simple and is as follows:

The employee selects his home in any part of the city that he may desire, without any dictation or suggestion of any kind from the company, except that the price paid shall not be in excess of that which the company deems to be a fair price. The company's attorneys examine the abstract of title without charge to the employee. The property is then purchased for cash, the employee paying 10 per cent on the purchase price or as much more as he may desire, and the company paying the rest. The contract between the company and employee requires that the latter shall refund his loan from the company at the rate of $1 a month for each $100 of the principal of the loan, and that he will pay interest at the rate of 5 per cent per annum on the monthly balance, the employee having the right to pay as much more on the principal as he may desire at any time. The contract further provides that payments will be suspended during sickness. If the employee leaves the service of the company, either voluntarily or involuntarily, he may carry on the contract the same as if he had remained in the service.

Many Employees Purchase Homes

There are about 185 regular employees of the company and 145 contracts have been issued. Approximately $265,000 has already been loaned by the company and approximately $130,000 has been repaid on the principal. No contract has been forfeited, as no employee has failed to comply with the contract. Over 50 per cent of the employees have paid in more than the contract called for.

Some time ago the company took out a group life insurance policy for its employees with a large life insurance company, covering the lives of all its employees in the sum of $1,000 each. The premiums on this policy are wholly paid by the company, and it has been found a great aid to the widow of an employee in caring for any unpaid balance that there may have been on the home contract at the time of the husband's death.

As shown by the large number of employees who have taken advantage of this plan, it is considered a desirable one by them. The company considers itself benefited because it believes that a home-owning employee is apt to be more reliable and careful than one who is not such a property holder. The plan has also tended to create favorable public sentiment, because the public looks with favor upon every plan which results in an increase in the number of home owners and taxpayers in the community.

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

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Traffic Increasing in Populous States

Census Figures for Eight More States and the District of Columbia Show that More Passengers Were Carried in 1922 than in 1917 in Every Case Except Ohio—California Leads with 46.5 per Cent Increase

THE healthy condition of the electric railway industry in the more important states is shown by the figures recently released by the Bureau of the Census. Earlier figures for sparsely settled states showed slight decreases in passenger traffic in several cases, but in the more thickly populated districts the passengers carried in 1922 was substantially greater than in 1917.

Georgia—The figures show a slight decrease in track mileage while passenger traffic increased by 14.6 per cent in 1922 as compared with 1917. Gross railway operating revenues aggregated $7,703,960, an increase of 52.2 per cent and net income from all sources made a gain of 106.4 per cent.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies	¶11	13	....
Miles of single track operated §	468.66	473.31	*1.0
Number of cars, all types	824	777	6.0
Number of electric locomotives	1	1	....
Number of persons employed	4,177	3,669	13.8
Salaries and wages	$5,223,143	$2,838,349	84.0
Primary horsepower, total	213,295	201,243	6.0
Kilowatt capacity of generators	139,620	129,282	8.0
Current generated, kilowatt-hours	376,846,155	319,184,303	18.1
Current purchased, kilowatt-hours	71,458,016	45,506,100	57.0
Passengers carried	**130,718,221	114,021,766	14.6
Revenue car mileage	22,619,406	20,907,644	8.2
Railway operations, revenue	$7,703,960	$5,060,481	52.2
Railway operations, expenses	$5,777,707	$2,915,480	98.2
Net revenue, railway operations	$1,926,253	$2,145,001	*10.2
Auxiliary operations, revenues ‡	$11,303,937	$5,086,031	122.3
Auxiliary operations, expenses	$6,334,920	$2,572,419	146.3
Net revenues, auxiliary operations	$4,969,017	$2,513,612	97.7
Net operating revenues	$6,895,270	$4,658,613	48.0
Taxes assignable to railway operations	$1,265,217	$708,769	78.5
Operating income	$5,630,053	$3,949,844	42.5
Non-operating income	$488,806	$338,601	44.4
Gross income	$6,118,859	$4,288,445	42.7
Interest and other deductions from gross income	$3,963,152	$3,244,265	22.2
Net income	$2,155,707	$1,044,180	106.4

* Denotes decrease.
‡ Chiefly revenues from electric light and power departments of electric railways.
¶ Two companies with 7.82 miles of track which reported in 1917 discontinued operations prior to 1922.
§ Includes 27.32 miles in 1922, and 33.91 miles in 1917 lying outside of the state, but owned by companies within the state, and excludes 8 miles in 1922 and 10.29 miles in 1917 operated in the state but owned by companies outside the state.
** In addition there were 8,000 passengers carried by two motor buses operated by electric railway companies.

Ohio—The figures show a decrease of 6.8 per cent in track mileage accompanied by a decrease of 6.5 per cent in the number of passengers carried. Gross railway operating revenues amounted to $62,329,336 in 1922, an increase of 31.6 per cent as compared with 1917; operating expenses increased 42 per cent and net income made a gain of 18.9 per cent.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies	†71	74	....
Miles of single track operated¶	4,008.50	4,299.18	*6.8
Number of cars, all types	6,165	7,041	*12.4
Number of electric locomotives	18	20	....
Number of persons employed	22,265	22,853	*2.6
Salaries and wages	$29,904,803	$19,824,059	50.9
Primary horsepower, total	393,296	518,482	*24.1
Kilowatt capacity of generators	281,371	338,041	*16.8
Current generated, kilowatt-hours	623,119,915	1,005,108,892	*38.0
Current purchased, kilowatt-hours	434,535,837	190,291,931	128.4
Passengers carried	§ 966,725,637	1,034,245,928	*6.5
Revenue car mileage	141,247,669	153,468,636	*8.0
Railway operations, revenues	$62,329,336	$47,369,242	31.6
Railway operations, expenses	$47,253,403	$33,281,662	42.0
Net revenues, railway operations	$15,075,933	$14,087,580	7.0
Auxiliary operations, revenues	‡ $10,388,877	$10,439,915	*0.5
Auxiliary operations, expenses	$5,299,987	$6,881,791	*23.0
Net revenues, auxiliary operations	$5,088,890	$3,558,124	43.0
Net operating revenues	$20,164,823	$17,645,704	14.3
Taxes assignable to railway operations	$5,480,235	$3,625,427	51.2
Operating income	$14,684,588	$14,020,277	4.7
Non-operating income	$1,939,488	$1,091,873	77.6
Gross income	$16,624,076	$15,112,150	10.0
Interest and other deductions from gross income	$10,738,532	$10,160,860	5.7
Net income	$5,885,544	$4,951,290	18.9

* Denotes decrease.
† Reduction due to mergers and to companies which have discontinued operations.
‡ Chiefly revenues from electric light and power departments of electric railways.
¶ Includes 123.40 miles of track in 1922 and 136.57 miles in 1917 lying outside the state, but owned by companies within the state, and excludes 93.03 miles in 1922 and 73.50 miles in 1917 operated in the state, but owned by companies outside the state.
§ In addition there were 2,637,352 passengers carried by fifty-two motor buses operated by electric railway companies.

Illinois—The figures show a slight decrease in track mileage and an increase of 5.3 per cent in the number of passengers carried. Gross railway operating revenues amounted to $100,762,053 in 1922, an increase of 57.6 per cent as compared with 1917; operating expenses increased 91.7 per cent and net income made a gain of 34.5 per cent.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies	†70	75	....
Miles of single track operated¶	3,458.50	3,478.47	*0.6
Number of cars, all types	9,496	9,510	*0.1
Number of electric locomotives	38	29	....
Number of persons employed	28,429	24,229	17.3
Salaries and wages	$50,599,171	$23,977,886	111.0
Primary horsepower, total	189,809	147,722	28.5
Kilowatt capacity of generators	150,785	103,475	45.7
Current generated, kilowatt-hours	324,376,010	256,981,900	26.2
Current purchased, kilowatt-hours	923,817,630	940,766,524	*1.8
Passengers carried	**1,753,500,547	1,665,552,944	5.3
Revenue car mileage	230,126,979	225,444,667	2.1
Railway operations, revenues	$100,762,053	$63,953,123	57.6
Railway operations, expenses	$71,558,177	$37,322,057	91.7
Net revenues, railway operations	$29,203,876	$26,631,066	9.7
Auxiliary operations, revenues ‡	$5,974,979	$2,560,711	133.3
Auxiliary operations, expenses	$3,730,279	$1,426,292	161.5
Net revenues, auxiliary operations	$2,244,700	$1,134,419	97.9
Net operating revenues	$31,448,576	$27,765,485	13.3
Taxes assignable to railway operations	$6,074,306	$5,252,745	15.6
Operating income	$25,374,270	$22,512,740	12.7
Non-operating income	$2,232,793	$1,694,417	31.8
Gross income	$27,607,063	$24,207,157	14.0
Interest and other deductions from gross income	$16,350,221	$15,835,140	3.3
Net income	$11,256,842	$8,372,017	34.5

* Denotes decrease.
† Reduction due to mergers and to companies which have discontinued operations.
‡ Chiefly revenues from electric light and power departments of electric railways.
¶ Includes 91.96 miles in 1922 and 85.96 miles in 1917 lying outside the state, but owned by companies within the state, and excludes 47.61 miles in 1922 and 48.92 miles in 1917 operated in the state, but owned by companies outside the state.
** In addition there were 509,284 passengers carried by twelve motor buses operated by electric railway companies.

Maryland and the District of Columbia.—The figures show a slight decrease in track mileage and an increase of 11.5 per cent in the number of passengers carried. Gross railway operating revenues amounted to $32,579,193 in 1922, an increase of 61.9 per cent as compared with 1917; operating expenses increased 90.2 per cent and net income made a gain of 30 per cent.

	1922	1917	Per Cent of Increase, 1917-1922†
Number of operating companies	19	19	.....
Miles of single track operated**	1,041.28	1,059.55	— 1.7
Number of cars, all types	3,755	3,817	— 1.6
Number of electric locomotives	5	7	.....
Number of persons employed	10,686	9,431	13.3
Salaries and wages	$15,123,861	$7,625,059	98.3
Primary horsepower, total	77,265	118,353	—34.7
Kilowatt capacity of generators	59,305	77,592	—23.6
Current generated, kilowatt-hours	138,663,405	125,412,872	10.6
Current purchased, kilowatt-hours	287,584,529	209,525,220	37.3
Passengers carried	††573,331,094	514,063,743	11.5
Revenue car mileage	67,320,143	62,989,623	6.9
Railway operations, revenues	$32,579,193	$20,119,262	61.9
Railway operations, expenses	$22,323,750	$11,735,843	90.2
Net revenues, railway operations	$10,255,443	$8,383,419	22.3
Auxiliary operations, revenues§	$2,899,897	$1,170,588	147.7
Auxiliary operations, expenses	$1,490,230	$760,736	95.9

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	1922	1917	Per Cent of Increase, 1917-1922
Net revenues, auxiliary operations	$1,409,667	$409,852	243.9
Net operating revenues	$11,665,110	$8,793,271	32.7
Taxes assignable to railway operations	$2,886,332	$1,695,551	70.2
Operating income	$8,778,778	$7,097,720	23.7
Non-operating income	$1,490,884	$1,293,047	15.3
Gross income	$10,269,662	$8,390,767	22.4
Interest and other deductions from gross income	$6,617,918	$5,580,887	18.6
Net income	$3,651,744	$2,809,880	30.0

* Denotes decrease; percentages not shown where base is less.

** Includes 4.70 miles in 1922 and 1917 lying outside this area, but owned by companies within this area, and excludes 26.24 miles in 1922 and 16.59 miles in 1917 operated in this area, but owned by companies outside this area.

†† In addition there were 294,013 passengers carried by nine motor buses operated by electric railway companies.

§ Chiefly revenues from electric light and power departments of electric railways.

Pennsylvania—The figures show a slight increase in track mileage and an increase of 9.7 per cent in the number of passengers carried. Gross railway operating revenues amounted to $102,077,951, an increase of 44.4 per cent as compared with 1917; operating expenses increased 72.2 per cent and net income made a gain of 10.3 per cent.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies	†117	119	*1.7
Miles of single track operation¶	4,326.74	4,324.41	0.1
Number of cars, all types	8,626	9,267	*6.9
Number of electric locomotives	7	5	....
Number of persons employed	30,570	28,557	7.0
Salaries and wages	$46,714,521	$25,142,481	85.8
Primary horsepower, total	238,078	250,483	*5.0
Kilowatt capacity of generators	164,718	165,078	*0.2
Current generated, kilowatt-hours	281,272,485	395,393,553	*28.8
Current purchased, kilowatt-hours	726,298,081	573,562,988	26.6
Passengers carried	1,667,889,553	1,520,378,517	9.7
Revenue car mileage	199,222,010	204,627,827	*2.6
Railway operations, revenues	$102,077,951	$70,673,008	44.4
Railway operations, expenses	$74,058,711	$42,998,469	72.2
Net revenues, railway operations	$28,019,240	$27,674,539	1.2
Auxiliary operations, revenues ‡	$2,156,004	$881,779	144.5
Auxiliary operations, expenses	$1,434,807	$523,772	173.9
Net revenues, auxiliary operations	$721,197	$358,007	101.4
Net operating revenues	$28,740,437	$28,032,546	2.5
Taxes assignable to railway operations	$4,976,665	$3,256,235	52.8
Operating income	$23,763,772	$24,776,311	*4.1
Non-operating income	$4,336,789	$3,670,219	18.2
Gross income	$28,100,561	$28,446,530	*1.2
Interest and other deductions from gross income	$21,502,058	$22,464,591	*4.3
Net income	$6,598,503	$5,981,939	10.3

* Denotes decrease.

† Reduction due to mergers and to companies which have discontinued operations.

‡ Chiefly revenues from electric light and power departments of electric railways.

¶ Included 31.79 miles in 1922 and 29.22 miles in 1917 lying outside the state, but owned by companies within the state, and excludes 149.90 miles in 1922 and 166.92 miles in 1917 operated in the state, but owned by companies outside the state.

California—The figures show a slight increase in track mileage and an increase of 46.5 per cent in the number of passengers carried. Gross railway operating revenues amounted to $57,759,996 in 1922, an increase of 70 per cent as compared with 1917. Operating expenses increased 69.8 per cent during the 5-year period and net income aggregated $2,293,934 in 1922 as compared with a deficit of $3,823,179 in 1917.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies	†29	32	....
Miles of single track operated	3,053.07	3,022.08	1.0
Number of cars, all types	6,016	5,542	8.6
Number of electric locomotives	76	78	....
Number of persons employed	18,794	15,977	17.6
Salaries and wages	$28,717,870	$16,217,815	77.1
Primary horsepower, total ¶	7,000	48,070	*85.4
Kilowatt capacity of generators ¶	6,500	30,200	*78.5
Current generated, kilowatt-hours	....	12,248,329	....
Current purchased, kilowatt-hours	584,020,073	500,094,869	16.8
Passengers carried	**935,446,247	638,632,142	46.5
Revenue car mileage	138,527,994	130,402,420	6.2
Railway operations, revenues	$57,759,996	$33,982,748	70.0
Railway operations, expenses	$43,436,899	$25,582,252	69.8
Net operating revenues	$14,323,097	$8,400,496	70.5
Taxes assignable to railway operations	$3,331,280	$2,072,814	60.7
Operating income	$10,991,817	$6,327,682	73.7
Non-operating income	$677,638	$436,951	55.1
Gross income	$11,669,455	$6,764,633	72.5
Interest and other deductions from gross income	$9,375,521	$10,587,812	*11.4
Net income	$2,293,934	*$3,823,179*	....

* Denotes decrease.

† Reduction due to mergers and to companies which have discontinued operations.

¶ All generating equipment reported in 1922 was idle, and in 1917 the greater part of the power equipment reported was not in operation.

** In addition there were 2,826,815 passengers carried by fifty-five motor buses operated by electric railway companies.

Louisiana—The comparison of 1922 operations with those of 1917 are influenced to a considerable extent by the fact that in 1922 one of the largest companies in the state furnished a combined report covering both its railway and electric light and power departments, while in 1917 separate returns were secured and the data relating to the production and sale of electric current were included in the special report on this subject and not in the statistics relating to railway operations. This change in method of reporting is due primarily to a reorganization of the company in question.

The figures show a decrease of 7.8 per cent in track mileage and an increase of 22.8 per cent in the number of passengers carried. Gross railway operating revenues amounted to $9,448,195 in 1922, an increase of 60.6 per cent; operating expenses increased 83.1 per cent and net income made a gain of 198.6 per cent.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies	†9	11	....
Miles of single track operated	304.80	330.59	*7.8
Number of cars, all types	848	831	2.0
Number of persons employed	4,768	3,169	50.5
Salaries and wages	$6,544,744	$2,260,429	189.5
Primary horsepower, total	94,345	59,859	57.6
Kilowatt capacity of generators	77,425	41,128	88.3
Current generated, kilowatt-hours	202,759,244	132,462,292	53.1
Current purchased, kilowatt-hours	6,615,333	5,314,781	24.5
Passengers carried	164,593,374	134,017,669	22.8
Revenue car mileage	20,428,933	23,832,650	*14.3
Railway operations, revenues	$9,448,195	$5,882,095	60.6
Railway operations, expenses	$6,828,380	$3,728,727	83.1
Net revenues, railway operations	$2,619,815	$2,153,368	21.7
Auxiliary operations, revenues‡	$6,955,027	$236,731	2,837.9
Auxiliary operations, expenses	$4,113,534	$126,870	3,142.3
Net revenues, auxiliary operations	$3,841,493	$109,861	2,486.4
Net operating revenues	$5,461,308	$2,263,229	141.3
Taxes assignable to railway operations	$1,437,237	$561,085	156.2
Operating income	$4,024,071	$1,702,144	136.4
Non-operating income	$114,109	$789,740	*85.6
Gross income	$4,138,180	$2,491,884	66.1
Interest and other deductions from gross income	$2,309,483	$1,879,425	22.9
Net income	$1,828,697	$612,459	198.6

* Denotes decrease.

† Reduction due to mergers and to companies which have discontinued operations.

‡ Chiefly revenues from electric light and power departments of electric railways.

Missouri—The figures show a slight increase in track mileage and an increase of 4.8 per cent in the number of passengers carried. Gross railway operating revenues amounted to $35,227,297 in 1922, an increase of 49.4 per cent during the 5-year period, but owing to a more rapid increase in expenses, net income shows a deficit of $183,118 in 1922 as compared with a net income of $1,363,367 in 1917.

	1922	1917	Per Cent of Increase, 1917-1922
Number of operating companies	†19	20	....
Miles of single track operated¶	1,170.58	1,144.28	2.3
Number of cars, all types	3,154	3,004	5.0
Number of electric locomotives	6	7	....
Number of persons employed	11,318	10,522	7.6
Salaries and wages	$17,055,620	$9,090,599	87.6
Primary horsepower, total	161,527	136,348	18.5
Kilowatt capacity of generators	106,800	100,555	6.2
Current generated, kilowatt-hours§	198,934,774	300,988,152	*33.9
Current purchased, kilowatt-hours	187,337,006	184,192,770	1.7
Passengers carried	**692,747,054	660,703,957	4.8
Revenue car mileage	80,657,516	80,670,043	....
Railway operations, revenues	$35,227,297	$23,584,486	49.4
Railway operations, expenses	$27,210,052	$16,035,391	69.7
Net revenues, railway operations	$8,017,245	$7,549,095	6.2
Auxiliary operations, revenues ‡	$1,651,055	$1,763,233	*6.4
Auxiliary operations, expenses	$1,178,820	$1,334,160	*11.6
Net revenues, auxiliary operations	$472,235	$429,073	10.1
Net operating revenues	$8,489,480	$7,978,168	6.4
Taxes assignable to railway operations	$2,721,326	$1,767,914	53.9
Operating income	$5,768,154	$6,210,254	*7.1
Non-operating income	$472,983	$170,259	177.8
Gross income	$6,241,137	$6,380,513	*2.2
Interest and other deductions from gross income	$6,424,255	$5,017,146	28.0
Net income	*$183,118*	$1,363,367	....

* Denotes decrease.

† Reduction due to mergers and to companies which have discontinued operations.

‡ Chiefly revenues from electric light and power departments of electric railways.

¶ Includes 98.74 miles in 1922 and 76.14 miles in 1917 lying outside the state but owned by companies within the state, and excludes 26.39 miles in 1922 and 25.51 miles in 1917 operated in the state but owned by companies outside the state.

§ Reduction in current generated due chiefly to change in operating conditions of one company which produced a large quantity of current for sale in bulk in 1917 while in 1922 only a relatively small amount was generated for sale.

** In addition there were 1,088,295 passengers carried by thirteen motor buses operated by electric railway companies.

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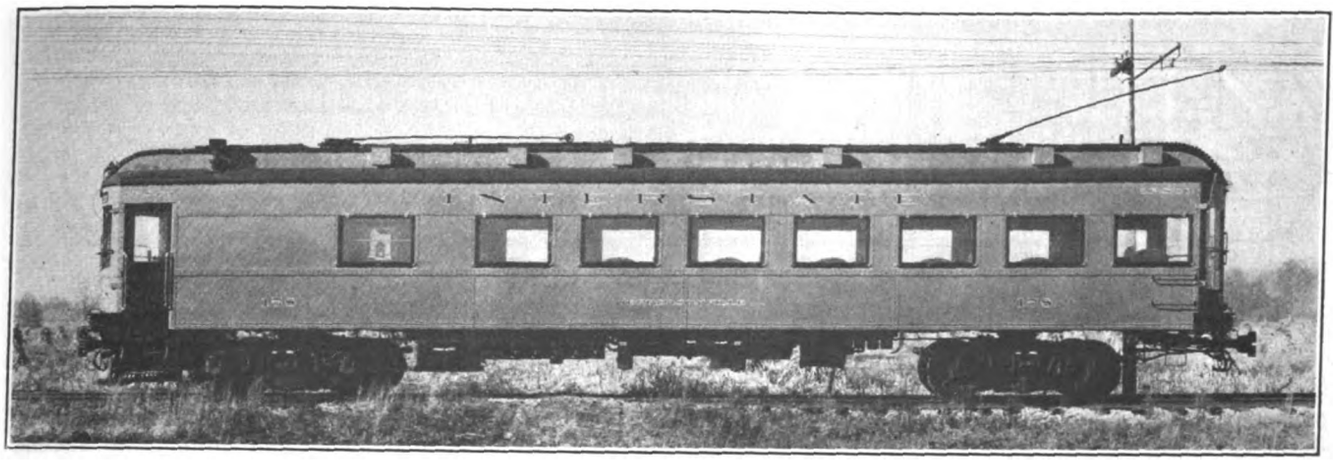


Combination Club, Observation and Dining Car of Louisville-Indianapolis Line

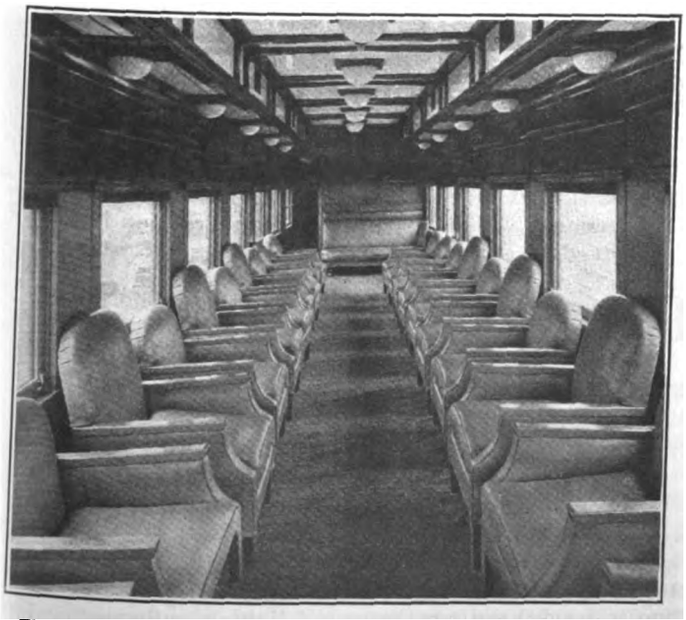
Interstate Starts Dining Car Service

Comfort and Luxury of the Interior Fittings and the Wide Variety Offered by the Menu Are Features of the Combination Club-Dining-Observation Car Service from Indianapolis to Louisville

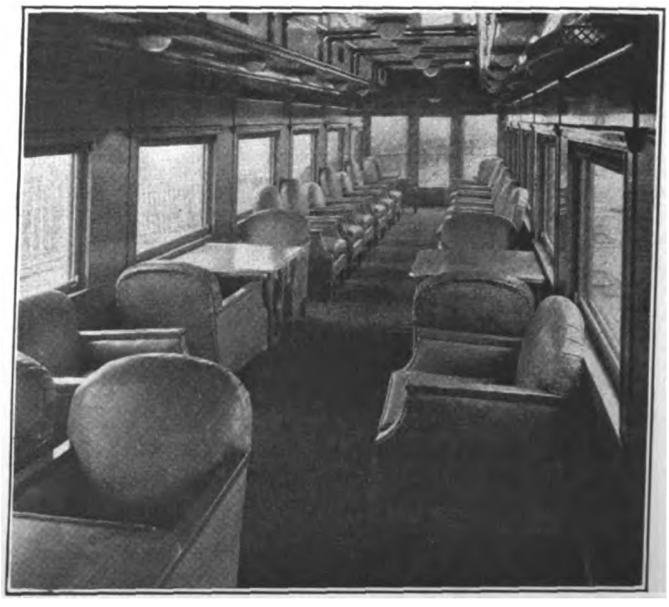
NEW equipment recently put in operation in the all-steel limited trains of the Interstate Public Service Company rivals in the commodiousness of its appointments the rolling stock of the crack trains of the largest steam railroads. These luxurious cars, costing $35,000 each, are in service on the Dixie Flyers leaving Indianapolis at 11 o'clock in the morning and 5 o'clock in the afternoon, reaching Louisville in three hours and forty-five minutes. Returning they operate on the Hoosier Flyers leaving Louisville at 11:45 a.m. and 5:45 p.m. Later it is expected that additional cars of this type will be used on other trains also.

The cars are combination club, observation and dining cars. Two-thirds of the car interior is devoted to a passenger compartment containing twenty-two individual chairs, upholstered in soft Spanish leather. Beside each seat is an electric push button connected with an annunciator. At one end of this compartment there is a long comfortable seat upholstered in the same material. This easily accommodates four people, thus increasing the passenger capacity to twenty-six. The rear end is arranged for observation with heavy plate glass windows extending nearly from floor to roof. In conjunction with the possibility of moving the chairs to any desired position, this arrangement enables the passenger to get with the utmost comfort an excellent view of the country through which the car is passing. In this respect the car excels the typical open platform observation car on steam railroads, as all dust is shut out.

Side windows are also of plate glass and are equipped for winter with outside storm sash. Screens may be substituted in summer for the storm windows. The artificial lighting arrangements are attractive, consist-



There Are Twenty-two Individual Leather Upholstered Chairs in the Club Car and Seats for Four More



Showing How Tables Are Put In and Chairs Rearranged for Dining Service

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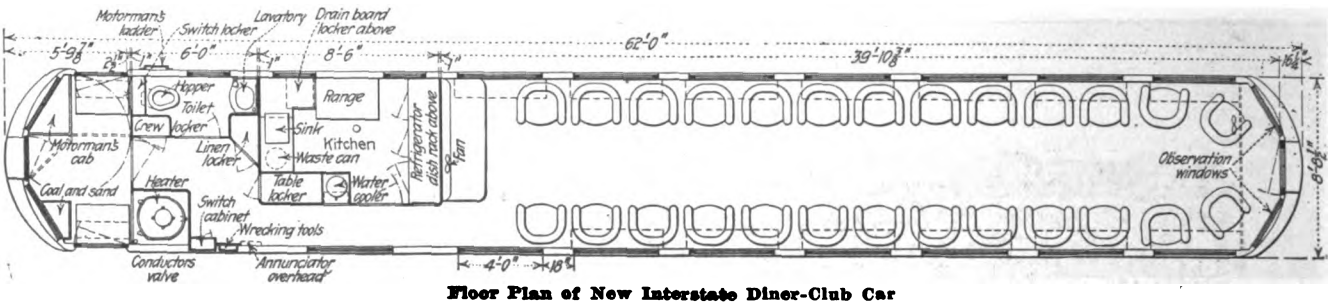
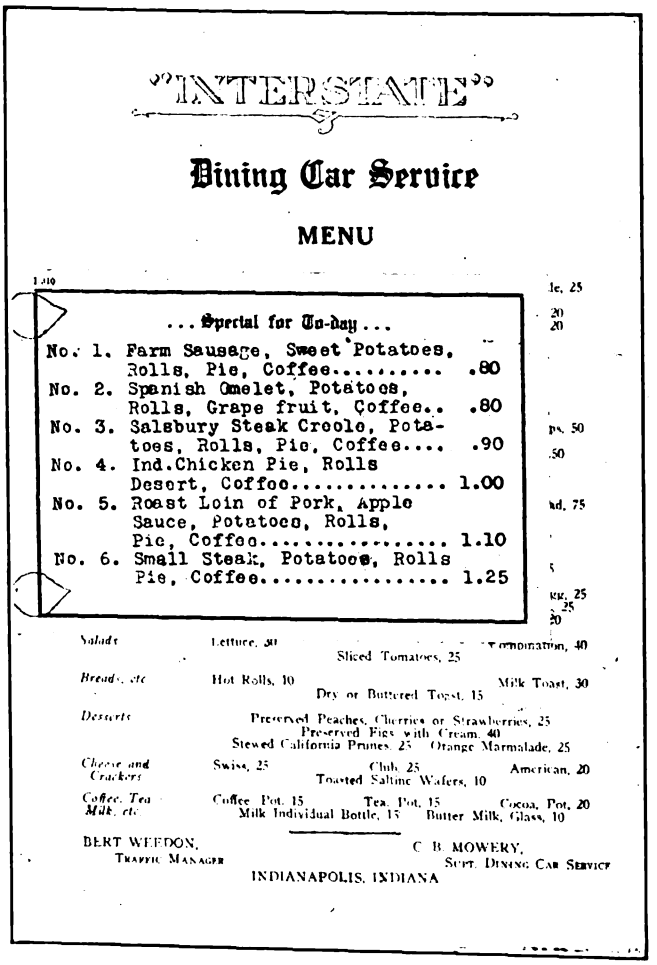


Floor Plan of New Interstate Diner-Club Car

ing of 100-watt dome lights in the center of each of the beams in the ceiling and 50-watt lights along the side. In addition there are emergency lights which operate from a storage battery whenever the power is off the car.

Portable tables which may be adjusted for the seating of two or four people, as desired, are part of the dining equipment. Place for the tables is made by simply rearranging the chairs. An extensive menu is provided, giving the passenger almost as large a choice of viands as he would have in a good hotel. Each car will have a crew consisting of a chef and a porter.

The kitchens are equipped in the same way as the kitchens of modern steam railroad dining cars. There is a cooking range, an ice box, provision locker and all other necessary features. The silver and china service are of the same high grade as the other equipment. The dining car service of the Interstate Public Service, Company has been placed in charge of C. C. Mowry, who until recently was assistant superintendent of the dining car service on the Monon Railroad.



"INTERSTATE"

Dining Car Service

MENU

... Special for To-day ...

No. 1. Farm Sausage, Sweet Potatoes, Rolls, Pie, Coffee..... .80
No. 2. Spanish Omelet, Potatoes, Rolls, Grape fruit, Coffee.. .80
No. 3. Salsbury Steak Creole, Potatoes, Rolls, Pie, Coffee.... .90
No. 4. Ind.Chicken Pie, Rolls Desert, Coffee..... 1.00
No. 5. Roast Loin of Pork, Apple Sauce, Potatoes, Rolls, Pie, Coffee..... 1.10
No. 6. Small Steak, Potatoes, Rolls Pie, Coffee..... 1.25

Salads — Lettuce, 30 — Combination, 40 — Sliced Tomatoes, 25
Breads, etc — Hot Rolls, 10 — Milk Toast, 30 — Dry or Buttered Toast, 15
Desserts — Preserved Peaches, Cherries or Strawberries, 25 — Preserved Figs with Cream, 40 — Stewed California Prunes, 25 — Orange Marmalade, 25
Cheese and Crackers — Swiss, 25 — Club, 25 — American, 20 — Toasted Saltine Wafers, 10
Coffee, Tea Milk, etc — Coffee Pot, 15 — Tea Pot, 15 — Cocoa, Pot, 20 — Milk Individual Bottle, 15 — Butter Milk, Glass, 10

BERT WEEDON, Traffic Manager — C. B. MOWERY, Supt. Dining Car Service
INDIANAPOLIS, INDIANA

The Interstate Menu Offers a Wide Variety

African mohogany of a light shade is used for interior trim. The ceiling is beamed in the same wood with white enamel between the beams. The side walls are entirely of mahogany, as is also the kitchen exterior and the various compartments and cabinets at the end of the car. Extreme simplicity marks the interior arrangement and this adds to the pleasing effect.

A hot water heating system has been installed for winter operation. In addition to this, however, there is an electric heating system, which may be used in case of emergency or on cool days in the spring and fall when the regular heaters are not required. Each car is equipped with three large electric fans, and a blower in the kitchen to remove whatever fumes there may be from the cooking.

The cars were built by the American Car & Foundry Company and are 62 ft. in length over all and 9 ft. 2½ in. in width. Fully equipped, they weigh approximately 100,000 lb. Control has been so arranged that they can be operated as single units, although they will usually be used in multiple-unit trains, with a steel motor coach as the leading car. Each of the new cars is equipped with two G.E. 254 150-hp. motors on the front truck, geared for a speed of 70 m.p.h.

The additional fare on these cars between Indianapolis and Louisville is 75 cents per chair. Between Indianapolis and Columbus, Ind., the extra fare is 50 cents, and between Louisville and Seymour it is the same. It is 75 cents a chair from Louisville to all points north of Seymour and from Indianapolis to all points south of Tremore. It is the first service of this kind that has been established in the Indiana-Ohio interurban district and is proving very popular with the public.

Coal Consumption Cut a Third in Three Years

By Attention to All Sources of Power Waste, Including Uneconomical Car Operation, Union Traction Has Saved Fuel and Reduced Maintenance Cost

FOR several years the Union Traction Company of Indiana has had under way a continuous effort to reduce power cost with the result that there has been a gradual reduction in coal consumption as follows: 1919, 124,030 tons; 1920, 102,573 tons; 1921, 85,224 tons; and 1922, 81,998 tons. Along with this has gone fairly steady increase in car mileage, from 7,813,419 in 1919 to 7,885,644 in 1920, 7,871,025 in 1921 and 8,330,112 in 1922.

An important feature of the campaign has been the use of meters on the cars, but it has also included attention to track bonding, the use of lighter equipment and its proper allocation, modification of gear ratio where

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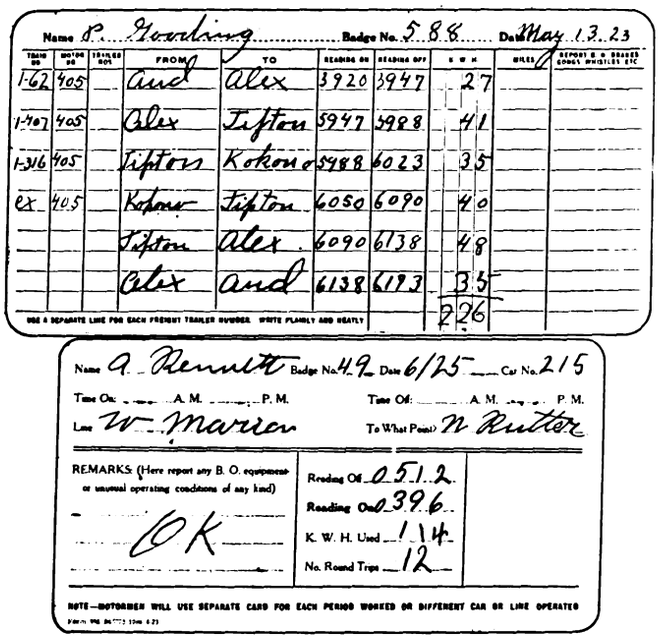
desirable, best possible maintenance of cars, and adjustment of brakes, conservation in shops, substations, etc.

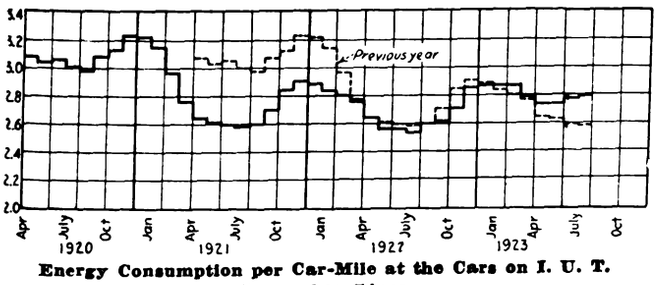
Accompanying the fuel saving there was a reflex influence on the equipment maintenance, which cost $45,000 less in 1921 than in 1920 and $14,000 less in 1922 than in 1921. A large part of this result was clearly attrib-



Cards Used for Recording Energy Consumption on I. U. T. Cars Above, for interurban cars. Below, for city and suburban cars.

utable to the better handling of cars which came about through an effort to save energy by systematic coasting.

During the spring of 1920 the company installed Economy meters on its interurban cars. The company's safety engineer, R. E. Luellen, was put in charge of energy-saving activities.* It took some time to get the work organized, but by the end of the year it was in full swing. The result was a reduction from the consumption of 4.339 kw.-hr. per car-mile at the direct-current switchboard in 1920 to 3.803 kw.-hr. in 1921, or 12.3 per cent. The reduction for the following year



Energy Consumption per Car-Mile at the Cars on I. U. T. Interurban Lines

over 1921 was to 3.629 kw.-hr., or 4.6 per cent. Thus, the saving for 1922 as compared with 1920 was 16.35 per cent. The fact that it was possible to make an additional saving the second year shows that the novelty of the 1921 campaign was not an important factor in its success. The energy consumption at the car for the past three years or more is shown on the accompanying graph.

In connection with the manufacturer's engineers, the railway company devised record cards adapted to its needs, one for the interurban cars, and one for the city and suburban cars, as illustrated. The backs of the cards are utilized to explain means of securing economical operation without losing time. The men read the meters and make their own records.

The local superintendents gather the cards daily and transmit them to the safety engineer, who files each man's cards for a month together. The results for each month are tabulated by lines, with the corresponding data for the preceding month. A copy of the summary is posted on the terminal bulletin board, with a table of totals for the several terminals. For the interurban passenger motor cars, the grand totals for the system are graphed, as illustrated, for comparison with the preceding year.

In order to impress the men with the relation between energy consumption and coasting, demonstrations have been conducted on certain days as follows: The men were asked to estimate their coasting on given trips, by counting poles, and to read their meters correspondingly. Comparisons were then made with the energy consumption immediately preceding. The coasting was found to range from 30 to 36 per cent.

*See article by Mr. Luellen in the issue of this paper for Oct. 22, 1921, page 728.

The Readers' Forum

Railways Fail to Sell Themselves to Graduates

UNIVERSITY OF PITTSBURGH

PITTSBURGH, PA., Dec. 13, 1923.

To the Editors:

I note with interest your editorial in the ELECTRIC RAILWAY JOURNAL for Dec. 1 under the title "Transportation Field Needs to Be 'Sold' to Faculties." This thought is similar to other editorials and articles which have been appearing in the technical press for some time with reference to many public utilities. I feel that there is another point of view to be considered in a question of this kind. I think you would find in a survey of the engineering faculties of this country that they all appreciate perhaps as much as you do the importance of not only the specialized transportation field but other special utilities.

Did it ever occur to you that engineering teachers have certain ethical obligations in connection with problems of this kind? It seems to me that it would be entirely out of place for engineering teachers to emphasize one or more public utilities at the expense of others. In my own case, for example, I am probably more interested in the transportation field than any other phase of engineering. And yet I am very careful in presenting this matter to my engineering graduates for the reason outlined.

I do feel, however, that in this particular case there is a solution for the problem. During the number of years in which I have been connected with engineering teaching, I have been impressed by the absence of any definite program on the part of railway organizations to "sell" themselves to engineering graduates. It is now commonly accepted practice among our leading electrical manufacturing and many utility companies to visit the leading universities and technical schools late in the senior year for the purpose of acquainting graduating students with opportunities in their respective fields. Herein, as I see it, lies the explanation of the failure to build up the personnel of many of our transportation utilities.

H. E. DYCHE,
Professor and Head of Department of Electrical Engineering.

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Association News & Discussions

Mid-Year Dinner Committees to Be Organized

A MEETING of local members of the committee on arrangements for the American Electric Railway Association Midyear Meeting was held at St. Louis, Friday, Dec. 21, at which the most important business was the report of the organization committee. This committee, which is in reality a committee on committees, has the responsibility of naming the committees and sub-committees, outlining their duties and functions and recommending their personnel to the general chairman, W. H. Sawyer. The members of this committee are C. O. Birney, chairman; B. W. Stemmerick, R. W. Williams, Herman Spoehrer and B. W. Frauenthal.

Two New Committees Organized by American Association

CONVINCED that the future success of electric railways lies largely in advancing the more general use of progressive methods, the executive committee of the American Association has authorized the formation of two new committees which will, broadly speaking, conduct a first-hand survey of the industry and report on the progressive work that is being done. This survey will include not only operating methods but the improvement of public relations and other activities of importance.

Each committee as organized consists of fifteen members. The United States has been divided into seven geographical districts, and a vice-chairman has been appointed for each. These men will do the field work for their respective committees. On each committee there also is one publicity man. The other seven members of each committee are executives of broad experience.

The success of the plan will depend in great part on the personality of the vice-chairmen and their ability to inspire confidence. Each one is expected to devote at least two weeks of his time, prior to July 1, to visiting and aiding the member companies in his district, both the time and expenses of the man to be borne by his employer company. One object of these visits will be to aid companies by advising them on how other companies are meeting problems, and another to seek advice and information for the benefit of the industry as a whole. While it is hoped that eventually it will be possible for the vice-chairmen to visit all member companies and extend help when needed, in the beginning it is suggested that they make surveys of the best properties in their territories.

The result of this work at the end of a year will unquestionably be to bring aid to a good many member companies, and, at the same time, make all the companies feel that they are a more intimate part of the American Electric Railway Association. The two committees also will have a rather comprehensive survey of the industry upon which to report at the annual convention.

The personnel of the two committees follows:

CITY OPERATION

H. B. Flowers, president New Orleans Public Service, Inc., New Orleans, La., chairman.

Regional Vice-Chairmen

R. F. Carbutt, New York, N. Y.
H. B. Potter, Baltimore, Md.
C. D. Porter, Hampton, Va.
R. W. Emerson, Cleveland, Ohio.
F. C. Chambers, Des Moines, Iowa.
W. E. Wood, Houston, Tex.
W. V. Hill, San Francisco, Cal.

Publicity

L. K. Starr, Atlanta, Ga.

Representative of Manufacturers

E. F. Wickwire, Mansfield, Ohio.

Members at Large

W. R. Alberger, Oakland, Cal.
G. H. Clifford, Fort Worth, Tex.
B. C. Edgar, Chattanooga, Tenn.
E. M. Graham, Bangor, Me.
C. W. Kellogg, Boston, Mass.
C. S. MacCalla, Youngstown, Ohio.
E. J. McIlraith, Chicago, Ill.
J. P. Pulliam, Milwaukee, Wis.

INTERURBAN OPERATION

Harry Reid, president Interstate Public Service Company, Indianapolis, Ind., chairman.

Regional Vice-Chairmen

F. W. Woodcock, Philadelphia, Pa.
H. L. Mitchell, Pittsburgh, Pa.
Samuel Riddle, Louisville, Ky.
J. S. Bleecker, Springfield, Ohio.
G. W. Welsh, East St. Louis, Ill.
V. W. Berry, Fort Worth, Tex.
W. V. Hill, San Francisco, Cal.

Publicity

Frank Blanchard, New York, N. Y.

Representative of Manufacturers

E. F. Wickwire, Mansfield, Ohio.

Members at Large

J. F. Collins, Jackson, Mich.
V. S. Curtis, New Haven, Conn.
H. A. Mullett, Milwaukee, Wis.
C. E. Thompson, Highwood, Ill.
J. C. Schade, Warsaw, Ind.

Power Transmission and Distribution

A MEETING of the committee on power transmission and distribution of the Engineering Association was held at association headquarters Dec. 10 and 11, the first day being devoted to the assignment of subjects and discussion of their scope, while the second day was given over to meetings of the various sub-committees. Those present were C. H. Jones, chairman; M. B. Rosevear, sponsor; G. C. Hecker, special engineer; J. W. Allen, Charles Gilman, C. L. Hancock, H. D. Hawks, L. T. Hixson, H. S. Murphy, J. F. Neild, H. A. Pharo, W. J. Quinn, W. Shaake, A. Schlesinger, J. M. Waldron, F. J. White, J. H. Drew, Mr. DeVries representing Adrian Hughes, Jr., and R. W. Eaton, who also served as secretary of the committee.

F. McVittie was appointed vice-chairman.

Tentative dates for this year's meetings of the committee were discussed. It was voted to hold the next meeting at Chicago, March 10 and 11.

The subjects assigned to the committee were considered in order, and the work proposed was referred to the sub-committees. The subjects include concrete poles, ruling dimensions of approach ears, dimensions of various types of suspensions, catenary suspension, trolley wire wear and composition, temporary connection to trolley wire, trackless trolley overhead construction, review of existing standards, and signal sections of the engineering manual.

On the subject of trolley wire, it was suggested that a joint special committee be organized from members of the power distribution and equipment committees to study the whole problem of current collection. It was also proposed that members of the power distribution committee put up "test miles" of trolley wire and obtain the life history of such installations.

Attention was called to the necessity for standardization of designs of approach ears so that the parts might be made less diversified and to some extent interchangeable. The same action was considered necessary for barn hangers and other hangers used in troughs.

Committee on Relief of Traffic Congestion

AT A meeting held at the Congress Hotel, Chicago, on Dec. 14, the T. & T. Association committee on relief of traffic congestion considered the preparation of a questionnaire to be sent out to member companies for the purpose of collecting data and studying means of relieving the increasing street con-

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gestion in the larger cities. With men present from various parts of the country, it was found that all had ordinances limiting parking and providing other regulations, but that these were not proving satisfactory in relieving the congestion. Chairman Paul E. Wilson of Cleveland presided. The meeting was attended by G. B. Anderson of Los Angeles, W. E. Thompson of New York City, D. L. Fennell of Kansas City and J. V. Sullivan, sponsor, of Chicago.

City Operation

THE committee on city operation of the American Association held its first meeting at Chicago, Dec. 14. Those in attendance were H. B. Flowers, chairman; R. F. Carbutt, R. W. Emerson, H. B. Potter and W. E. Wood, regional vice-chairman; M. E. Ailes representing L. K. Starr, publicity member; E. F. Wickwire, manufacturer representative; J. P. Pulliam, E. J. McIlraith, C. S. MacCalla and V. W. Berry representing G. H. Clifford, members at large; S. E. Emmons and E. J. Blair, guests; Labert St. Clair and G. C. Hecker of the association staff.

The secretary read the plan of organization and procedure, after which the aims and objects of the committee were discussed. As to the best method of starting the work, various plans were presented.

A number of subjects mentioned for investigation by the committee included the motor bus, traffic congestion, lightweight cars, one-man operation, power saving, etc. It was felt that one thing to which the committee might devote some attention is the question of higher schedule speeds. The slowing down of schedules in city operation was held to have brought about greater use of the motor bus and the private automobile.

H. A. Johnson, president of the Engineering Association, who was present at the afternoon session, spoke of the trips made by representatives of the Chicago, North Shore & Milwaukee Railroad and said he felt the benefits derived from these trips had crystallized President Budd's ideas and resulted in the formation of the committees on city operation and interurban operation. In his opinion the way to start the committee work was for the regional vice-chairmen to go out into their territories and visit the properties. He said that the resulting interchange of ideas would benefit both the regional vice-chairmen and the managers of the properties visited. He thought a meeting of the regional vice-chairmen should then be held in order to report and discuss what they had found.

President B. I. Budd was at the meeting for a short time and spoke of the possibility of manufacturers and bankers working out a plan for financing modern equipment to replace antiquated equipment. He pointed out what the motor bus manufacturers have done along that line. He also expressed the belief that increased speed and relief of traffic congestion are very important. He said he thought the committee might begin to prepare publicity material for future use, stressing the expensive street widening projects and boulevards undertaken by the municipalities for motor interests, and pointing out at the same time that practically nothing of that nature has been done for the street car riders, who constitute probably 80 per cent of the general public.

Mr. Budd expressed the hope that the committees would furnish information and ideas leading to modernization and toward further development of the industry. He said the industry has not by any means reached the limit of its development, and that if we can only get rid of some of the nightmares of the past and become imbued with the desire to give better service and promote better public relations the industry will go forward rapidly. He mentioned the enthusiasm and energy displayed in the early days of the industry and said that if the committees could only arouse a part of that spirit on the part of the managements today a tremendous amount of good would result.

It was decided to hold the next meeting at New York Jan. 10.

Interurban Operation

THE first meeting of the committee on interurban operation of the American Association was held at Chicago, Dec. 12. Those in attendance were Harry Reid, chairman; H. L. Mitchell, Samuel Riddle, G. W. Welsh, F. W. Woodcock and V. W. Berry, regional vice-chairmen; Frank Blanchard, publicity member; H. A. Mullett, C. E. Thompson and J. C. Schade, members at large; M. B. Lambert and C. L. Van Auken, guests; Labert St. Clair and G. C. Hecker of the association staff. E. F. Wickwire had come to Chicago following his recovery from a serious illness, but was unable to attend the meeting due to a relapse.

The plan of organization and procedure, referred to elsewhere in this issue of ELECTRIC RAILWAY JOURNAL, was read, after which the chairman outlined briefly his views regarding the scope of the committee's activity. The addition to the personnel of the committee of members at large from the Pacific Coast, the state of New Jersey and the Southeastern district was suggested.

Mr. Lambert suggested that the proposed committee activities be given wide publicity during the next two or three months. He then spoke of the opportunity presented through this committee and through the committee on city operation for the manufacturers to co-operate. He suggested that various manufacturers designate certain of their district representatives to co-operate by bringing to the attention of the regional vice-chairmen any outstanding features or improvements observed. Mr. Lambert thought the regional vice-chairmen also might bring to the attention of the manufacturers many suggestions that would be helpful in stimulating activity on the part of the manufacturers in responding to the needs of the industry.

In the ensuing discussion it was pointed out that it must be demonstrated to member companies that the association is attempting through the work of this committee and the committee on city operation to advance the general interests of the entire industry. Since the idea is just at its inception a great deal of discussion was devoted to ways and means of obtaining the desired information and distributing it to the member companies. It was proposed to get immediate publicity through the technical press of outstanding developments or accomplishments found. The committee agreed that such publicity should be given in advance of the committee's annual report where particularly interesting information was obtained by the regional vice-chairmen.

It was agreed that Chairman Reid would write to the manager of every interurban railway in the country advising him of the organization, plan and procedure outlined for this committee work.

President B. I. Budd, who was present at the afternoon session, expressed his appreciation to the chairman and the members of the committee for accepting the responsibility of this work. He said that he felt the help which could be rendered the industry was incalculable. Mr. Budd declared that the interurban situation was not so serious as many people thought. "I believe," he said, "that the erroneous impression regarding the situation in general is due largely to the lack of information or to the dissemination of much misinformation. A great deal of publicity is given to the weaknesses of the industry, but very little to its accomplishments." Better apparatus and tools and the more intelligent use of every known development and improvement require the dissemination of information in such shape that the application of these methods may be known to every one in the industry.

Another feature of the work discussed by Mr. Budd was the opportunity for the vice-chairmen to become acquainted in their visits with young men who are capable of development as future leaders. He suggested building up a list from which future committee men might be selected, and felt that the committee work would assist in developing these young men for the companies and for the industry, and thereby make available a flow of young men for positions of responsibility.

There was a general discussion of the relation of the motor vehicle to the industry and it was pointed out that the committee should direct its attention to this phase of the transportation problem.

Mr. Lambert suggested that the committee study the possibilities of the organization of holding companies to finance the purchase of equipment and establish central maintenance plants. He stated that his company would be

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glad to place at the disposal of this committee and the committee on city operation its experts on freight haulage and on shop practice.

Mr. Blanchard felt that there has been too great a disinclination on the part of managers to establish proper and friendly contact with the newspapers, which in his opinion are the best media in a community to establish direct contact with the general public.

He urged companies whenever they have real news to give it to the newspapers, but advised against the practice of attempting to secure free advertising by offering it to the newspapers as news. He urged a proper and reasonable amount of paid advertising by the companies. He suggested that the newspapers be used to acquaint the public, particularly in the small communities, with the companies' employees. He also suggested that the companies tell the public through the newspapers how its money is being spent in the communities and show what a large percentage of its receipts are returned to the community in wages, material and other items.

Definite Educational Plans Prepared

AT THIS year's meeting of the committee on education of the American Association, held in New York Dec. 18, the assignment of the executive committee was interpreted to instruct the committee to prepare an elementary text on electric railway economics. This the committee definitely plans to do if a way can be found to finance the undertaking. The proposed material will serve as a text for instruction in the fundamentals of electric railway service, aside from operating and mechanical considerations. These will form the basis for later plans.

The committee will at once canvass the field to learn, through the cooperating educational directors, what is now being done along educational lines by member companies.

A booklet will also be prepared for wide distribution among employees, to stimulate interest in education. This will be done with a view to impelling each employee to ask himself whether he is making the best use of the educational facilities already within his reach if he will but make the effort to utilize them.

Those present at the meeting were: Edward Dana, Boston, chairman; W. J. Edmunds, Pittsburgh; A. L. Hodges, Brooklyn, representing C. E. Morgan; A. T. Koehler, New York, National Industrial Conference Board; Myles B. Lambert, East Pittsburgh; H. H. Norris, New York; J. V. Sullivan, Chicago; Prof. W. H. Timbie, Boston. Messrs. Dana, Lambert and Executive Secretary J. W. Welsh were appointed as an executive sub-committee to inaugurate the plans of the committee as promptly as possible, and to Mr. Norris was assigned the duty of receiving suggestions as to the booklet and putting them into concrete form.

Chase Hotel, St. Louis, Where Midyear Convention Will Be Held

Publicity for Midyear Meeting

PLANS are already under way in making arrangements and securing publicity for the Midyear Meeting of the American Electric Railway Association, to be held in St. Louis on March 4. Col. A. T. Perkins, general manager United Railways of St. Louis, is chairman of the publicity committee, which has made arrangements to secure adequate recognition for the convention. St. Louis welcomes the convention for many reasons. It calls itself the "city surrounded by the United States." With the terminals of twenty-six railroads reaching all parts of the country it is the gateway to the South and Southwest.

Among its many advantages, the city especially prides itself on its electric railways. The United Railways, which has been in receivership for some years, has now advanced to a position where the Federal Court and the Public Service Commission believe that the time for reorganization and resumption of control by the owners is at hand. The company also has the important matter of several franchise renewals on hand on the east side of the Mississippi River.

On the Illinois side also, East St. Louis is a greater industrial center than St. Louis itself. It is served by the lines of the East St. Louis & Suburban Railway and affiliated properties under the leadership of President W. H. Sawyer, who also is chairman of the committee on arrangements for the dinner. The lines of this company terminate at the west end of the Eads Bridge at Third and Washington Avenues, St. Louis. With characteristic foresight, President Sawyer already has announced that the badge of any one attending the Midyear Meeting will serve as a pass on the east side line. The McKinley lines, now absorbed by the Illinois Power & Light Corporation, have a terminal in St. Louis at Twelfth and Lucas Avenues in the heart of the business section, reaching it by means of the McKinley Bridge over the Mississippi. On the Illinois side, these lines serve Granite City, Venice, Wood River and Alton on the line to Springfield, Peoria, and other Illinois points.

The city is looking forward with great interest to the Midyear Meeting.

The Hotel Chase, St. Louis, Mo., where the Midyear Meeting is to be held, "in its appointments, furnishings, and beautiful settings is as beautiful as any in America," according to Mr. Sawyer. A street car line extends to the door of this hotel, which affords direct connection with the downtown business district in less than twenty-five minutes.

The Palm Room, in which the banquet will presumably be held, is large enough so that 950 persons can be seated with clear vision of the speakers' table. There is also the Crystal Ball Room with a seating capacity of 600, and an inclosed roof garden with a seating capacity of 600; the former probably will be the room used for the business meetings.

News of Other Associations

Midwest Association to Meet

THE Midwest Electric Railway Association will hold its next quarterly meeting at Springfield, Mo., January 17. There will be a morning and afternoon business session, at which several papers will be read, and a banquet in the evening with several prominent speakers. This association is composed of executives and operating officials of Missouri, Kansas, Nebraska, Oklahoma, Colorado and Arkansas.

New York Electric Railway Association

AT A meeting of the executive committee of the New York Electric Railway Association, held last week, the date of the midyear meeting was set for Thursday, Jan. 24. The meeting will be held in the Commodore Hotel, New York City. The morning session will begin at 10 a.m. There will also be an afternoon session and an evening dinner, also at the Commodore.

Wisconsin Utilities Convention.—The 1924 convention of the Wisconsin Utilities Association, will be held April 17 and 18 at the Hotel Pfister, Milwaukee.

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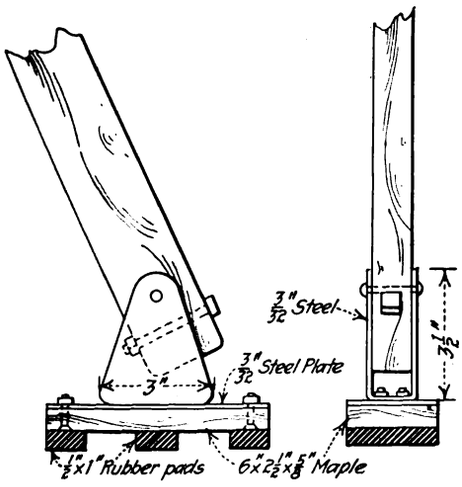
Maintenance of Equipment

Safety Shoe for Shop Ladder

LADDERS used in the shops of the Chicago Surface Lines are equipped with "safety shoes" of the type shown in the accompanying sketch, to prevent slipping on the concrete floor.

These shoes are made up in the shop and consist of a U-shaped bracket of $\frac{3}{16}$-in. thick steel riveted



This Shoe Prevents Ladder from Slipping on Concrete Floor

to a flat plate 2½ in. wide by 6 in. long. A maple block ⅝ in. thick is bolted to the bottom of the plate and ½-in. x 1-in. rubber pads are screwed to this block. This arrangement always brings the full area of the ladder footing into contact with the floor and the rubber further prevents slipping.

Soldering Contact Tips on M. U. Switch Group

A METHOD of fastening contact tips to the stationary contacts of switch group control on multiple-unit control cars has been worked out at the shops of the Metropolitan West Side Elevated Railway, Chicago, and has resulted in longer life to the contact tips with fewer failures of this particular part of the switch group mechanism. The contact tip is tinned on the under side after being formed to fit the stationary contact. The stationary contact is likewise tinned, and after the machine screws which ordinarily hold the contact tip in position are driven home, the assembled contact is heated and the two parts thus sweated together.

At the time the stationary contact is tinned, sufficient solder is used to fill up the counterbored hole into which the cable lugs are screwed. This holds these lugs securely in position and prevents arcing at the point where the lugs screw into the stationary contact.

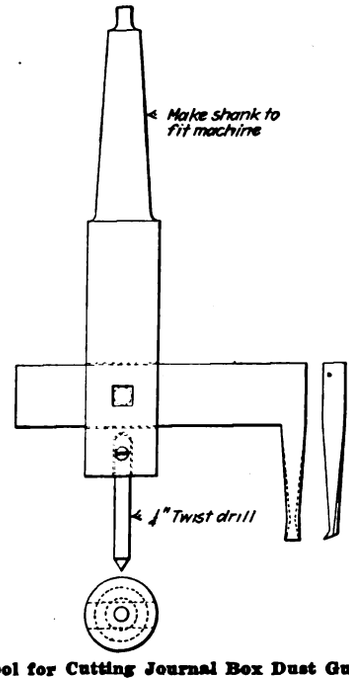
This method of fastening the contact tip has made possible the wearing of the tip down to a thickness which previously could not be allowed on account of the warping of the tip and the consequent holding of arcs when the circuit is broken. This arc, although held down to a minimum by this new method, has in the past proved rather disastrous to arc boxes or arc shields on the switch unit. These shields are made of $\frac{3}{16}$-in. transite, and considerable pitting and burning has been experienced. To eliminate this trouble the transite is soaked in oil, waste oil from the control cylinders being used, and the arc appears to slide over rather than pit the shield.

Convenient Tool for Cutting Dust Guards

BY J. T. PORTER
Master Mechanic North Texas Traction Company, Fort Worth, Tex.

THE Northern Texas Traction Company uses standard wood dust guards for its journal boxes, and has found the tool shown in the accompanying illustration of particular service for cutting the holes accurately. It is provided with a shank with the upper part arranged to fit the particular boring machine or drill press which is to be used. The lower part of the shank has a slot in which a right-angle cutting arm fits. The cutting arm is held in position by a set screw after being adjusted to the proper location for the hole which is to be cut. In making the tool, care should be taken to see that the set screw does not work loose. A good method is to countersink the arm where the set screw strikes it and then to use a locknut against the shank. The lower end of the shank is provided with a quarter-inch twist drill for accuracy in setting and to give a bottom support that will prevent vibration.

Previous to the use of this tool, the old method of cutting the holes in dust-guard boards was to mark off



Tool for Cutting Journal Box Dust Guard

the hole and then saw out the circle on a bandsaw. With this method the outer part of the board has to be cut through to get inside and make it possible to saw the circle. This cutting through the outer part of the board weakens the dust guard and frequently results in breakage. It was also almost impossible to saw out the circle accurately, and as a result when the board was slipped over the shoulder on the axle there would be open places that would let in dust.

Another method of cutting the holes which was tried without success was to clamp the board in a chuck of a speed lathe and turn the hole out. This is a great improvement over the sawing method, but difficulty was experienced when the hole was being turned from the pressure of the chuck jaws. This pressure caused the wood to spring somewhat so that when the board was finished and removed from the chuck it would

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spring back and the hole would be slightly oval in shape.

By use of the tool shown in the accompanying illustration, dust guards for journal boxes can be cut on either a boring machine or a high-speed drill press. All that is necessary to hold the board in place on the bed of the machine is a clamp that will keep the board from turning or rising. The holes will be cut to exact size and will be entirely true. The use of this tool has shortened the time of cutting the holes in these boards at least 50 per cent over previous methods used. In cutting the holes better success was had by revolving the tool at a high rate of speed, as a cleaner cut hole is formed.

Increasing Trolley Wheel Mileage*

ALTHOUGH the trolley wheel is a very small part of a street car, it plays a very important part in its operation, and much time and money have been spent in perfecting current collectors. Some companies have found trolley shoes superior to the trolley wheel, but the experiments of the El Paso Electric Railway with several different trolley shoes were unsatisfactory and did not give the results which have been obtained with the trolley wheel.

The company states that its trolley wheel mileage record surpasses that of any other company in Texas, and for the past four years has been as shown in the following table.

Year	Miles per Trolley Wheel
1919	14,000
1920	18,000
1921	20,000
1922	22,000
1923 (based on seven months operation)	23,000

The company considers that this record is due largely to the fact that an expert trolley man is kept, who does nothing but supervise and inspect trolleys. They are carefully inspected each 2,000 miles, and if they show the slightest defect they are removed and placed in first-class condition before again being put into service. At every inspection the tension of the trolley base is tested with a special weight made for that purpose, and in this way the bases are kept at uniform tension. When the trolley wheels show the least sign of wear they are removed and sent to the machine shop, where a new groove is turned. Another reason for the large mileage is the fact that the overhead is kept in first-class condition.

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

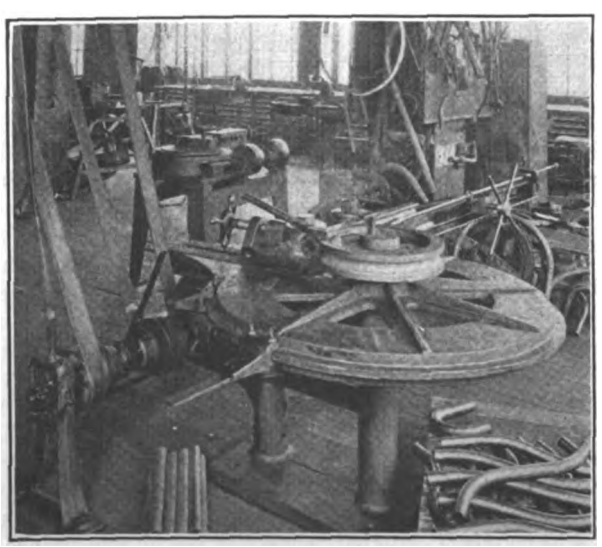
New Equipment Available

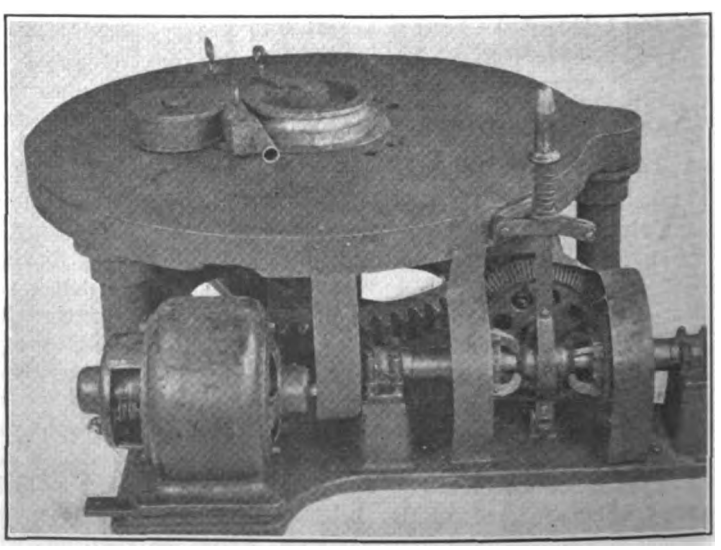
Pipe and Bar Bending Machines

SEVERAL machines for bending pipes, bars and structural iron have recently been placed on the market by the Wallace Supplies Manufacturing Company, Chicago, Ill. One line operated by belt drive consists of the types 5-B, C, D and E. These machines are practically the same, except that they are arranged so that different tool equipment can be used. The 5-B machine is arranged with suitable tool equipment for bending pipes or tubes, but separate tool equipment can be furnished so that angles, channels and other shapes can be bent on this machine. This line is intended primarily for use in bending tubing, electrical conduits, water, gas, steam and air pipes up to 2 in. diameter and for bending bars or structural shapes with 2 in. as a maximum dimension.

These machines are operated by throwing a friction clutch into engagement by means of a lever and can be operated either forward or reverse. Adjustable stops are provided to suit any degree of bend required. The clutch is automatically thrown out of engagement at both the end of the bending operation and when the machine has been reversed to the starting position. The fixtures for pipe bending provide for securing the pipes to the forms by means of a strap. Both the outside follower and the form are grooved with the proper clearance to secure the desired results. The outside follower bar operates between the tube and the roller, instead of the roller working directly on the tube. This method supports the tube for a greater distance and prevents flattening.

Special forms with inside follower bars or floating mandrels can be furnished for bending light-gage tubing to a short radius without danger of flattening or crimping. Heavier





At Left, Belt-Driven Pipe Bending Machine. At Right, Power-Driven Machine for Bending Larger Sizes of Pipes and Structural Shapes

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gages of tubing than $\frac{1}{16}$-in. wall can be formed by using the outside follower bar only and dispensing with the mandrels for supporting the tubes on the inside during the process of bending.

The No. 15 Wallace bar-bending machine is used for bending cold metal bars of 1 in. diameter or 1 in. square, flat shapes $\frac{3}{8}$ in. x 2 in. on edge or flatwise, and angles 2 in. x 2 in. x $\frac{1}{4}$ in. The machine can also be used on hot bending work $1\frac{1}{2}$ in. squares or round, also flat shapes $\frac{3}{4}$ in. x 2 in., and angles $2\frac{1}{2}$ in. x $2\frac{1}{2}$ in. x $\frac{5}{16}$ in.

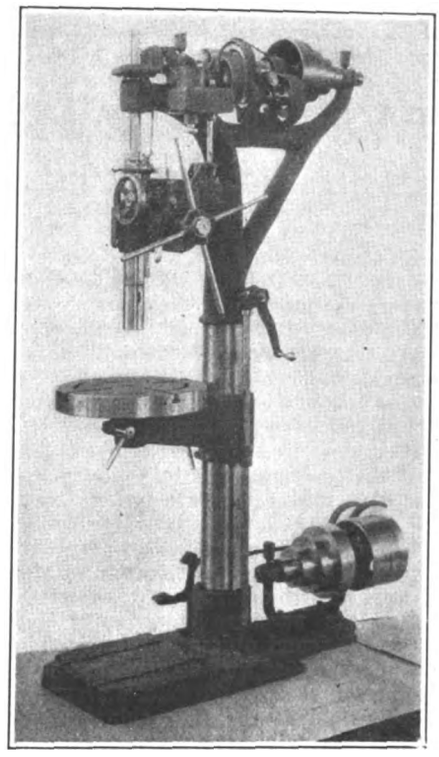
An adjustable stop mechanism is provided on the underside of the machine for automatically stopping and rotating the table at any predetermined point, so that materials can be bent exactly to any desired number of degrees. The speed of the rotating table is 6 r.p.m., the production varying according to the number of degrees that the material has to be bent, the length and kind of stock and also the size of the sections. A fair average production estimate for ordinary cold bending to 180 deg. is 150 pieces per hour, based on rounds, squares and flats bent flatwise.

The No. 8 Wallace machine is power driven and is of very sturdy construction. It was designed primarily for bending of reinforcement bars as large as $1\frac{1}{4}$ in., but the machine has ample power to bend two of these bars at a time and in this way production is increased. The machine can also be used for bending angle iron and for bending pipes of all sizes up to 4 in. diameter. The No. 8 bender will produce from fifteen to twenty bends per hour.

Improved Vertical Drilling Machine

THE accompanying illustration shows a 20-in. vertical drilling machine which has recently been redesigned and improved by the Superior Machine Tool Company, Kokomo, Ind. The improvements include bronze bushings, back gears, geared feeds, and wheel and pilot feeds. Particular attention has been given to a demand for a drilling machine for jobbing work.

The housings for the bearings are bored to standard dimensions, and the bushings which fit in these may be easily removed and replaced when worn. The spindle sleeve is made of cast iron, bronze bushed, and is graduated the full length of its travel. The stop collar is arranged to allow for maximum travel without removal. The column is well proportioned and is reinforced at sections subject to heavy strain. A 2-in. belt and pulley and $2\frac{3}{4}$-in. belt on the counter pulley are used for driving. This gives all necessary power for drilling within the capacity of the machine. Ample provision for lubrication is afforded for all working bearings. As shown in the illustration, this machine is belt driven, but it can be adopted for motor drive, with motor speeds varying from 750 to 1,800 r.p.m.



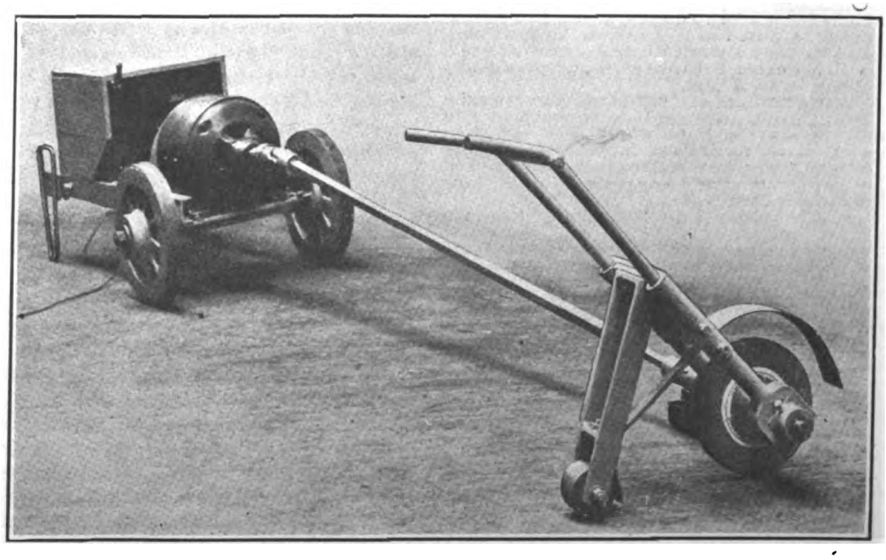
New 20-In. Vertical Drilling Machine

The table is reinforced by sectional ribbing and also has a large supporting shoulder on the hub, to give additional stiffness when drilling at the edge of the table. The height of the machine to the top of the pulley is 74 in., the spindle being 41 in. from the base. The distance from the table to the spindle is $25\frac{3}{4}$ in., the traverse of the spindle sleeve $8\frac{1}{2}$ in., and the traverse of the table $23\frac{1}{4}$ in. This machine drills on the center of a $20\frac{1}{4}$-in. circle. Six spindle feeds from 0.005 to 0.018 in. per revolution are available.

When belt driven, a driving pulley 9 in. x 3 in. running at a speed of 450 r.p.m. is used. This gives four direct spindle speeds from 971 to 875 r.p.m. and with the back gears in four additional speeds from 25 to 226 r.p.m. can be obtained. A 1-hp. motor is required if the machine is to be motor driven.

Rigid Shaft Connection for Track Grinder

A MACHINE for emergency work and for grinding the grooves of special trackwork has recently been developed and is being marketed under the name of the Vulcan telescopic shaft grinder, by the Railway Trackwork Company of Philadelphia, Pa. The principal feature of this grinder is the shaft connection, which is a square steel tube connected to the motor and grinder shaft by universal joints. The manufacturers claim that there is less danger of trouble and less breakage of shafts from this type than with the flexible shaft equipment. By using universal joints at each end of the telescopic shaft sufficient flexibility is obtained for the usual operations of grinding encountered on tracks and in electric railway shops. The apparatus weighs approximately 400 lb.



Track Grinder with Shaft Which Telescopes

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The News of the Industry

One-Man Car Trial

Berkeley Will Use Equipment for Six Months—Oakland Fight Not Making Progress

Through its Council the city of Berkeley, Cal., has voted to put one-man cars on trial for a period of six months. The significance of this move is better understood when it is explained that at present there is an ordinance in that city which forbids operation of cars of this type; that Oakland, an adjoining city, has banned the one-man car, and that Oakland's Mayor sent a letter to the Berkeley authorities urging them to join with him in the war he is making on the San Francisco-Oakland Terminal Railways.

City Manager Edy and City Attorney Sanderson of Berkeley have been directed to prepare an amendment to the prohibiting ordinance, providing for a six months probation of the safety cars. The operation of the one-man cars in Berkeley will be limited to Ashby Avenue and Dwight Way.

The Council has also decided to permit the railway to operate buses in Berkeley at an annual fee of $60 a bus. All other applicants who sought similar permission have been excluded.

City Manager Approves Plan

The action of the Council was based on an exhaustive investigation conducted by City Manager Edy as a result of which he recommended that one-man cars receive a fair trial. He held:

1. Operation of one-man cars need not be objectionable from the standpoint of policing.
2. Use of one-man cars may be expected to delay traffic or to bring about traffic congestion only if such cars are used on heavily traveled lines.
3. Traffic delays incident to the use of safety cars can be materially reduced by adopting the San Diego system of collecting fares as passengers enter on inbound cars and as they leave outbound cars.
4. No extra hazards surround passengers riding in such cars.
5. Operation of one-man cars should bring about an immediate improvement in service on the lines where they are used and, as economies are introduced, the city is manifestly in a better position to request a review of the company's rates by the Railroad Commission.
6. The so-called "one-man, two-man cars" are superior to one-man cars. If permission to use the latter is granted and if such use proves satisfactory to the public, the former should be operated to the limit of their practicability in Berkeley.

Objection to the proposed amendment is voiced by the Housewives' League, which is threatening to call a referendum on the matter. This, however, has not as yet been definitely decided. Improvement clubs are generally expected to back the recommendation of the City Manager.

The controversy in Oakland over the use of the one-man car appears to have passed the acute stage, at least for the time being. Petitions are still being circulated asking for a bond issue to settle the question of municipally operated buses, but the public seems indifferent. It is claimed that the necessary 6,000 signatures have been obtained, but on Dec. 11 the petitions were still in the hands of the circulators. Although the ordinance remains in effect that was passed against the use of the one-man cars in Oakland, cars of that type are still being run there.

In the meantime the city bus, the "Rosalie," continues to be operated by the city under the supervision of Commissioner Moorehead. An effort was made to purchase this bus, but the Council found a flaw in the ordinance, which specified that a "new" bus should be acquired. As the "Rosalie" was six weeks old at the time this ordinance was passed, a majority of the Council balked and the "Rosalie," although making official trips, is still only loaned to the city by the makers.

Mr. Moorehead recently announced that he had found funds among those of which he has control by which four new buses can be purchased. He has expressed the intention of asking the Council for permission to acquire these buses, but so far, he has failed to do this and the source of the funds which he proposed to use remains one of the deep mysteries of Oakland.

Making Plans for Railway Continuance in Massachusetts

In view of the court decree which calls for cessation of service on the Connecticut Valley Street Railway system, operated by a receiver, by March 1, a movement is under way to form a citizens' company in Northampton to buy the lines running from that city to Amherst and Hatfield. The Northampton Street Railway officials, while stating that they had no intentions of taking over these lines on their own behalf, have indicated that they might be willing to operate them under some arrangement with the prospective owners. In respect to the Greenfield and Turners Falls line no interest has been exhibited in the matter of arrangements to continue the road in operation, the residents apparently being resigned to the prospect of bus operation.

On the Northern Massachusetts system, active interest is being taken in Athol, Gardner and Templeton, in the plan to command local capital to purchase and operate stretches of road serving these communities. These plans are ordered with a view to buying the physical properties at a sufficiently low price to start the project on a paying basis. Service on the section running between Winchendon and Baldwinville was discontinued on Dec. 15.

New Contract Proposed

Cincinnati Committee Contends that Relations of Railways with City Are Discordant

Abrogation of the Cincinnati Traction Company's franchise and the awarding of the company with a new contract with no "entangling alliances," together with a fare not to exceed 7 cents and improved service for the car riders, are the outstanding recommendations in the report of Mayor George P. Carrel's traction committee, made public on Dec. 15. The report will be submitted to the City Council before Jan. 1 for ratification. The committee was appointed two years ago by Mayor Carrel to study Cincinnati's traction situation.

Similar Proposal Made Before

The proposals are similar to those offered in April, 1921 by W. C. Culkins, formerly Director of Street Railroads. At that time Mr. Culkins recommended that the service-at-cost franchise under which the traction company operates be abrogated. The Mayor's committee further recommends that the traction company be compelled to pay the cost of repairing that portion of the street along the rails for a distance of 2 ft. outside and between the rails. The committee also suggests that the aggregate capitalization of the Cincinnati Traction Company, Cincinnati Street Railway and the Cincinnati & Hamilton lines be reduced from $39,000,000 to $25,000,000; that the earnings of the traction company be limited to 6 per cent on the $25,000,000, and that the traction company be required to surrender its jurisdiction over all other activities in which it is involved and devote its entire energy to the operation of its electric railway system. Another provision suggested is that net earnings exceeding 6 per cent on the capital be applied to cut fares.

The Mayor's committee said it had reached the conclusion that the differences between the Cincinnati Street Railway and the Cincinnati Traction Company were irreconcilable. The report criticises the existing franchise, which it says is a partnership between a public body and a private enterprise, saying it has failed utterly of its heralded results at the time of its adoption. The Cincinnati Traction Company took over the local electric railway system from the Cincinnati Street Railway under a fifty-year lease in 1901.

It is pointed out that instead of fares being reduced or held at a specific rate they have advanced and the prospects are for indefinite advances. Along with this, the report says, there has been a steady decline in service.

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The recommendations of the Mayor's committee were approved by the entire membership.

The committee found:

1. The mutual relations between the Cincinnati Traction Company and the Cincinnati Street Railway and the city of Cincinnati are discordant and lacking in necessary co-operation and harmony.
2. Maintenance of the traction properties has been deferred year by year until the accumulation of deferred maintenance will require from $2,000,000 to $4,000,000 to absorb.
3. The Cincinnati Traction Company has activities other than the transportation of people over the streets of the city.
4. The aggregate capitalization of the street railway properties in this city is excessive.
5. The service given to the public in the operation of the car lines is grossly inadequate and unsatisfactory.
6. The rate of fare, considering the service rendered, is unreasonable and excessive.

The committee recommended that:

1. The now existing contract of the city of Cincinnati, known as the service-at-cost franchise, be rescinded and abrogated.
2. A new franchise be offered, which shall provide among other things:
(a) A reduction in the aggregate capitalization of both the Cincinnati Traction Company and the Cincinnati Street Railway, including the Cincinnati & Hamilton lines, from approximately $39,000,000 as now claimed, to a sum, which including stocks, bonds, debentures, car certificates and all other forms of indebtedness, and such sum as shall be necessary to rehabilitate the system, or to so improve it as to assure first-class service, shall not exceed $25,000,000, and to which shrinkage and reduction both the companies should contribute.
(b) A provision limiting the rate of fare to a maximum of 7 cents based on present operating costs, with a further provision that net earnings exceeding 6 per cent on the capital investment, as above recommended, be reflected in diminution of fares.
(c) A cessation on the part of the operating companies of all activities save the operation of cars and the transportation of the passengers over the lines within the city limits and territory immediately contiguous thereto.
(d) A provision constituting a sum sufficient to take care of the cost of the repairing of that portion of the streets along the rails of the operating company to a distance of 2 ft. outside and between the rails, and that the same be a preferred charge against the earnings of the operating company.
(e) A provision to the effect that any order of the Director of Street Railroads, or other authorized city official, to the operating companies, shall be presumptively reasonable and to be complied with within the time specified in the order, unless declared by a court of competent jurisdiction to be unreasonable or confiscatory.
(f) The city officials in every department to take at once the necessary steps to compel a compliance with the above recommendations.

Americans Organize Company to Develop Foreign Utilities

Announcement was made on Dec. 18 by the Electric Bond & Share Company, New York, N. Y., of the incorporation in Maine of the American & Foreign Power Company, Inc., which will enter the public utility field of Cuba, Central America and South America. The organization of the new company, which marks the first time that American hydro-electric enterprise has been extended on a large scale into foreign countries, was effected by the Electric Bond & Share Company, the common stock of which is owned by the General Electric Company.

The president of the new company will be S. Z. Mitchell, who is also president of the Electric Bond & Share Company, and the following will be directors: Owen D. Young, chairman of the directors of the General Electric Company; Anson W. Burchard, president of the International General Electric Company; Clarence Dillon of Dillon, Read & Company, and Charles E. Mitchell, president of the National City Bank.

The ground work of the new company consists of a number of public utility companies acquired in the last few years by the Electric Bond & Share Company in thirty-nine communities in Cuba, Panama and Guatemala. Some of the more important are hydro-electric companies serving Santiago, Cienfuegos, Cardenas, Santa Clara and Camaguey in Cuba; the Panama Power & Light Corporation, which controls several important power units in Panama, and the chief power companies in Guatemala. Among these properties are included one or two electric railways. These will be developed so as fully to meet the needs of the territory they serve, but the plans of the new company do not now contemplate entering this field with new enterprises.

Community Chest Helped by Railway Employees

When the drive of the Allied Charities of Kansas City, Mo., and the Community Chest of Kansas City, Kan., was conducted, from Nov. 5 to 10, none of the institutions of Kansas City responded more quickly or more generously than the employees of the Kansas City Railways. The men and the women who make up this organization were among the first to go over the top.

In former years outside committees have solicited the employees, but this was not satisfactory, so this year committees to handle the work were appointed in every division and at all departments on both the Missouri and Kansas sides and each committee in turn elected its own chairman or captain. Actual work was started by the committees on Nov. 1. The motto was: "A Day's Pay for a Year's Charity." The goal was 100 per cent subscribers from each member of the organization. Each evening the captain of each team telephoned his report to the secretary of the company, who tabulated the records and sent out daily bulletins showing the standing of the various divisions and departments.

Within six days the grand total of their efforts for the benefit of charity resulted in 3,290 employees subscribing $13,822.40, an average of $4.20, a record that no other organization in Kansas City bettered.

Vacancy for Engineer.—The United States Civil Service Commission announces an open competitive examination for assistant electrical engineer (power plant). This examination is to fill a vacancy in the Quartermaster Corps of the Army, Philippine Islands. Receipt of applications will close on Jan. 15.

Wage Plan Subject of Association Meeting in Philadelphia

One of the outstanding events of the annual meeting of the Co-operative Welfare Association of the Philadelphia Rapid Transit Company was the suggestion made by Dr. Arthur A. Mitten, secretary of the association, that a new wage plan should be put into effect based on the purchasing power of the dollar. Dr. Mitten's plan was announced following a recommendation by Ralph R. Nyman, retiring head of the association, that some new method for adjusting wages was needed to replace the so-called "three-city plan," which, he said, was made effective as a wartime measure and had outlived its usefulness.

Mr. Nyman said that since men and management are in Philadelphia together accomplishing more than was being done elsewhere it was not just that their wages should be governed by conditions in other cities. He said that 99 per cent of the men had agreed to accept a 65-cent rate, refunding the 2½ cents to the co-operative wage dividend fund, the present wage being 67½ cents. At the end of the year each worker is credited with 10 per cent of his year's wages in this dividend account, which brings the effective rate from 65 cents to 71½ cents an hour. Mr. Nyman announced that $3,300,000 in stock was held by the workers in the wage dividend fund. In addition, the Welfare Association owns 10,000 shares and the association itself, which administers sick benefits, has a membership of 99.96 per cent of eligible members. Mr. Nyman further said that the helping hand fund had distributed $30,000 to needy employees and that the savings fund had passed the $2,000,000 mark.

Dr. Mitten referred to the "three-city average" and said that during the war, when agitators sought to arouse trouble by contending that the wages were lower than the union scale, the company was in a defenseless position, because of the existing man shortage, and in order to avert the attempted strike planned to secure government intervention. It adopted the War Labor Board's wage rate decision for certain so-called first-class unionized cities and made this the basis for adjustment of employees' wages in all departments of the company.

He referred then to the determination of the company that beginning Jan. 1 of next year the basic wage rate would be 65 cents. He said that this wage assured the continuation of the present standard of living, which was better than heretofore experienced. He said in this connection:

"We should, therefore, in these prosperous days so plan that we be not overtaken by adversity when business depression makes decreased wages necessary."

The new wage scale, which is effective Jan. 1, 1924, was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 15.

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Virginia Property Relieved of Paving Between Tracks in Portsmouth

The State Corporation Commission has relieved the Virginia Railway & Power Company of the duty of paving between its tracks in Portsmouth. A counter action was overruled which had been brought by the city of Portsmouth, holding that the commission had no right to disturb a contract between the city and the company.

The case, the first of its kind in Virginia, arose not long ago when the city of Portsmouth decided to pave its principal street, a wide thoroughfare, and served notice on the railway that it would be expected to pave between its tracks and 2 ft. on each side of them, according to the contract with the City Council. The railway took appeal to the Corporation Commission, on the grounds that the property was not a paying investment and that the company could not be forced to expend funds for this work when the property was being operated at a loss.

Jurisdiction was the principal question before the commission, and that body decided that no city could enter into a contract prejudicial to the welfare of all. The principle of the decision is that the Commonwealth is greater than any of its political subdivisions. The commission held that there was no valid contract obligation on the company with respect to the alleged duty of paving and that even if there were such a contract the state had the power, with the consent of the company and over the protest of the city, to suspend such duty. It therefore overruled the demurrer of the city of Portsmouth.

Pointing to the fact that the company's losses from operation last year were about $100,000 and that the paving bill would be in the neighborhood of $175,000 (estimated), the commission decided that to impose this heavy burden upon the power company "under present conditions would be unjust and unfortunate; unjust to the power company and unfortunate to the public whose needs the company is designed to serve."

The commission states that the decision is on the merit of the proposal, and does not mean that similar action will be taken in other cases.

Ruling Rendered on Service Extensions.—Asserting that the Wisconsin Railroad Commission is without authority to order extensions of public utility services in municipalities, the Wisconsin Supreme Court affirmed the decision handed down recently by a lower court at Madison in the case of the state vs. the Washburn Water Works Company involving municipal or commission jurisdiction over municipal water main extensions. The Wisconsin Supreme Court in its latest decision held that authority to demand extensions and impose penalties for failure to comply with orders of the commission is vested in the municipality and not the commission. This ruling is regarded as likely to have an important bearing on railway extensions requested by municipalities.

M. O. Agitation Renewed

Messrs. Witt and Hatton Want to Take Over Cleveland Railway—Consummation of Plan Unlikely

Talk of municipal ownership of the railway system is again going the rounds in Cleveland.

Under the service-at-cost franchise with the Cleveland Railway the city has the option to purchase the property at any time by the payment of $110 a share for the stock. This stock is now selling in the market for about $95 a share. Inasmuch as there is approximately $30,000,000 par value of stock outstanding, with an additional $5,000,000 par value of bonds, it would require a bond issue of about $38,000,000 for the people of Cleveland to purchase the property.

The talk of municipal ownership was started recently because of the fact that Cleveland on Jan. 1 begins the city manager form of government, and Peter Witt and Prof. A. R. Hatton, two of the newly elected members of the City Council, are both avowedly in favor of municipal ownership of the Cleveland car system.

Following declarations by Prof. Hatton and Mr. Witt that they favored purchase of the railway lines, John J. Stanley, president of the Cleveland Railway, said he was agreeable to the city purchasing the lines at any time if the stockholders were paid $110 a share as called for by the option in the franchise.

On Dec. 17 Councilman John Sulzmann introduced a resolution calling for a bond issue sufficiently large to purchase the Cleveland system. This resolution was defeated in the City Council, but on a move to reconsider it is now in the hands of the street railway committee of the Council, where it will die with the present Council this year. Councilman Sulzmann's action was evidently taken merely to beat an expected move on the part of Councilman-elect Hatton after the first of the year.

During the life of the service-at-cost franchise in Cleveland, there have been two efforts in City Council to have the city purchase the lines. Both were defeated as was a proposition put up to the people of the city by the socialist party.

Most political leaders are of the opinion that any effort to bond the city for $38,000,000 to $40,000,000 for the purchase of the lines by the city would meet with defeat. It is the general belief in Cleveland that the service-at-cost franchise, with the City Council dictating the kind of service to be given, affords the people of Cleveland practically all the advantages of municipal ownership with none of the drawbacks inherent in such ownership.

Officials of Brooklyn Company Agree to Modification of Transit Plan

Gerhard M. Dahl, chairman of the executive committee of the Brooklyn-Manhattan Transit Corporation, has consented to accept a subway extension instead of an elevated structure as a means of ending the deadlock which has prevented the extension of the Fourteenth Street-Eastern subway from Meserole Street, Brooklyn.

The dual subway contracts called for an elevated structure for that part of the line, and the refusal of Lindley M. Garrison, formerly receiver of the old Brooklyn Rapid Transit Company, to permit the substitution of a subway brought about the deadlock, the Board of Estimate refusing to build an elevated line.

Mr. Dahl said that the directors of the company on the report of a special committee, composed of Robert Albert Shaw, Arthur S. Somers, Travis H. Whitney, William S. Menden, president of the company, and himself had agreed that the three projects should be considered as a unit under this program:

1. Dual subway contract No. 4, signed March 19, 1913, is still binding between the city of New York and the company. Under this contract the city agreed to construct the Fourteenth Street-Eastern line. This has not been completed. We are ready, however, to operate this line whenever the city finishes the work. We have been asked whether we will consent to a change in our contract so that the eastern portion may be constructed as a subway. As the public demand for this change evidently expresses the public need, we will agree to this change in the contract provided our present legal rights and claims are adequately preserved and the subway is constructed under plans which will connect it with our existing structures at East New York, but we wish to point out to the public that this company expended years ago, in anticipation of the early completion of this line, approximately $500,000 third-tracking the Myrtle Avenue elevated, which includes an express station at Wyckoff Avenue to connect with the Fourteenth Street-Eastern line. This expenditure will be wasted unless facilities are provided for the convenient transfer of passengers between the Fourteenth Street line and the Myrtle Avenue line at this point.

2. The second plank in our program of action is the construction of the Nassau-Broad Street line. This is also an unfulfilled part of Contract No. 4. The B.-M. T. is ready to equip and operate this line as soon as the city constructs it. Furthermore, as a part of this contract the city agreed to build shops and yards. These are urgently needed in order to maintain even the present service. When the Nassau-Broad Street line is built and the Fourteenth Street-Eastern line is completed, the present 50,000 daily victims of the Canal Street blockade will receive the direct relief which they demand and need.

3. The third plank relates to the proposed connection between the Fulton Street "L" and the Fourth Avenue system at Ashland Place. The B.-M. T. is entirely willing to sign a contract for the Ashland Place connection as soon as it has definite and tangible assurance that the city will construct and complete the Fourteenth Street-Eastern and the Nassau Street lines.

Increased Pay for Inspectors.—The compensation for first grade inspectors (road inspectors) in the employ of the Municipal Railway of San Francisco has been increased from $165 to $185 a month, effective Nov. 16. At the same time the salary of day dispatchers was increased from $175 to $195 a month and of night dispatchers from $165 to $185 a month.

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Babtiste and Beard Honored

C. A. Babtiste and W. K. Beard, advertising managers of the ELECTRIC RAILWAY JOURNAL in New York and Philadelphia territories, respectively, were the guests of honor at a dinner on Dec. 17 at the University Club, New York. The occasion was to celebrate more than a quarter of a century of service by them with the McGraw-Hill Company. The theme of the dinner was dependability. James H. McGraw was toastmaster and more than 100 guests, mostly members of the McGraw-Hill organization, gathered to pay tribute.

After introducing the guests of honor and reviewing briefly the history of their association with the company, Mr. McGraw presented each of them with a check for $1,000, accompanied by a letter expressing his appreciation of their loyal, intelligent and dependable service.

Summoned from Philadelphia at almost the last minute, Mr. Beard was so completely taken by surprise that he said he found it difficult to express adequately his appreciation of the event.

Mr. Babtiste spoke brilliantly about the meaning of the publishing business to him and about the work of the company as an avocation for young men. He said that a publishing house to be successful as the McGraw-Hill Company has been could go forward only on the basis of "Service, more service and still more service."

During the evening L. W. Seeligsberg, formerly business manager of the ELECTRIC RAILWAY JOURNAL and now in business for himself, was presented with a gold watch as a token of appreciation from his former associates.

The dinner happened to be on Mr. McGraw's birthday and the occasion was seized upon by his associates to surprise him with the gift of a handsome watch and chain.

Indiana City Seeks to Buy Three-Mile Railway

The city of Washington, Ind., has petitioned the Public Service Commission for authority to buy the Washington Street Railway, consisting of 2.6 miles of track, six cars and two trailers and other property. The city, the petition said, has a comparatively new $140,000 electric power plant, which is equipped to provide current for the cars. The property of the company is assessed for taxation at $36,840, it was said.

Moving Pictures to Win Public Co-operation

The Boston Elevated Railway has adopted a new plan to secure the good will of the public. It will bring all its troubles to the attention of the public. It has just established an information booth in the Park Street station, one of the most congested points on the system, to keep the passengers informed on car movements and delays and suspensions and diversion of traffic routes.

In addition to this the company has adopted a movie film which shows actual incidents and conditions on the system that make for slower or interrupted service, and these pictures are to be shown in the theaters all over the district. The reel was shown in several houses in Boston this week. The picture presents the arrival of an irate passenger at one of the stations, greatly provoked by the fact that there is no car on hand to rush him into his office, for which he already is late. The starter is taken to task severely for such rotten service, and as the scene shifts from place to place the passenger learns about the open drawbridge, the breaking down of a motor truck, the traffic blockade at one point and a big fire at another and he learns about various other situations over which the company has no control, but which affect the service. At the end of the reel the irate passenger has become satisfied and congratulates the starter on doing so well with such handicaps. The public is expected to become more tolerant and give better co-operation after it has seen these pictures.

News Notes

Company and Every One Else Celebrating. — Considerable interest is being shown in street railway circles in the celebration of its anniversary month by the Northeast Oklahoma Railroad at Miami. The company operates interurban service between Miami, Okla., and Columbus, Kan. The company is carrying a series of advertisements in the newspapers giving information as to payrolls, passengers carried, cars moved, freight handled, and asking for public support and patronage. All employees are soliciting business and suggesting routing of freight over the line that issues their pay checks. Posters in store windows proclaim the desire of the company to serve. A company orchestra is giving concerts and a general "open house" is being conducted by all departments of the company.

Extension Matter Given Hearing.—Hearing in the matter of the petition of the Mayor of Amsterdam, N. Y., for an order of the Public Service Commission to direct the Fonda, Johnstown & Gloversville Railroad to extend its lines into the Fifth Ward of the city, under the terms of a franchise granted in 1910, was further continued without opposition until Jan. 14 at Albany to enable the company to put in some additional testimony. Witnesses gave evidence concerning the cost of building and operating the proposed extension and the demand for trolley service in the Fifth Ward. Estimates were also given as to the revenues which would be received by the proposed extension as well as the operating cost, the witnesses contending that such construction and operation would result in a loss to the company in its other operations in Amsterdam. City Attorney Fitz James contended that the company should live up to its franchise.

More Men to Receive Christmas Bonus.—Payment of the 1923 Christmas bonus will be made to 1,916 trainmen of the Los Angeles Railway. The exact amount of money that will be paid has not been computed, but there are eighty-six more men to receive bonus this year than last year, the total last year being 1,830 trainmen. Special awards to be made to the ten top safety car operators and the ten top motormen and conductors of each division will range from $10 to $100. These awards are made in addition to the regular bonus, which is $60, on a basis of $5 per month.

Newspaper Praises Railway.—Once again the members of the Common Council of Binghamton, N. Y., will consider the advisability of granting the Binghamton Railway the right to charge a 6-cent fare within the limits of the city. Editorial comments in the *Morning Sun* of Binghamton under date of Dec. 5 would favor the 6-cent rate in view of the fact that the company kept faith with its promises made at the time the 6-cent fare was first proposed, namely, that new and better cars would be added and the company's service improved. The writer does not hesitate to add that residents in the city of Binghamton can find consolation in their 6-cent fare when compared with a 7-cent and 8-cent charge in various other cities.

Accident on Indiana Interurban.—Several persons were reported injured in a double rear-end collision of interurban cars on the Louisville, Ky., and Jeffersonville, Ind., connecting bridge during a fog on the morning of Dec. 17. It was reported that the first car, from Charlestown, Ind., had slowed down, when it was rammed by a regular car from Jeffersonville. The Seymour, Ind., car, also southbound, in turn rammed the car from Jeffersonville. The front and rear platforms of the center car were wrecked, but the other two cars were able to proceed on their own power. None of the three cars was derailed. The three cars are all under the operation of the Interstate Public Service Company.

Safety Measures Devised.—To supplement the crossing protection already maintained at the scene of the recent Twentieth Century Limited wreck at Forsythe, N. Y., the Public Service Commission on Dec. 14th ordered the New York Central and the Nickel Plate Railroads to give twenty-four-hour flagman service, and the Buffalo & Lake Erie Traction Company, operating a trolley line over the highway at this point, to bring all cars to a dead stop and then have the flagman cross the highway again to see there is no danger of an accident to highway users.

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Foreign News

London Tube Collapses

A strange mishap occurred Nov. 27 in one of the tunnels of the City & South London Railway near the Elephant and Castle station. Just after a train had passed the ground above subsided and blocked the tube.

For some time work has been in progress of enlarging the railway tunnel, which hitherto had been smaller in diameter than those of the other tube railways. It is planned to make all of the tubes uniform in size, so as to permit through-routing and allow the interchange of equipment.

In the main the tubes that are now in regular operation by the companies in the city of London are driven through hard clay. It was necessary to remove the cast iron lining of the tunnel, excavate the necessary amount of material and place a new lining of increased diameter in the tunnel. The cause of the subsidence was the disturbance of the ground during the progress of this work in the vicinity of a large underground cavity. The whole of the railway has now been closed against traffic and will probably remain out of service for some time. Meanwhile, an augmented service of buses has been out on the route.

Subway Project Approved

The Municipal Council has approved the subway project in Argentina. The work of building the new lines that are now proposed will be undertaken by the concessionaire in the near future.

English Electrification Deferred

The plan of electrifying the main line of the Southern Railway's London, Brighton & South Coast division from London to Brighton has been indefinitely postponed, according to Sir Herbert Walker, chairman of the company. He stated that the heavy commitments in the London suburbs, where traffic congestion is more serious, must be taken care of first. The plan for electrifying the main line would cost £10,000,000 and the directors of the company were not satisfied that it would prove a financial success.

Charge for Luggage on London Tube Railways

On account of the delay at stops, the London Underground Railways has begun charging for the conveyance of luggage or bulky packages. Where the ordinary single passenger fare is 5d. or under, the charge will be equal to the single fare, and where the ordinary single passenger fare is over 5d. the charge will be 6d. Passengers' personal luggage up to 14 lb. weight will be carried free.

Extent of Damage to Japanese Electric Railways by the Earthquake

Street Railway System of Tokio Lost 837 Cars and 50 Miles of Track—Much Other Damage Done in the City and Surrounding Territory Is Described

By Shiro Sano
Electrical Engineer, Tokio

THE sudden visit of the great earthquake on Sept. 1 left great damage to Tokio in various phases of metropolitan life, although the havoc wrought by the earthquake itself was not great compared with that due to the subsequent fire. The loss of life and property Tokio received at this time is the greatest ever experienced there, although the city has previously been visited by great earthquakes, on an average once in every century.

The street railway system of Tokio suffered a loss of nine substations, five car sheds, the main office and five branch offices, and 837 cars. About 100 miles of trolley and distributing lines and 50 miles of track were either burned down or disfigured by the quake. The total loss is estimated at about $20,000,000. The damaged substations include two of 3,000 kw. each, one of 2,250 kw. and one of 2,000 kw. Fortunately, about 300 cars were saved and six substations were left intact, their outputs totalling 10,640 kw.

All the machines used on the system are either rotary converters or motor generators, except two sets of mercury rectifiers with a capacity of 550 volts, 900 amp. each, in the course of erection, which were burned.

The city has no generating station of its own, but purchases all of the energy, mainly from the Kinugawa Hydro-Electric Company. The damage to this company was slight and it was ready to supply electricity Sept. 4.

The operation of the street railway of Tokio was resumed Sept. 6 with a limited number of cars on a few routes only, but operations were gradually widened as the reconstruction proceeded. By Oct. 1 the track in use had increased to 89.5 miles, the number of cars running to 400, the number of passengers carried to 863,000, with total carfare of 38,771 yen ($20,000). The greatest trouble in the way of reconstruction is the shortage of cars, although every step is being taken to build new cars and to repair those partly destroyed. Cars from other cities could not be used, owing to the 4-ft. 6-in. track gage of Tokio, which is a relic of the old-time horse cars. To provide for immediate service the city authorities decided to order 1,000 Ford automobiles to be used in conjunction with the electric cars.

Free service was offered from Sept. 6 to Sept. 17 to all passengers, but later this gratuity was limited to holders of "certificate of sufferer." From Sept. 26

Street Car Burned in Front of the Famous "Shiroki-ya" Department Store. At Right, Destruction on Ainza-dori Street

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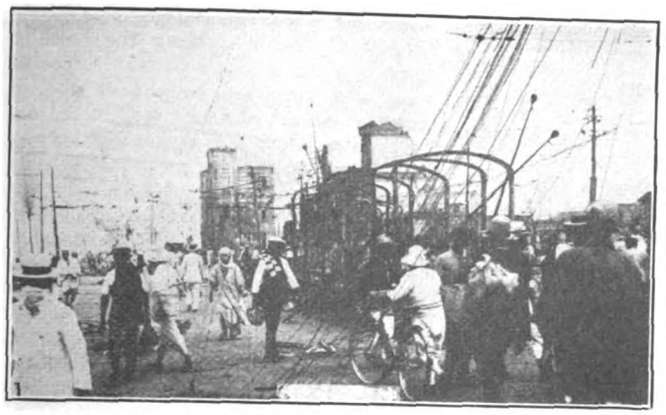
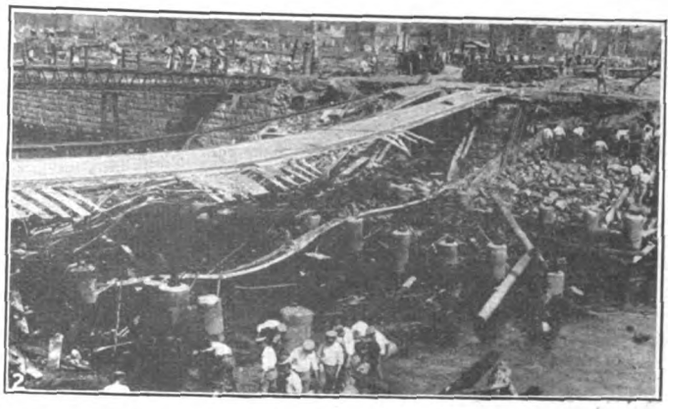


No. 1. Many Cars Were Completely Burned in the Fire Following the Tokio Earthquake



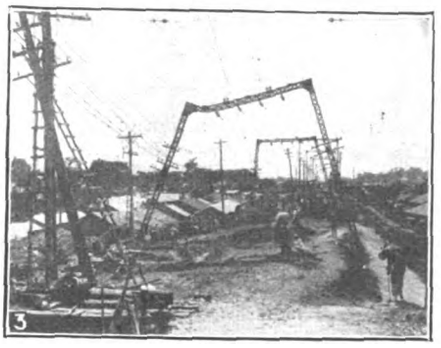
No. 2. A Number of Bridges Collapsed Completely. The Men in the Foreground Are Military Engineers

on free rides were discontinued and new rates of fare put in effect. Before the quake a charge of 8 sen was made for a single ticket, and 15 sen for a return ticket, with free transfers. The fare has since been changed to 6 sen for single and 10 sen for return tickets, without transfer. This really is a kind of fare-raising in the guise of low rates. It is, however, to be abandoned as soon as the system recovers to normal. The reason advanced by the city officials for the change is the lack of facilities for printing transfers.

The street railway system of Yokohama was almost entirely burnt up and it was only on Oct. 2 that it began operation on a few routes with freight cars as passenger cars.

Suburban Railways

The damage done to the suburban railways is comparatively small and most of the systems began their operation soon after the catastrophe. The Keihin Electric Railway received damages to two car sheds and its generating station, and lost four bridges. It began partial operation on Sept. 11, and on Sept. 17 resumed service on its entire system. The income increased greatly owing to the suspension of the parallel line between Tokio and Yokohama of the Imperial Government Railways, whose generating station was destroyed.



No. 3. The Line of the Keihin Electric Railway Was Destroyed by the Earthquake

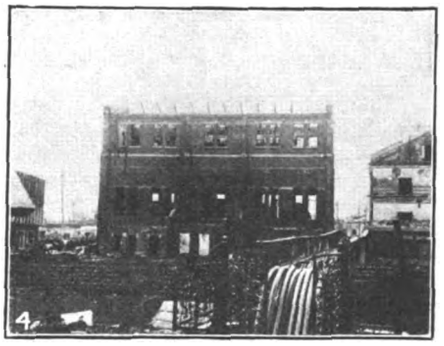
The Tamagawa Electric Railway received no damage from the quake, but the purchased power supply of 3,000 kw. was stopped for a while. It was unable to operate until Sept. 8. The Keisei Electric Railway received only slight damage and began operation soon after the earthquake. It offered free service until Sept. 8. The Keio Electric Railway, the Oji, the Meguro Kamata, the Ikegami, the Chichibu and the Musashi railways received but slight damage and resumed operation within a short time.

The general tendency of the suburban railways is toward an increase of passengers since the quake. The reason attributed is the exodus of city dwellers to the suburbs, as their homes were destroyed by fire, and they were obliged to find accommodations outside.

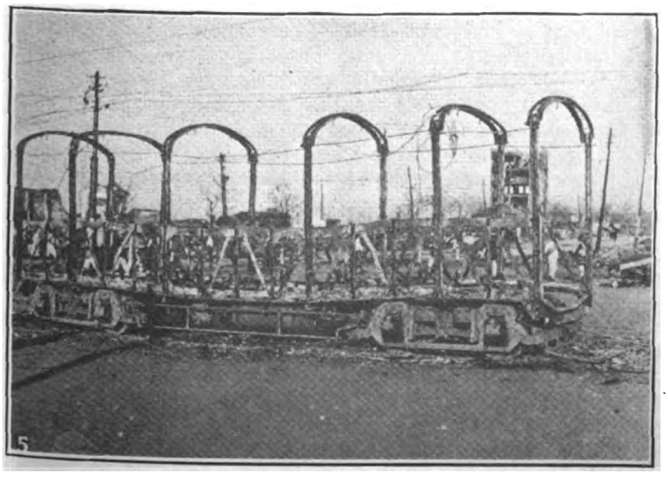
A bureau of reconstruction was formed after the calamity and is busy in planning the new Tokio. According to the proposed plan the city will have a number of subways under the main streets. This is expected to facilitate greatly transportation in the future.

[From other sources it is learned that the total loss suffered by the electrical industry in Japan will exceed $100,000,000, and it will require three to five years to restore pre-earthquake conditions. A portion of the photographs reproduced herewith are furnished through the courtesy of S. Hirota, chief editor of the *Ohm*, Kobe, Japan, and S. Yamazaki, chief engineer, Investigation Department, Tokio Electric Light Company.—Eds.]

No. 4. The Yuraku Street Substation Was Completely Gutted by Fire. This Is One of the Tokio Stations Lost



No. 5 All that Was Left of a Tokio Low-Floor Car



No. 6. Remains of the Ueno Electric Railway Station

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Financial and Corporate

Valuation Appeal Argued

City Presents Its Case to Superior Court Seeking Relief from Commission Valuation Ruling

Argument was begun on Dec. 13 before the Superior Court of Pennsylvania on the appeal by the city for relief from the order of the Board of Public Utility Commissioners of the state upholding the 7-cent fare on the lines of the Philadelphia Rapid Transit Company upon a valuation of the company's which the commission fixed at substantially upward of $200,000,000. The questions which the city says are involved in the appeal are:

1. Is the order of the commission reasonable and in conformity with law?
2. Is a valuation based on present reproduction cost correct?
3. Is the 1907 franchise contract between the railway and the city binding as to rates?

The city desires the Superior Court to remand the case to the commission with directions to reconsider the matter and decide it in conformity with law.

Contends Commission Order Unreasonable

The contention of the city is that the commission's order is vague and evasive and therefore not reasonable. The city holds that on its face the commission's order does not show enough facts to enable a reviewing court to check its correctness. In analyzing the difference between city and company figures on present reproduction cost the city says that the commission's order takes up only four items covering $49,000,000, out of a total difference of $103,000,000. The city contends, in short, that:

The commission makes a substantial allowance for going concern value and for economies in operation without stating the amounts. It fails to state a definite valuation. It is a determined effort to uphold the rate of fare created and instituted by the commission itself, without adequate reasons, published too hastily within ten days of the argument of a case of such magnitude, showing the 10,000 pages of testimony were not carefully weighed.

3. The valuation is based exclusively on present reproduction cost, which is not in conformity with law. The commission rejects all the city's figures on original cost and investment without consideration, and after comparing insufficiently the city and company figures on present reproduction cost new, concludes that as it would cost substantially upward of $200,000,000 to reproduce the property today, that is its present value. This is contrary to the decision of the Supreme Court of the United States in the Atlanta Gas case, decided last June, which followed the Galveston Electric case of 1921. These cases decide that present costs must be given weight, but it is wrong to adopt them as the sole measure of value.

There are other errors of law in the opinion. The commission allows $14,000,000, the cost of paving done by the company, calling it price paid for the franchise, when in fact the company itself carries its annual paving payment, of $500 000 under the 1907 contract, as part of its operating expenses, and the commission has approved this practice. The commission allows $13,000,000 for loss of fair return during early years of operation, when in fact the history of the property shows it was profitable from the start, earning an average of 12 per cent from 1861 to 1890. It allows $17,000,000 for cost of financing, an item the Supreme Court of the United States decided inadmissible in the Galveston case. It rejects the city's investment figure of $131,000,000 on incorrect grounds, as shown from the testimony.

The order is unconstitutional, as it impairs the obligation of the contract of 1907. That contract is binding. It was specifically authorized by the act of Assembly of April 15, 1907, which, under the decision of the United States Supreme Court in the Home Telephone & Telegraph case in 1908, gives it binding force. Even if the commission has power to alter rates fixed in ordinary franchise ordinances under the police power, that power does not extend to a contract like this, under which the city gave up valuable considerations in exchange for the rate promises made by the company.

During the presentation of the city's side by Samuel Rosenbaum, assistant city solicitor, Judge Keller interposed to remark:

They (the commission) evidently did not deem material the question of the actual value of the company's property as "upward of $200,000,000" was sufficient to justify the establishment of the 7-cent fare as a proper return to the company.

There was no need for the commission in the circumstances to determine definitely exact values. How much more than $200,000,000 the valuation should be would make no difference, as that valuation was sufficient to justify the present fare.

The case was concluded on Dec. 14 with the presentation of the argument of Frederick L. Ballard, counsel for the company. The court reserved decision.

Mr. Ballard said that the fare paid in Philadelphia is justified by the high quality of the service rendered, irrespective of what is the fair value of the property of the railway. Mr. Ballard declared that the fare of 7 cents cash or four tickets for a quarter had enabled the company to operate the Frankford "L," build two crosstown lines, operate the trackless trolley over Oregon Avenue and buy 520 large passenger cars.

"This state," Mr. Ballard added, "still is willing to reward those servants that provide good service." He referred to a section of the public service company law according "to any public service company financial recognition of efficiencies, economies and improvements effected by it."

Efficient Service Conceded by City

These factors of efficient service had been conceded by the city and properly considered by the Public Service Commission, Mr. Ballard pointed out, but the commission went further. That body, in determing that the present fair value of the company's property was substantially upward of $200,000,000, gave due regard, he said, to the many other factors of rate fixing.

The attorney explained that figures submitted to the commission showed that the company's service was "quicker, more frequent and more direct" than in a majority of the leading American cities and that the fare in Philadelphia was 6.6 cents compared with 7.9 cents in those cities.

In June, 1920, the Philadelphia Rapid Transit Company, feeling the need of more revenue because of war prices of labor and supplies, sought to abolish free transfers and exchanges in the delivery district, but the commission ordered a valuation to serve as a basis for a permanent rate of fare. In October, 1920, the company again asked for an increase, this time to a straight 5-cent fare, without transfers or exchanges. The commission refused this and instead ordered a temporary fare of 7 cents cash, with four tickets for 25 cents for six months until the valuation was completed. In May, 1921, this was continued. The valuation hearings did not end until May 15, 1923. The case was argued before the commission on June 11, 1923, and within ten days the commission published its order. The city promptly appealed.

In its original order the commission held in brief as follows:

1. A definite valuation is not essential except to protect the company from confiscation or to protect the public from unreasonable profits
2. The city's various investment and cost figures are not reliable enough to be controlling and, in any event, the decisions forbid the commission so regarding them.
3. On the contrary, the decisions require the commission to give substantial weight to present reproduction costs. On this basis, the value of the property is substantially upward of $200,000,000. The city admits $187,000,000 undepreciated and the commission decides enough disputed items to bring that over $200,000,000. The commission is not certain anything should be deducted for depreciation, but if so, it is at least offset by going concern value, both of which are intangibles.
4. The present rate of fare is reasonable when compared to that in other cities and to the present value of pre-war dollars; under it the company is giving good service and improving it, and enjoying a generous return after paying liberal operating expenses, so it is not confiscatory. But with a property valuation of at least $200,000,000, this return is not excessive, so we dismiss the complaint.

Loans Needed for Seattle Municipal Payments

With a cash deficit of about $780,000, not to be confused with the book deficit of $1,144,803, the Seattle Municipal Railway will need more loans to meet the $833,000 redemption payment and $333,350 interest due March 1 on the $15,000,000 purchase bonds, according to an announcement of city officials. The financing contemplated between now and Feb. 1, when the redemption and interest money must be set aside, will involve loans of between $350,000 and $400,000, treasury officials state.

About one-half of the cash deficit was piled up during the three and one-half months last spring when the railway was on a 5-cent fare between March 1 and June 16. With the return to the 8½-cent fare, the railway is making a small net profit, its monthly reports have shown, and the book deficit for the ten months of 1923 for which financial statements have been completed totals $167,312, showing a considerable recouping of the 5-cent fare losses. City officials are hopeful that the cash deficit will be wiped out by the end of 1924 or early in 1925. Details of the necessary new loans have not been worked out.

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Abandonment Authorized

Ohio Body Rules Service May Stop from Youngstown to Girard, Niles and Warren—Cities Seek Postponement

The West End Traction Company, a subsidiary of the Pennsylvania-Ohio Electric Company, controlled in turn by the Republic Railway & Light Company, with the consent of the Ohio Utilities Commission, will terminate its service from Youngstown to Girard, Niles and Warren on Jan. 1. Service will also be discontinued from Niles to Mineral Ridge, from Warren to Leavittsburg and on the city lines in Warren. The population in these communities aggregates 50,000. In all, about 20 miles of trackage is involved. The order of the commission was entered Dec. 14.

The cities of Warren, Niles and Girard, in Trumbull County, have since petitioned the commission to delay until Feb. 1 from Jan. 1 the abandonment of service. The company has consented to the modification of the commissions order with the understanding that increases in fare will be granted to permit operation to continue.

The West End Traction Company filed its application with the commission on Oct. 6. It sought authority permanently to abandon all of its property, comprising an electric railway extending from the westerly limits of the city of Youngstown, to the city of Girard, a distance of approximately 1 mile; thence to the city of Niles, a distance of 5 miles; thence to the city of Warren, a distance of 5 miles, and thence to the village of Leavittsburg, a distance of 4 miles, together with a line running from Niles to Mineral Ridge, a distance of about 3 miles. In addition to these direct lines the company also operates two short loops in the city of Warren.

At the hearing on the matter on Nov. 16 demurrers were filed by the cities of Niles, Warren and Girard and by the Commissioners of Trumbull County, denying the jurisdiction of the commission to hear and determine the application. In arguing these demurrers, counsel cited the franchise contracts between the applicant company and these political subdivisions which reserve the subject of fare revision for adjustment by the parties. It was further alleged that these contracts stripped the commission of jurisdiction in any differences which might arise between the parties.

The commission held that the demurrers were not well taken. The opinion of the commission was that the statutes confer upon it exclusively, jurisdiction to authorize the abandonment of public utility facilities.

The company contended that for the past four years the operation of its system has been carried on at an actual out-of-pocket loss. Moreover, during this period, the officials of the company pointed out, maintenance has been deferred to almost the danger line. On its part, the commission said that the evidence was to the effect that during this period of time the company operating this division had adopted every feasible and practical method of encompassing economies.

The evidence as to the revenues is summarized in the following table:

	Year 1920	Year 1921	Year 1922	Nine Months 1923
Total revenues	$575,919	$478,129	$477,729	$356,634
Operating expenses	621,763	544,731	485,324	374,372
Operating deficit	$ 45,844	$ 66,602	$ 7,595	$ 17,737
General taxes	63,000	63,000	63,854	29,658
Total deficit	$108,844	$129,602	$71,449	$47,396

In its finding the commission pointed out that these figures show there is nothing set aside for the deferred maintenance or depreciation accounts and no balance available for a return on the property.

The commission also pointed out that the line traverses a territory which has had a steady and continuous growth in the last ten years, but that the revenue and traffic of the company during this period, especially in the last four years, has steadily decreased. It ascribes the condition confronting the company as doubtless due to the general use of the privately-owned automobiles.

Counsel for the municipalities developed the fact that the revenues as reported did not include the receipts from a coach line which parallels the railway. This property, the commission found, was held in the name of a separate company. As respects this bus operation, the witnesses asserted that it was experimental and that no definite conclusions were yet possible. The commission pointed out that the service operated along this route is not comparable to the applicant's service, and that rates are collected practically double these charged by the traction company.

The main contention of the municipalities, aside from that of lack of jurisdiction on the part of the commission, was that the applicant company should negotiate such adjustments in its fares as would enable the retention of the service. The opinion of the commission on this point was that the following question and answer from the record sum up this situation:

> Q. Is it possible, Mr. MacCalla (the vice-president and general manager of the applicant company), under any rate of fare that would be practicable, for that company to make a fair return or a substantial return upon the amount invested in the tracks and property?
>
> A. I believe such a rate as would theoretically do that would have the effect of decreasing the traffic and actually defeating the object aimed at. In other words, I do not believe it is possible to put a rate in there which would give a reasonable return on the capital after taking care of operating expenses and necessary reserves for replacements.

There was some question in the record as to the good faith of the owners of this property in segregating it. On this point the commission said that the city of Youngstown some time since contracted with the operators of the properties for the segregation of the so-called Youngstown Municipal Railway and that the normal procedure for the owners was to segregate the property involved in the present proceeding under a distinct ownership. In concluding its opinion in the case the commission said:

> Having regard for the fact that a common carrier of persons should be financially responsible for the transportation of the people who entrust themselves to it, we must conclude that the welfare of the public will best be served by the abandonment of this line, which is consuming its own capital to maintain its service.

Only 8 per Cent Dividend in New Orleans Authorized

R. S. Hecht, president of the Public Service, Inc., New Orleans, La., has taken occasion to reply to statements made from other than company sources as to the probable course the company will take in the matter of declaring dividends upon its present common stock and the probable issuance of the additional stock, etc.

Mr. Hecht says that at no time has his company considered paying a dividend of more than 8 per cent on the present common stock. Further, the agreement between the company and the city does not authorize a dividend of more than 8 per cent. In fact, money in excess of the amount needed for dividends must be put back into the company. Mr. Hecht said that this process must continue for a period of five years.

With respect to the company's needing more money, Mr. Hecht said it would probably have to have new money each year for several years.

At the meeting of the board of directors in January the budget and program for 1924 will be decided. At the same time the method will be determined by which additional financing can be carried out.

He said the company was spending the new money as advantageously as possible, and that all of the expenditures were calculated to increase efficiency and reduce the cost of operations, which of course would work toward a reduction in fares.

Commissioner Maloney says that the matter of refinancing the New Orleans Public Service, Inc., is not now before the Commission Council. He indicated that the question now up for settlement between the company and the city is the one of the additions that should properly be permitted to be made by the company to the rate base as agreed upon by the company and the city as the point from which the start was made when the present operating arrangement was put into effect.

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Abandonment of Alameda Line Approved

Holding that the service on the Fourteenth Street-Alameda Pier suburban line of the Southern Pacific Company is a duplication of the service furnished via the Seventh Street line and the Eighteenth Street line to the Oakland Pier, the California Railroad Commission on Dec. 8 authorized Southern Pacific Company to cease the operation of the Fourteenth Street-Alameda Pier suburban service or the crosstown Oakland-Alameda line on Dec. 27.

The Southern Pacific Company operates across the Harrison Street Bridge a suburban service between Fourteenth Street, Oakland, and the Alameda Pier, also a street car service from the Sixteenth Station, Oakland, into Alameda. It was shown that the company has been operating both these lines at a loss for several years.

The commission found that the public is also served by the Twelfth Street line of the San Francisco-Oakland Terminal Railways, and the Southern Pacific Company crosstown service from Oakland to Alameda is also duplicated by service through this territory by the San Francisco-Oakland Terminal Railways.

The commission found that there is at present an economic waste in the maintenance of these lines by the Southern Pacific Company and that further capital expenditures for a new bridge to permit continued operation over the Estuary cannot be justified. In addition to authorizing the suspension of this service the commission directed the Southern Pacific Company to secure from the cities of Oakland and Alameda the necessary authority, if any be required, to relinquish franchises under which these lines are now being operated.

Consolidation of Philadelphia Companies Urged

Joseph Gilfillan, a director of the Union Traction Company, Philadelphia, who represents a large stockholding interest of the company, has sent a letter to the president and directors of the Union Traction Company, Philadelphia Rapid Transit and the Philadelphia Traction Company, looking to a consolidation of the transit companies of Philadelphia. He points out that any plan looking to the simplification of the present corporate structure should be in the direction of a consolidated ownership of all lines in one corporation.

In the exchange of securities involved, he says, the stock of underlying companies, which own the tracks and franchises would be represented by a first mortgage bond issue secured upon these properties, while the shares which represent the money heretofore successfully spent in the improvement of these properties would be represented by first and second preferred stock, leaving to present operating company, the Philadelphia Rapid Transit Company, the common stock interest and the control and management of the system. It is pointed out that the lines in consolidated ownership would amply secure a sufficient bond issue to finance the consolidation.

More Funds for Railway

New Jersey Road Would Sell Terminal and So Secure Money for Railway Business

Sale of the Public Service Terminal in Park Place, Newark, by the Public Service Railway to the Public Service Corporation is proposed in an application for approval filed with the Public Utility Commission. The application indicates a plan to enlarge the terminal, which the railway is not in a position to do because of lack of available funds. In fact, construction of a seven-story addition to the building has already begun.

The purchase price stipulated in resolutions adopted by the directors of the railway is $2,500,000 subject to a mortgage of $5,000,000 executed by the Public Service Newark Terminal Railway, formed to build the terminal, and subsequently merged with the Public Service Railway.

Upon confirmation of the proposed sale the agreement between the associated corporations contemplates a renewal of the fifty-year lease, under which the Public Service Railway rented certain space, including the concourse, offices and space occupied by the railway tracks, at an annual rental of $330,240.

The application sets forth that occupants of the terminal, which include the Public Service Gas Company and the Public Service Electric Company, desire additional office space and that the railway deems it inadvisable, if it had the available funds, which it has not, to make the necessary capital investment for the enlargement. The application sets forth further that:

> Such sale will put the property in the possession of an owner which can advantageously make such enlargement, and will in addition thereto put your petitioners (Public Service Railway) in possession of considerable funds to assist it in and about its railway business.

Upon the merger of the Public Service Newark Terminal Company and the Public Service Railway in 1915 the lease between the two companies was canceled, the railway becoming the owner instead of the lessee of the terminal property. The present proposition contemplates the revival of this lease for the remainder of the fifty-year period for which it was originally drawn, the Public Service Corporation instead of the terminal company becoming the owner and lessor.

The annual rental under the terms of the revived lease will remain at $330,240 until 1965, at which time it may be renewed at the option of the railway on terms to be agreed upon. In the event of a disagreement the rental terms would be settled by arbiters, one chosen by the Public Service Corporation, one by the Public Service Railway and the third by the two already chosen.

Auction Sales in New York

At the public auction rooms of A. H. Muller & Sons, New York, the following securities were sold on Dec. 19:

392 shares New York Railways Company, $1 lot.

250 shares Buffalo & Lake Erie Traction, common, $8 lot; 250 shares of preferred, $80 lot, and $50,000 first mortgage 5 per cent bonds, 10¼ per cent.

$2,000 New York Railways 4 per cent first mortgage bonds, due 1942, $300 lot.

457 shares Aurora, Elgin & Chicago Railroad common, $100 each, $3 lot.

333 shares Western Ohio Railroad certificates of deposit, $100 each, $6 lot.

$1,000 Nashville Railway & Light Company cons. 5 per cent bonds, due 1953, 84¼ per cent.

100 shares Interborough Consolidated Corporation preferred, $100 each, $8 lot.

80 shares Brooklyn Rapid Transit Company (old stock), $1 lot.

$2,100 Olean, Bradford & Salamanca Railway first and refunding 7 per cent bonds, due 1951, $50 lot; 105 shares preferred, $7 lot, and 252 shares common, $2 lot.

Trustee Appointed.—George M. Bryne of Winchester, Mass., has been appointed by Governor Cox to the position of trustee of the Eastern Massachusetts Street Railway, to succeed the late Samuel W. McCall, who lived in the same city. Mr. Byrne is a member of the firm of George M. Bryne & Company, builders and contractors, and has been chairman of the Winchester Board of Selectmen for a number of years.

Line Sold.—The Southwestern Traction Company, which operates between Belton and Temple, Tex., has been sold at trustee sale for $15,000 and the assumption of the taxes and paving obligations that are outstanding against the company. It was bid in by J. C. Houser, present manager of the company, for himself and H. H. Hamilton of New York City. They will try to operate the line and make needed improvements to its track and equipment. The line was built in 1903.

$712,000 Equipment Trust Authorized.—The San Diego Electric Railway, San Diego, Cal., has been authorized by the California Railroad Commission to execute and enter into an equipment trust agreement and second mortgage, guaranteeing payment of $712,000 of 6 per cent equipment trust certificates recently authorized by the Railroad Commission to cover the cost of a large amount of electric railway equipment.

To Pay Interest.—Samuel D. Tuell, receiver of the Houghton Traction Company, Houghton, Mich., notified the Old Colony Trust Company, trustee, Boston, that pursuant to the order from the United States District Court for the Northern Division of the Western District of Michigan, under date of Nov. 26 last, he would pay the coupon interest on Dec. 15 which became due Jan. 1, 1923, on the first mortgage 5 per cent gold bonds dated Oct. 1, 1908. Payment will be made with interest on overdue interest from Jan. 1, 1923, up to Dec. 15, at the rate of 5 per cent per annum.

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Traffic and Transportation

Higher Fare in Cincinnati on Jan. 1

Formal announcement of an increase of ½ cent in fares was made by the Cincinnati Traction Company on Dec. 15. The new fare, 8½ cents, will become effective Jan. 1. Preliminary reports of the receipts and expenditures of the company for October and November made to William Jerome Kuertz, Director of Street Railways, left no room for doubt that the fare would be increased. Walter Draper, vice-president of the traction company, said that the increase was necessary to meet the company's obligation to pay the city franchise tax. During the past three years the franchise tax has not been considered as a factor in rate making, since under the terms of the franchise the tax is not to be paid unless earned. By consent of the traction company and City Council the obligation to the city was suspended provided that rates would not be increased. That action was taken upon the ground that it would be unfair to the car riders to have the tax continued as a factor where it could not be paid since it had not been earned by the company. Last September, however, the company gave notice of an increase from 7½ to 8 cents effective on Oct. 1, and immediately the provision of the franchise relating to the city tax again became operative.

Favor Change in Night Service in Boston

The Boston Elevated Railway has tried a new method to ascertain the will of the people regarding the operation of its cars in night service, in which the company made a change some time ago. All-night service into Tremont Street subway in Boston was started Oct. 14. Later workers presented petitions claiming that only those who worked in the neighborhood of Scollay Square, Park Street and Boylston Street stations were at all benefited by the new order. All the others who were used to getting the cars at their doors were forced to walk. It was their contention that conditions would be improved if the old service were restored, because most of the employees, tired after a night's work, might go from their work to the street and get the car without the necessity of a long walk.

The trustees refused the petition, but Chairman Jackson at the time said that the decision was not final and that the experiment would be given a fair trial. The latest move on the part of the company has been to submit the question to a vote by the users of the night cars, and it says it will abide by the results. Ballots were handed out to all the riders one day with instructions for marking crosses against the plan preferred. Of 3,663 votes cast, 1,747 were for the plan to which a change had been made and 1,535 were for the old plan. In this test 247 of the riders stated affirmatively that they had no choice and 134 returned the ballots without marking them in any way.

Fare Injunction Denied to City of Ottumwa

The injunction suit brought by the city of Ottumwa against the Ottumwa Railway & Light Company has dragged its way to a conclusion in the courts. The injunction has been denied by the Supreme Court of the State. The 7-cent fare is held to be legal and just, and all that remains is for the costs to be assessed.

In commenting on the case the Ottumwa *Courier* said:

> It is not difficult to recall that the suit against the company was inherited by the present city administration from the last Leeny régime, and it is not difficult to recall the circumstances under which the fight originated. An effort was made to compel the company to provide service at a rate which involved a loss. If the courts had ordered compliance there could have been but one of two results. Either the company would have been forced into a receiver's hands eventually, or the rates for electric service and steam heating would have been increased to a point at which the resulting revenues would have wiped out the deficit from railway operation.
>
> If a community must have street cars—and every going community needs them—it must provide a revenue sufficient to justify investors in financing a railway or it must tax itself to pay for the upkeep of its own system.

Fare Validity in Milwaukee Questioned

Basing his plea on the recent decision of the United States Supreme Court in the case of the Superior Water, Light & Power Company, of Superior, Wis., a Socialist Alderman of Milwaukee has presented to the Common Council for its approval a resolution requesting that the city attorney take steps to determine whether or not the Milwaukee Electric Railway & Light Company is at present illegally charging a cash fare of 7 cents instead of 5 cents in contradiction to a franchise ordinance passed by the Common Council in 1900 which was to endure until Dec. 31, 1934.

Interpreting the Superior decision as it applies to the Milwaukee situation, it is obvious that the fare set forth in the 1900 franchise is binding and that the Wisconsin Railroad Commission had no power or authority to alter the rates. The Wisconsin Supreme Court, however, has repeatedly decided that control of rates passed to the Railroad Commission, when state utilities were placed under its jurisdiction.

In the case of the Superior Water, Light & Power Company the United States Supreme Court decided against the State Supreme Court and the city in the methods adopted to acquire by condemnation proceedings the electric, gas and water plants of the Superior Water, Light & Power Company by terms other than those specified in the franchise, which were in accordance with the Wisconsin Public Utilities act of 1907. In upholding the company the court asserted that the franchise and its amendments constituted a valid contract, not subject to abrogation by the state public utilities act.

Adopts Weekly Pass. — The Geneva, Seneca Falls & Auburn Railroad, Geneva, N. Y., has started the sale of weekly pass tickets at $1 each. Tickets are good for unlimited trips for seven days, commencing Monday of each week, on all Geneva city line cars and on interurban cars in Geneva and east to and including Lake Road stop.

Change Made in Ticket Use.—Regulations governing the sale and use of the forty-six-ride school commutation ticket books for use on the lines of the Albany Southern Railroad, Rensselear, N. Y., have been changed to provide that on and after July 1, 1924, the time limit on such tickets will be fifty days from date of sale, instead of within the school year in which purchased as at present. The use of school tickets will be confined to pupils and teachers traveling to attend schools where sessions are held at least five days each week.

Fare Hearing Adjourned.—Hearing on the application of the Detroit United Railway to the Michigan Public Utilities Commission for permission to increase its rate of fare from 2 cents to 2½ cents a mile was recently adjourned. It was brought out in the testimony at the hearing on Dec. 17 that the Detroit United Railway had lost more than $1,000,000 in the last nine months, part of which was due to a $500,000 annual increase in wages of employees. It is contended that the line had also suffered considerably from bus competition. The company claims that in order to earn a 7 per cent return upon the utility commission's valuation of $26,691,320, the rate of fare would have to be raised to 2½ cents a mile. Company officials agreed, however, to issue commutation tickets at reduced rates.

Service Restored.—After a trial period of a month and a half in which less frequent schedules were in effect, the Clinton, Davenport & Muscatine Railway will shortly restore the hour and one-half service on its interurban line to Muscatine, Iowa.

Illness Delays Decision.—Serious illness of Mrs. Henry A. Dubbs, wife of Henry A. Dubbs, Master in Chancery, who heard the pleas of the city of Denver attorneys and that of the Denver Tramway relative to the 6-cent fare, prevents the Judge from taking an active part just now and the decision that was expected some time during December will most likely not be given until after the New Year.

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Personal Items

D. C. Green Named Manager of Utah Traction

D. C. Green, formerly vice-president and general manager of the Fort Smith Light & Traction Company of Arkansas, has been named vice-president and general manager of the Utah Power & Light Company and vice-president of the Utah Light & Traction Company, Salt Lake City. He succeeds S. R. Inch, who has accepted an important position with the Electric Bond & Share Company in New York. Mr. Green has had a wide experience in the management of electric and gas utilities. Early in 1915 Mr. Green came from the northwest to Salt Lake City as manager of the Salt Lake division of the Utah Power & Light Company. He left Salt Lake City in the fall of 1916, and since that time has been associated with various utilities in a managerial capacity.

The change will not sever Mr. Inch's connection with the Utah companies, since he remains a vice-president and director of both. Mr. Inch first came to the Utah Power & Light Company as general superintendent early in 1913. In January, 1918, he succeeded C. E. Groesbeck as vice-president and general manager of the Utah Power & Light Company and vice-president of the Utah Light & Traction Company.

Joseph T. Hissem, who has been secretary of the Galna (Ill.) Chamber of Commerce and secretary of the Galena Red Star Merchants' Association, has taken a position as auditor in the general offices of the Northern States Power Company, at Minneapolis.

B. E. Bramble, Champaign, Ill., for many years auditor of the Illinois Traction System, has been appointed comptroller of the North American Light & Power Company, according to an announcement made by William A. Baehr, president of the company. Mr. Bramble will divide his time between the Chicago and Champaign offices of the company.

Arthur P. Russell, vice-president of the New York, New Haven & Hartford Railroad, with headquarters at Boston and New Haven, has in addition to his present duties assumed jurisdiction of public relations and publicity. He will now have charge of matters tending to promote harmonious relations between the company and the public and will supervise the preparation of general information to be issued by the management.

Thomas F. Kennedy has recently been appointed new-business manager of all of the Cities Service properties, with headquarters in New York City. His connection with the Doherty interests started in 1901, when he joined the Denver Gas & Electric Light Company as a meter reader. Since then he has been steadily advancing until in 1920 he was selected as manager of the new-business department of the Western Light & Power Company, with headquarters in Boulder, Col. In July, 1922, he came to New York as assistant to George Williams, whom he now succeeds as head of the new-business work of the Doherty organization.

Mr. Arnold Joins North Shore

Eastern Wisconsin Electric Official Will Have Charge of Buses Used by Interurban

Bert Arnold, Oshkosh, has been called to the post of manager of the motor coach department of the Chicago, North Shore & Milwaukee Railroad, effective Jan. 1. He will have his headquarters at Milwaukee and will report to C. E. Thompson, assistant to the president. Mr. Arnold will have charge of the operation of the motor coach lines of the company and of the expansion of this service.

B. W. Arnold

To the railway men in the Wisconsin territory Bert Arnold is familiarly known as the Wizard of Oshkosh. He is at present manager of railways of the Eastern Wisconsin Electric Company, with jurisdiction over the local properties in Oshkosh, Fond du Lac and Sheboygan and the interurban line between Neenah and Oshkosh. It may sound like overdoing the thing to say that Mr. Arnold knows everybody and everything in the territory in which his company operates, but the statement is substantially true. It is just about six years ago that Mr. Arnold went to Oshkosh. At that time public relations were anything but good and the physical property of the company was somewhat below par. All this Mr. Arnold has corrected. As for cooperation, even the independent bus men use the railway station as a terminal at his suggestion. He demanded a square deal at the hands of the local papers and he has got it. It was Bert Arnold who in 1922 put across in magnificent shape the first separate convention of traction men in Wisconsin.

Mr. Arnold brought to the position at Oshkosh a background of wide experience in railway work. He entered the field in 1899 with the Wheeling & Lake Erie Railway. Next he was dispatcher of the Lake Shore Electric Railway, Cleveland, Ohio, and chief dispatcher of the Muncie, Hartford & Fort Wayne Railway, Muncie, Ind. In 1907 he became superintendent of the southern division of the Illinois Traction System. From his headquarters with that company at Springfield he was transferred to Decatur as superintendent of all lines entering that city, and later was made chief clerk to the general superintendent of the system. In 1910 he was made superintendent of transportation of the Chicago, Ottawa & Peoria Railway. In 1917 he joined the Eastern Wisconsin Electric Company. The career and the work of Mr. Arnold were reviewed at length in the ELECTRIC RAILWAY JOURNAL, issue of Sept. 9, 1922.

Obituary

Charles Frankel, president of the Frankel Solderless Connector Company, New York, died suddenly on Dec. 18. Mr. Frankel was sixty-one years of age. He was an outstanding figure in electrical manufacturing activities and was prominent in civic affairs.

F. B. Myers, former president of the Cleveland, Southwestern & Columbus Railway, Cleveland, died in Ashland, Ohio, on Dec. 3. He was a director of the Nickel Plate Railroad and of the Union Trust Company, Cleveland, and had other interests. Early in 1921 he resigned as president of the Cleveland, Southwestern & Columbus Railway, so as to give his entire attention to the Ashland Pump & Hay Tool Works and the Faultless Rubber Company. Mr. Myers was seventy-four years old.

Ralph E. Gilman, special engineer in charge of turbo-generator engineering of the Westinghouse Electric & Manufacturing Company, died in Los Angeles on Dec. 5. Mr. Gilman was graduated from the Leland Stanford, Jr., University, Palo Alto, Cal., receiving his E.E. degree in 1898. He entered the employ of the Westinghouse company immediately after his graduation and completed the apprentice course of the company in January, 1901. The next two years he was located in the engineering department. In 1903 he was transferred to the British Westinghouse Company and spent the next five years in London, England. In 1908 Mr. Gilman was recalled to East Pittsburgh and assigned to special duties in the power engineering department. He was in this department continuously until the time of his death.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Philippine Mahogany Trim

Lighter than Birch and as Cheap as Cherry—Location of Market Affects Price

A departure from usual car building practice is embodied in the plan of the Chicago Surface Lines to use Philippine mahogany instead of birch or cherry for its interior car trim on account of its lightness and fine appearance. Although this wood is exported under the trade name of "Philippine mahogany," its proper designation is "red lauan." Quarter sawn, it has a beautiful ribbon grain, which, with its dark reddish-brown color, makes it useful for interior finish, furniture, etc. Whether or not it is superior to cherry in appearance is largely a matter of taste. Birch in its natural state is not particularly beautiful, but it possesses properties which make it possible to stain it to resemble almost any hard wood.

In weight, red lauan possesses advantage over birch and a slight advantage over cherry. The weights of the various woods at about 8 per cent moisture content, which is approximating the condition under which the material is used in interior car trim, are: birch, 42 lb. per cu.ft.; black cherry, 34 lb. per cu.ft.; Philippine mahogany, 33 lb. per cu.ft.

Quantities of Timber Available

Because they are grown over such wide areas, it is difficult to estimate the exact amounts of these three woods which are available for commercial purposes. According to official estimates, however, there is in the United States about 19,000,000,000 ft. b.m of birch of all kinds and 500,000,000 ft. b.m. of cherry. A commercial handbook prepared in connection with the Commercial and Industrial Fair held in Manila last February makes the statement that there are in the Philippines 192,000,000,000 ft. b.m. of the woods of the *dipterocarp* family, which includes Philippine mahogany.

Birch is the cheapest of the three woods. Recent prices prevailing in New York City for red birch varied from $90 to $145 per 1,000 ft. b.m. and for white birch from $85 to $130 per 1,000 ft. b.m. The price of cherry varies from $90 to $180, depending on the quality. Philippine mahogany costs from $150 to $170 per 1,000 ft. b.m., depending on its freedom from pin worm holes, its color, etc. In the matter of price, therefore, the advantage is plainly with birch.

An item which should receive consideration in connection with the price of Philippine mahogany is the fact that this wood is likely to have many small pin holes. This is not considered technically to constitute a defect in the wood, and there is, therefore, no way for the purchaser to guard against this fault. Even the best grades of this wood have pin worm holes, and it is necessary to fill them and then rub off the surface with a cloth. The operation is quickly performed and does not greatly affect the cost, but the necessity for it should receive due consideration when Philippine mahogany is compared with birch and cherry, which do not require filling and polishing.

If an inland market is considered instead of that of New York City, the price differential in favor of birch increases, because that wood is available on short haul from the Lake states. In that region cherry is on an even basis with mahogany, because of the freight rates for the latter from the seaport to the interior. For example, birch was quoted on the Chicago market as late as Dec. 7 at prices from $60 for the poorer grades to $130 for the higher grades. This is approximately a third less than the New York price quoted in the earlier paragraph. In fact, for all cities other than seaports, Philippine mahogany would be at a disadvantage because it would necessarily bear the expense of railroad freight haul, as well as ocean freight. Birch is grown in the Appalachian Mountain region and for that section of the country has therefore comparatively short freight hauls. A large proportion of the cherry produced in this country comes from the same territory and would enjoy the same advantage.

Lumber Production at High Level All Year

Lumber production in the United States based on figures collected by the Department of Commerce has averaged more than 230,000,000 ft. b.m. per week since April 1. The largest production in a single week was for the seven days ending Nov. 10, when the maximum of 241,000,000 ft. b.m. was attained. Since that time there has been a slight falling off with the week ending Dec. 1, showing a production of only 225,000,000 ft. b.m. The week ending Dec. 8, however, showed an improvement with a production of 232,000,000 ft. b.m.

The rate of production for the year 1923 is well above that of the last few years. In 1922 the average weekly production was below 200,000,000 ft. and in 1921 it was below 150,000,000. The years 1919 and 1920 were nearly identical with an average weekly production of 171,000,000 and 173,000,000 ft. b.m.

Big Business Expected by Westinghouse Company

Present business bookings of the Westinghouse Electric & Manufacturing Company indicate good results for the second half of the fiscal year. For the first six months of the fiscal year through Sept. 30 the earnings were substantially equal to a full year's aggregate preferred and common dividend requirements. It is expected that operations for the first eight months of the year will show a net available for dividends running between $14,000,000 and $15,000,000.

The company is experiencing a resumption of business activity approaching spring and early summer levels, which is keeping the plant operations at capacity. Unfilled orders now approximate $75,000,000. The company is making an effort to reduce unfilled orders, in order to make delivery on contracts and take care more efficiently of business offered. The Philadelphia and East Pittsburgh plants are operating day and night. The outlook continues satisfactory and the sales department states that there is no indication of slackening in forward business. Bookings in November were larger than in October, which in turn exceeded the September total of $10,600,000. Indications are that the total for the year will probably be as large as last year, when the amount received was $152,328,564.

Canadian Control Obtained by General Electric

The General Electric Company has secured control of the Canadian General Electric, approximately two-thirds of the total $10,800,000 outstanding common stock of the Canadian company having been deposited with it.

As was noted in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 27, the directors of both the American and Canadian companies approved the offer of the General Electric Company to purchase the common stock of the Canadian General Electric. Under the plan common stockholders of the Canadian company were offered $62.50 cash and one share of new $50 par value 7 per cent cumulative preferred stock of the Canadian company for each share of the common.

Metal, Coal and Material Prices

Metals—New York	Dec. 18, 1923
Copper, electrolytic, cents per lb.	13.125
Copper wire base, cents per lb.	15.75
Lead, cents per lb.	7.35
Zinc, cents per lb.	6.52
Tin, Straits, cents per lb.	47.125
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.425
Somerset mine run, Boston, net tons	2.175
Pittsburgh mine run, Pittsburgh, net tons	2.05
Franklin, Ill., screenings, Chicago, net tons	1.975
Central, Ill., screenings, Chicago, net tons	1.50
Kansas screenings, Kansas City, net tons	2.09
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.65
Weatherproof wire base, N. Y., cents per lb.	17.50
Cement, Chicago net prices, without bags	$2.10
Linseed oil (5-bbl. lots), N. Y., per gal.	$0.93
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	11.25
Turpentine, (bbl. lots), N. Y., per gal.	$0.935

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Steel Sales Below Normal Capacity

A survey by the Department of Commerce of the present capacity of the structural steel fabricating industry in the United States indicates that the normal capacity is about 250,000 tons per month. In no month of the present year, however, has the actual tonnage booked closely approached the capacity. The tonnage in March was 235,000, or about 94 per cent of the shop capacity. April was slightly lower, and since that time the figure has been running at about 50 per cent.

Booklet Describes Trade Terms

The recognized interpretation of trade terms and abbreviations as in use in the larger commercial countries is contained in a booklet just issued by the International Chamber of Commerce, at Paris. Copies of the publication, which is both in English and French, are being distributed among the American members of the International Chamber. Non-members in the United States may obtain copies through the secretary, American Section, International Chamber, at Washington.

Victoria Exhibit in Prospect

The Victoria Electrical Federation is planning an electrical exhibition to be held in Melbourne, Australia, during September, 1924. The federation hopes to cover the entire electrical industry, showing actual working models of the various types of apparatus, including machine, transport, lighting and other industrial equipment. The fair will last four weeks.

Rolling Stock

Interstate Public Service Company, Indianapolis, Ind., during 1923 ordered twenty new cars at a cost of approximately $250,000. This new equipment includes three club and dining cars, three sleepers, two motor express cars, three express trailers and ten live stock cars. This equipment will be built by the American Car & Foundry Company. Reference has been made previously in the ELECTRIC RAILWAY JOURNAL to a part of this order and elsewhere in this issue some of the equipment is described.

Twin City Rapid Transit Company, Minneapolis, Minn., rebuilt during 1923 seventy-five double-truck two-man cars into front exit cars.

Eastern Wisconsin Electric Company, Oshkosh, Wis., has purchased a snow plow.

Interborough Rapid Transit Company, New York, N. Y., has placed orders for 100 new steel motor cars with the American Car & Foundry Company for use in the subway in accordance with the order of the commission issued last August. The cars will cost $30,000 each, making a total expenditure of $3,000,000. According to the commission's order, these cars must be ready for operation in the fall of 1924. Under the plan the Interborough Rapid Transit Company, the Rapid Transit Subway Construction Company and the New York Trust Company, as trustees, have entered into an agreement providing for the issuance of $2,250,000 in equipment trust certificates, bearing 6½ per cent interest, and issued in $1,000 denominations. This is the second order for 100 cars which the Interborough has placed at the suggestion of the commission following the investigation of the service and facilities of the subway in 1922. The 100 trail cars ordered last year have been delivered and are now in daily service.

Track and Line

Madison Railways has been granted an extension of time from Dec. 1, 1923, to Oct. 1, 1924, in which to carry out the work of double-tracking University Avenue from Randall Avenue to Breese Terrace. The company is now confronted with the immense improvement program of first finishing up the work on Breese Terrace next spring followed by the double-tracking of University Avenue, improving its East Johnson Street line and extending its line on Monroe Street from Harrison Street to Crandall Street.

New York State Railways has completed the Court Street extension to the works of the Onondaga Pottery Company. The men employed at the pottery plant formerly were compelled to walk nearly half a mile at either end of the day.

Shreveport Railways contemplates adding 3,000 ft. of new track to its line within the near future, according to H. B. Hearn, president. Arrangements for a right of way have been completed for the Jewelin Extension of the Fair Grounds Highland car and an ordinance has been prepared calling for a special election to be presented to the City Council of Shreveport within the week, authorizing the granting of a franchise. The new terminal will reach the city limits and will extend along the Fair Grounds property, paralleling Greenwood Road, thence to Jewelin Road.

New York, N. Y.—The American Bridge Company, a subsidiary of the United States Steel Corporation, has received a contract for 4,400 tons of steel for subway route 52 in Queens.

Walla Walla Valley Traction Company, Walla Walla, Wash., will build a branch line from Freewater to Umapine, at a cost of $100,000. The Oregon-Washington Railroad will have running rights over the line and will share in its construction.

Eastern Wisconsin Electric Company, Oshkosh, Wis., will spend $5,624 in co-operating with officials of Oshkosh in completing one of the most extensive street improvement programs ever undertaken, which will be started in the spring of 1924 on nine of the principal streets of the city, estimated to cost around $124,000. The company will pay $2,317 as its share of paving work on Merritt Street from Linde Avenue to Evans Street and $3,307 on West New York Avenue from Jackson Drive to the west side of Elmwood Avenue.

Pacific Electric Railway, Los Angeles, Cal., has been authorized to extend its Second Street car service in Long Beach to Alamitos Bay and Maples. Work will be started within the next month.

New Advertising Literature

Truscon Steel Company, Youngstown, Ohio, has issued in pamphlet form "Reinforcement in Concrete Roads Worth Its Cost." This is a reprint from *Engineering News-Record* of Nov. 15, by H. Eltinge Breed, consulting highway engineer, New York.

Silent Hoist Company, New York, N. Y., has issued Bulletin No. 22 descriptive and illustrative of the Silent Hoist electric car puller. The bulletin briefly but comprehensively describes its design and construction, as well as its utility.

Johns - Pratt Company, Hartford, Conn., manufacturer of fuses, has issued a Christmastide folder extending the season's greetings.

Foamite-Childs Corporation, Utica, N. Y., fire protection engineers and manufacturers of all types of fire-fighting devices, has published a new sixteen-page illustrated booklet, "The Essentials of Self-Protection Against Fire." The booklet presents the whole subject of first-aid protection against fire in an unbiased manner. A large reference chart supplements the text with a complete tabulation of the characteristics of all types of chemical fire extinguishers. The booklet is attractively printed in the standard size, 5½ x 8½, for convenient filing and permanent reference. Copies may be had on request addressed to the company at Utica.

Reliance Electric & Engineering Company, Cleveland, Ohio, has issued an illustrated bulletin, No. 5018, which gives the complete details of the design and construction of Type AA Reliance induction motors.

Bridgeport Brass Company, Bridgeport, Conn., is proud of its home city. It has issued an attractively printed folder entitled "See and Know Bridgeport—The Park City. The Industrial Capital of Connecticut." Besides containing a map of the city, hints on what to do and where to go are featured for the traveler in the city. Even the motorists will find the pamphlet instructive, as it contains some general rules on traffic and parking. The folder contains many pretty pictures of beautiful homes and points of interest within the boundaries of Bridgeport.

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New York, Saturday, December 29, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 26

Another Car Designed to Sell Transportation

IN SOME ways the design of the new light-weight interurban cars of the Pennsylvania-Ohio Electric Company, described elsewhere in this issue, goes further than previous designs have done with the idea of making the ride comfortable and pleasant for the passenger. Deep-cushioned seats, linoleum-covered floors and real mahogany woodwork have become fairly familiar during the past year or two, and it is generally accepted as good practice to keep bell cords, register rods, door engines and the like out of sight. But this railway has gone beyond that by concealing the air pipes to the engineer's valve behind a metallic cover painted to harmonize with the interior car trimming, and by eliminating altogether the advertising signs and luggage racks.

While elimination of advertising presumably does raise the dignity of the interior, the need to do so in a coach is debatable. Nowadays the car cards are for the most part tastefully designed, printed on good quality material, and neatly installed. They are usually inoffensive to the eye and they often furnish the passenger food for thought in idle moments.

The concealment of the air pipes, however, will be considered by everybody to be a good move. These are unsightly at best, and frequently oily and dirty.

The special lighting fixtures and the mahogany trim in the upper part of the Pennsylvania-Ohio cars add unmistakably to the distinctiveness of their interiors. While the lines of these cars are not as good as might be secured, the attractiveness sought has been obtained in substantial measure.

Such innovations as are made in this and other recent cars show that the industry is giving some well-deserved attention to the subject of car design from the merchandising as well as the engineering standpoint. The roads that have adopted these new ideas have invariably found that their business profited and their public relations were improved.

Where the Dangers to One-Man Cars Lie

NEWS reports of the last three months indicate a revival of the opposition to one-man cars. These attacks are not confined to any one part of the country. There have been rumblings of dissatisfaction in the East, South, Central States and Far West, and it may be that this condition will be reflected in hostile legislation during some of the 1924 sessions. It is to be hoped that these cases of dissatisfaction are purely sporadic. Nevertheless, the one-man car has been such a boon to the industry that it behooves every railway man to consider what may be done to overcome any sentiment of this kind which may limit the operation of cars of that type on his road.

There are only three possible reasons for opposition to one-man car operation, namely:

1. A belief that the interests of labor require a larger crew on street cars than is actually necessary.
2. Ignorance on the part of the public of the merits of the one-man car.
3. An attempt by companies to make the one-man car do more than it should be called on to do.

The first reason will probably always prevail to some extent, so long as demagogues exist. Nevertheless, it is not a difficult task to prove that the interests of labor lie in just the opposite course. Not only do one-man operators receive a higher wage than operators on two-man cars, but if the service should be confined to two-man cars, many electric railway companies would have to go out of existence. So-called "full crew" laws were for long a needless expense to the steam railroads, but the public generally has come to understand that they cause an economic waste.

Ignorance on the part of the public of the merits of one-man cars, the second reason mentioned above, may be expected in cities where they have not been in service. It can be overcome only by carefully considered explanation and education before the cars are put in operation and during the early stages of their trial.

Perhaps the greatest danger to the one-man car comes from the third cause mentioned, i.e., from the companies themselves. The merits of the one-man car should not blind any one to the fact that it has its limitations, and its greatest real friends are those who are willing to recognize that it has these limitations.

The One-Man Car Has Its Limitations

IF THERE is an attempt to make the one-man car do more business than it comfortably can, either as regards its loading capacity or the ability of the operator to make change, this condition is immediately reflected in longer stops and slower schedule speed, and if this condition continues the result is not only an exasperated public, but lower earnings per car-hour. In some instances this critical point has undoubtedly been passed, usually through overenthusiasm as to what one-man cars can do. And it is perhaps significant that such cases of overenthusiasm are most apt to be found on properties where the one-man car is comparatively a recent innovation. This is only to be expected, because history has frequently shown that recent converts to an idea are apt to be not only the greatest zealots in its behalf but that they often err in going too far in its application.

Fortunately, there are many ways of overcoming

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difficulties of passenger congestion on one-man cars, without abandoning the one-man idea.

The simplest way of helping out the operator when his duties are so many as to slow down the speed of the car is to simplify his task of collecting fares. Usually, there are many possible ways of doing this. Sometimes street collectors can be used to advantage at congested points at certain hours. Occasionally the conditions are such that prepayment areas can be introduced. The time of change making on the car can be made less by the use of tokens and passes, and it can be distributed over a long time and so shorten the length of stops by operating the car pay-leave in one direction and pay-enter in the other. Or the problem may be approached with the idea of shortening the time of other parts of the process of fare collection or in some other way to reduce the work of the car operator.

A good gage for determining whether some time-saving is desirable is the figure attained of schedule speed in miles per hour. Where this begins to get below that of other cities of like population and similar street congestion, or shows a retrogression on the same property, something should be done. If the simple methods described herein and others like them fail, the two-man car may be the only recourse.

Great help along the lines being considered may be expected of the one-man two-man car, provided it really is operated by one man when the traffic conditions call for such operation, and by two men when two-man operation really is demanded, which will usually be during the rush hours. From a tabulation of recent car orders, this seems the most popular type for city railways today. It is an ideal design when used with judgment.

Obviously, such a car in one-man two-man service means considerable extra work for the schedule maker in connection with the conductor's runs, because on many lines there will be few if any straight runs for conductors left. But the task of providing satisfactory runs for the majority of the men is not insurmountable.

Economies Possible on Small Properties Too

IN THIS issue is reviewed at some length the report of a consultant on the railway in Charleston, S. C., which serves a population of 70,000. It is of interest because there are many small properties whose earnings are not very good and with which it is often thought nothing much can be done. Yet in Charleston it was found that material savings could be made, in spite of the fact that about 90 per cent of the city service was already being supplied with one-man cars.

The principal savings are expected to be realized from the elimination of duplicate and waste car mileage and from a speeding up of the cars. The greatest ailment from which the small properties are suffering is a slow, indifferent sort of service. Charleston was not as bad in this respect as many, in spite of its Southern clime. But the system was suffering from an excessive number of stops and several other practices that tended to slow up the operation and not only make costs high but discourage riding. Then there were a number of things, small in themselves but totaling big, that the outside point of view found could be done to cut costs. So there are things to be done, even with the small property. And while cutting expenses, some of the major economy measures also improve the service, and more patronage is thereby attracted.

Make Signs Informative for the Casual Reader

MUCH emphasis is being placed these days on the idea of merchandising transportation. An important part of merchandising is so to describe the goods that the public will know what is being offered and will want to buy. For the regular rider, a single letter or number designation on a car is all that is needed and is a very good plan. But the destination sign should be so worded as to give the stranger and casual rider the maximum possible information.

Perhaps this idea was more fully realized by the street railway men of thirty years ago than it is today, for in those days on the attractive car exterior was painted not only the destination but a catalog of the principal points reached en route. For example, the cars of one line in Washington carried a legend such as this: "Mount Pleasant, Capitol and B. & O. Depot via 14th Street and Pennsylvania Avenue."

With the advent of larger and more complex railway systems such plans fell into disuse on account of the desirability of having all the cars of the company interchangeable. Dash signs, roof signs, and finally the illuminated roller signs have all been used to impart the desired information. Of course, with any type of changeable sign the space available to display routes and destinations is far less than when the whole car body could be used for the purpose. This is particularly true with the roller sign, now almost universally used.

The great advantage of the roller sign is that when a car is changed from one route to another or from one destination to another a suitable sign is immediately available. The necessity thus to be able to transfer a car on short notice from one route to another presents somewhat of a problem to the sign painter, as there must be suitable names on the sign roll. If a car may be operated on many routes it is necessary to have a great number of names and the roll, therefore, assumes considerable length.

In an effort to reduce the length of the roller curtain and thus effect a minor economy, some railways have tried to devise destination names that would serve for more than one route. Sometimes this has been carried to the point of absurdity. Names that are almost meaningless are used simply because of their universal applicability. While this was mentioned briefly in an editorial in this paper last week, attention being called to the bad practice of using non-informative signs on cars out of service, the use of such terms is not confined to cars routed toward carhouses, but occurs in many other instances. Some examples are: "City Line," "Belt," "Downtown," "R.R. Station" and "Bridge."

Such designations are not inaccurate, perhaps, but they are often quite indefinite. The regular rider on a particular line may know which railroad station is meant, and some people probably know what "City Line" means. To the casual rider, or to the stranger in town, however, such designations mean very little. The regular rider knows where the car goes however it is marked and the company gets his fare anyway; but if a few fares from strangers can be gathered in by making it easy for them to know the car's destination this money is just extra profit. Hence, why not make the sign tell just as much of route and destination as space and ingenuity permit?

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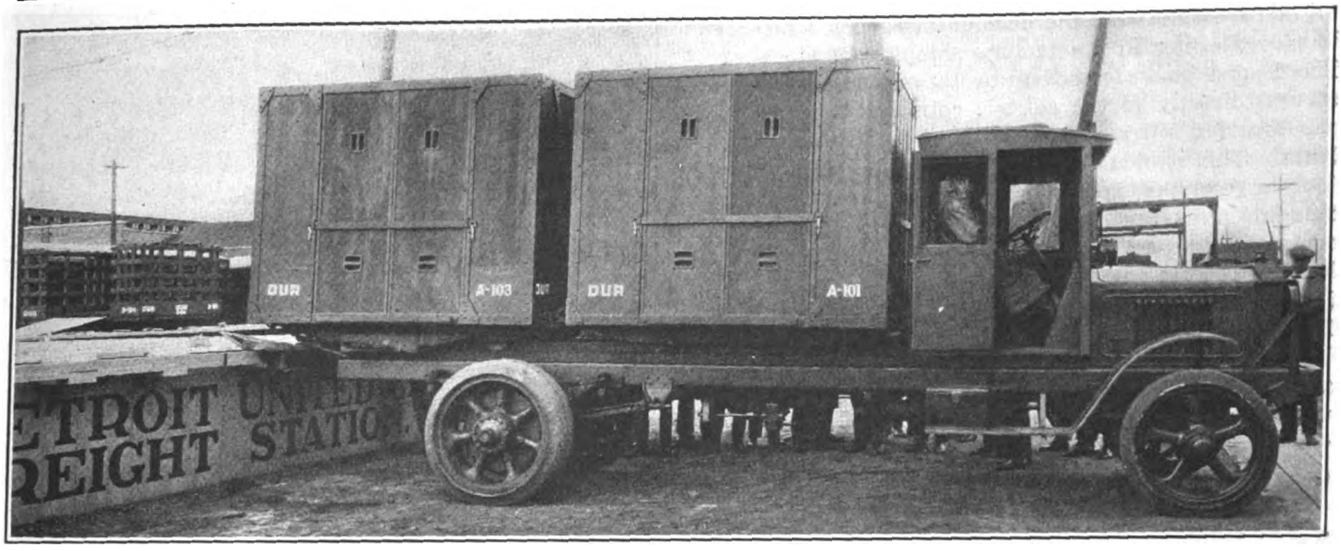

These D. U. R. Containers for Less-than-Carload Service Have 2½ Tons Capacity and Can Be Shipped Sealed from Origin to Destination

Demountable Containers Expedite Freight Handling in Michigan

By E. J. Burdick
Vice-President and Manager Detroit United Railway

A Special Truck Chassis and Demountable Containers Have Been Adopted by the Detroit United Railway to Pick Up and Deliver Less-than-Carload Freight Shipments with Maximum Economy—The Company Now Is in Trucking Business at Request of Wholesalers' Organization

A METHOD of handling freight in less-than-carload lots has been adopted by the Detroit United Railway to facilitate loading and unloading and allow through routing of the shipment without rehandling. Essentially the plan consists of the use of relatively small containers that can be loaded and sealed at the point of origin, and then carried either on any motor truck or more conveniently on a special chassis to a point where the containers are loaded on a special flat car of the railway. At the receiving end the process is reversed.

This arrangement saves nearly all the time formerly used in the trans-shipment at the railroad terminals, and permits a more intensive use of the railway's equipment. A description of both the mechanism and the manner of its employment are of interest.

Careful study of the freight problem by the Detroit United Railway resulted in the formation of a subsidiary company to handle the trucking, both in long distance hauls and in pick-up and delivery service. In planning the basic idea as well as the major part of the developed details, we have contended that the motor car —both for passenger and freight—has its proper place in the field of transportation, and that it is advisable for electric railways to adjust themselves to the new system of motive power through co-ordinating the two, instead of refusing to recognize the utility of this suddenly developed method of conveyance.

The regulatory law recently enacted by the State of Michigan contains a general policy covering road conservation and wild-cat operations. The state policy having been determined, the Detroit United Railway was in a position to know what it had to face both in the way of possible competition and expansion. Its first definite step was the incorporation of the Detroit United Railway Trucking Company, with a capital stock of $500,000; all stock held for and in behalf of the interurban system.

After several meetings of the department heads it was thought that, theoretically at least, the use of demountable truck bodies seemed the proper step. Such bodies could be hauled to established car lines, there transferred as units to flat cars and at the other end retransferred to trucks and distributed without disturbing the contents. This plan also allows a minimum use of the highway and a maximum use of established rights-of-way, very largely company owned. Michigan laws place a maximum upon truck load and length of motor trains. It appealed to the Detroit United, therefore, that economies which would result from placing several motor loads on one electric freight car and several cars in the trolley train, thus reserving the trucks themselves for the many terminal trips for pick-up and delivery, would give them a decided advantage over intercity trucking competitors using the highways.

Advantages of the Plan

There are many advantages to follow such a co-ordinated trolley and truck shipping system as the Detroit United Railway is contemplating. According to the old system the product is packed at the shipping room in the factory, loaded on a truck body, unloaded at the railway freight house and loaded into the freight car. After arriving at the end of the railway trip exactly the same number of moves is made at the point of delivery.

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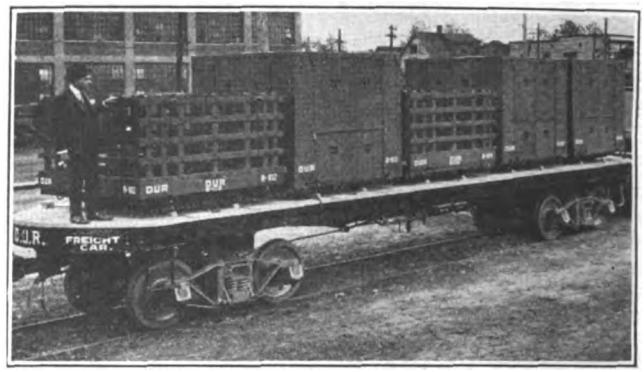
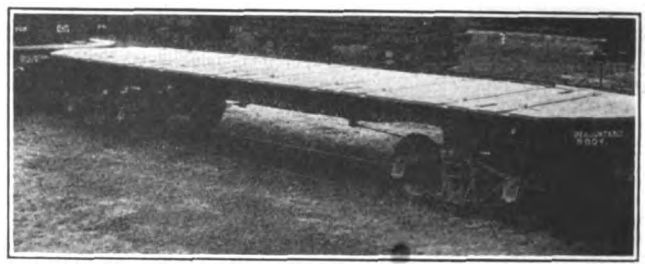
Compare this with the demountable body which can be placed either in the factory shipping or stockroom. The loaded body is moved to the truck chassis and carried directly to the electric railway car or loading platform and is transferred without disturbing the contents. This avoids four labor handlings in shipping, four in receiving, and makes substantial savings in the standing time for truck and driver. Fractional loads contained in packing cases of assorted sizes can be handled readily with this equipment with the same saving in labor at the freight station as is obtained with full container shipments. The fewer the number of handlings, the less will be the loss and breakage. As an additional precaution, the new type containers can be sealed by the shipper.



Containers When Mounted on Flat Car Are Locked in Position



Flat Car Has Channels for Container Wheels. Locking Device on Axle of Container Engages Recessed Bar on Car

Perishable Products Better Handled

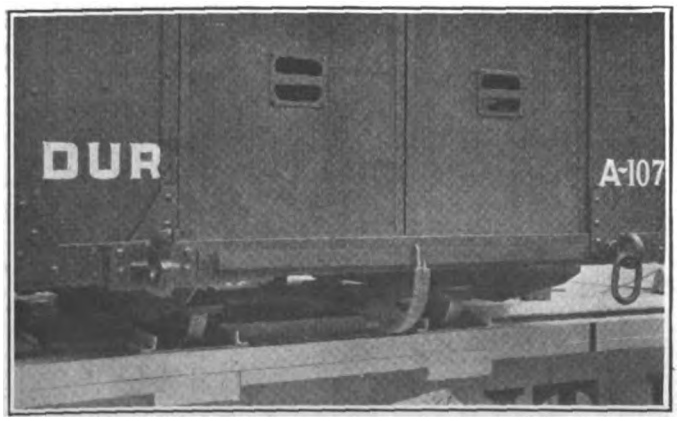
The handling of perishable products has always presented shipping difficulties. Every hour of delay decreases the value of the shipment. Consequently overnight delivery is a very desirable service. Under the new plan a demountable case can be left at the farm. When it is filled the farmer or the company, as may be agreed, takes it by motor truck to the nearest receiving station, where it is loaded on a car. In the morning, after the shipment has arrived at the rail terminal, it is delivered to its destination intact, with the contents in the best possible condition. It is under seal from the time the farmer does the packing until that seal is broken by the consignee.

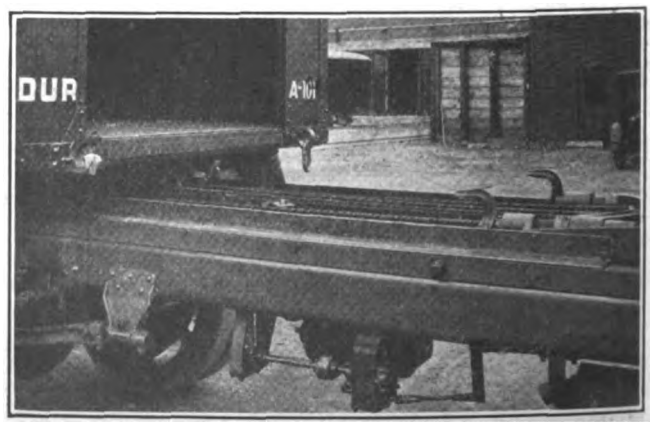
Compare this method with the usual plan now followed in handling farmers' products to the market. The goods are subject to long delays, exposure to heat and cold and are passed through many hands. In addition, the crates are turned first on one side and then on the other as they are stacked and packed in warehouses and cars. Sometimes the product of one farm is so mixed with that of others in the selling that to a considerable extent identification is lost.

In addition to its advantages in the transportation of perishable farm products, the container arrangement is applicable to the handling of manufactured machine parts under a plan which may be called a "machine to machine" delivery. Parts may be put directly into containers at the machine as manufactured and delivered to an assembling plant in some other town without expensive packing and excessive handling costs. The construction of the containers makes it simple to move them about the plant by use of the ordinary type of industrial tractor. Extra containers may be provided so that they can be put directly into the assembling plant and the parts used as required with no additional handling.

At the present time the Detroit United Railway is engaged in trucking and is awaiting approval by the State Commission to put the new plan into general use. At the earnest solicitation of the Wholesalers' Bureau of the Detroit Board of Commerce, the Utility Commission authorized establishing a trucking line of 80 miles from the end of the Detroit, Jackson & Chicago Railway at Jackson, Mich., to Sturgis, Mich., through Hillside and Coldwater. This route is more extensive than the company had originally planned in connection with a contemplated pick-up and delivery service. The demand for speedier transportation from this territory to and from Detroit was such that the company agreed to try it out, using for the present time the ordinary trucking equipment.

Some idea of the extent of this service may be gained from the following schedule: Freight is received up to 4 p.m. at Detroit for Jackson and is carried over the





Arrangements for Handling the Containers

At the left, the ball-bearing wheels and locking hook and link are shown. At the right, the winding drum for loading may be seen. The large doors are removable to facilitate packing and unpacking.

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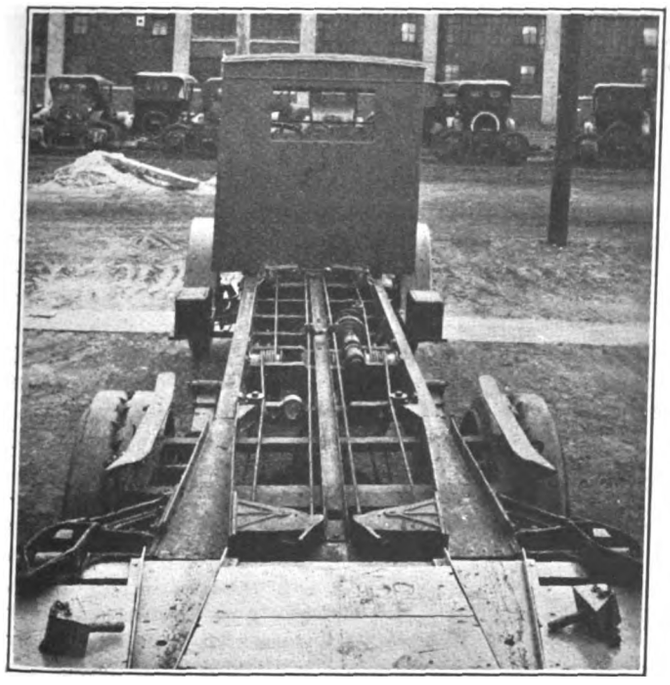
electric line during the night. At 8 a.m. the following day truck distribution for Sturgis is started, which is usually completed by 3 to 4 p.m. that same day. In the reverse direction a pick-up truck leaves Sturgis at 8 a.m., picks up freight at intervening stops between Sturgis and Jackson, loads the freight into an electric freight car that afternoon and the merchandise arrives in Detroit the following morning. For this pick-up and delivery service a charge of 25 cents per 100 lb. is made over the regular steam road rate. This method has proved highly satisfactory and eliminates trucks using the highway between Jackson and Detroit. The service was started with 1½-ton trucks, which have been replaced with 5-ton chassis, all equipped with the demountable apparatus but using for the present the ordinary type of body.

The Mechanics of the Containers

How to put on and take off the bodies from the truck chassis was found one of the great problems to solve. Cranes on every car and cranes at every loading station spelled a big investment which seemed impracticable from the railway standpoint. Attention was called to a



Loading Mechanism and Channel Tracks Are Bolted to Chassis. Channelways on Rear Can Be Adjusted for Height to Meet Similar Channels on Platform. Hooks Hold Front Container to Truck

worm and endless chain device made by the Ideal Truck Equipment Company of Chicago as a possible solution of the problem. An examination of what this company had indicated that the idea was there, but that it would have to be developed further to suit our needs. This was done through the co-operation of the railway engineers with those of the equipment company. The present device utilizes the truck motor to move the container on or off the loading platforms. This device does not prevent the chassis being used with a regular truck body in the ordinary manner.

The loading and unloading mechanism mounted on the truck chassis consists of a superstructure containing a pulley at each end, over which is run a steel cable receiving its power from a winding drum through a chain and worm mechanism driven from the truck transmission. Flared channelways are provided to form a track for the containers. These may be adjusted vertically to align with similar channels on the loading platform of the freight house. An engaging hook on the cable pulls the container on or off the truck as occasion demands. The mechanism contains a locking device for holding the containers in position during transportation on the truck and a cutout device which automatically stops the operation when the load has been pulled into the proper position. The rear container is stabilized in its position by side bearings. The forward container is held by hooks on the truck which engage its front axle. The containers are held in position on the flat car by similar means. Containers of this type have taken curves at speeds of 60 m.p.h. without slipping from their positions.

The containers, developed with the co-operation of the Fisher Body Company, are built up of light but rugged angle-iron framing with permanent corner panels of plywood which cover approximately one-third of the area on each of the four sides. On the bottom, two substantial sills are formed of 3-in. x 5-in. x $\frac{5}{16}$-in., 8.2-lb. steel angles which carry the cast-steel bearing housings for the support of the wheels, axles and locking device. The wheels, which are flangeless, with a diameter of 9¼ in., are mounted on ball bearings and travel in steel channel tracks on the chassis, loading platform and flat cars. The wheel gage is 31 in., and the axles are spaced on 4-ft. 3-in. centers.

A substantial maple floor is laid over the sills. The entire framing structure is reinforced with gusset plates and brackets. Approximately two-thirds of the area on each of the four sides is inclosed by a pair of doors extending full height. These doors are arranged so that they can be entirely removed to facilitate packing and unpacking, leaving an opening 48⅝ in. wide. A locking bar holds them securely in position so as to make the closed container entirely weatherproof. The weight of the complete equipment, including the auxiliary mechanism on the chassis, is comparable with the weight of an ordinary oak van truck body of equal capacity. The inclosed half-sized unit has over-all dimensions approximately 6 ft. 6 in. wide and 7 ft. 6 in. long. The over-all height from wheel tread to roof is 6 ft. 10 in. and the height from floor to roof of the container is 5 ft. 9¾ in. Each of such half-size containers is designed for a capacity of 2½ tons.

For the shipment of goods which do not require protection from the weather an open type of container has been developed. This has simple stake sides, but is mounted on the same floor as the inclosed container described.

Using a 5-ton truck chassis, either one full size or two half size stake or inclosed type containers may be carried.

The accompanying illustrations show the type of construction employed and the arrangement of containers on both truck and flat cars.

Annual Meeting of F.E.S.

THE annual meeting of the American Engineering Council of the Federated American Engineering Societies will be held Jan. 8-11 at the Shoreham Hotel, Washington, D. C. The sessions will include a Public Works Conference on Wednesday, sessions of the American Engineering Council on Thursday and Friday, and a banquet for the A. E. C. and delegates on Thursday evening.

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Trainmen and Community Work for Safety*

San Diego Trainmen Share in Safety Savings According to Car-Hours Worked—Citizens Organize to Reduce Street Hazards

THE San Diego Electric Railway has recently made a change in its method of distributing its bonus to the trainmen from the "Safety Fund." This fund has been in force since 1914, when the company announced a plan for stimulating among the platform men a more personal interest in accident prevention and the safe operation of cars. It set aside in that year 3 per cent of the gross revenue, out of which was to be paid all the claims for personal injury, property damage, outside law, courts, including witnesses, medical, hospital and other expenses and announced that the rest would be divided among the car men on a car-hour basis. In other words, the man who put in the greatest amount of platform hours participated to the greatest extent in the savings.

Five platform men were chosen to represent the car men in connection with this fund. They were called the safety committee and held meetings one night each week to review the accident reports of that week. Having the experience of car men themselves, they could readily see the mistakes that their fellow workers made, and it was the duty of this committee to call to the attention of the men connected with an accident where a mistake had been made in judgment and where pure carelessness played a part. For this service the members of the committee were paid $3 apiece a week, this sum being taken from the fund.

Up to 1923 it is estimated that the car men in San Diego have been able to divide close to $100,000 through this fund, many of the checks to individuals running considerably over $100.

The system has worked very satisfactorily for both company and men, and there has never been any thought of abandoning the principle. Experience has shown, however, a few desirable improvements. Thus, it was found that many men who had had accidents were receiving at the end of the calendar year proportionately as much as those who had had no accidents at all. Hence, beginning with Jan. 1, 1923, a plan was adopted to equalize the bonus on the basis of the man-hours worked and also of the number of accidents each car man had had. A slight change was made also in the amount of money assigned to the fund, which was changed to 3 per cent of the gross revenue from the transportation of passengers up to and including $1,000,000 and 2 per cent on the next $500,000.

The method of computing immunity from accidents is put on a monthly basis; that is, in each month that a man has no accident for which he is responsible, he is credited with 8.33 per cent (which is one-twelfth of 100 per cent). At the end of the year the percentages thus obtained by each man are totalized, the men are divided by these aggregate percentages into several classes, and the per cent that each class bears to the total is ascertained. These percentages will then represent what per cent will be taken of the total remaining in the fund and divided among the men in each individual class.

The total number of hours worked by the men for the year in each class is then divided into the total amount of money available for the class to arrive at an hourly rate, and the amount of money for the class is then divided among the men in the class according to this rate and the individual hours worked. To participate in this plan, a full month must be worked with a lay-off allowance for regular men of not more than four days per month and for extra men of not more than six days per month.

All platform men who may be detailed by the transportation department to temporary work, such as selling tickets, work-car service, traffic count, dispatching on account of construction, flagging on account of construction, acting in the capacity of relief receiver or temporary inspector, do not lose the credit of 8.33 per cent because of failing to put in the required number of days on platform work. However, the total number of days worked during the month, which includes the number of days that a man may have put in on the cars and on his temporary work, must equal the number of days he would have been required to put in on the cars had he remained on his regular run and not been detailed to the other work.

The responsibility for all accidents is decided by the safety committee.

SAFETY CO-OPERATION NOT LIMITED TO COMPANY EMPLOYEES

While realizing that the consummation of any safety program is mostly dependent upon its own efforts and that of its own employees, the company realizes that the co-operation of the public is also most necessary. Having started the practice of caution at home, it felt it was justified in asking for the co-operation of the public and was fortunate in securing the co-operation of the heads of various civic bodies in organizing what is known as the San Diego Public Service Committee, whose purpose is to eliminate, so far as possible, all traffic accidents.

Fifty citizens volunteered to act as a vigilance committee in reporting careless or reckless automobile drivers to the executive committee. The committee in turn writes a courteous letter of warning to the driver, and three such warnings constitute sufficient reason for his arrest. This committee meets at luncheon every Monday, and its duties are not alone directed to the automobile hazards but to anything that constitutes a menace upon the streets. The result of this plan, conducted under the direction of a temporary organization, has proved so satisfactory that it has reecntly been decided by the citizens to make the committee permanent.

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

Standard Watches Insure Accurate Time*

SOME companies operate under the theory that because street railway schedules are subject to so many interruptions, it is not particularly important for the men to have accurate timepieces. On the El Paso Electric Railway system, however, it is believed that the very fact that it is difficult to maintain good schedules makes it imperative for the operators to have the correct time. During the year all trainmen have been required to secure regulation watches of standard makes, and these watches are inspected twice a month and a record of their condition is kept. This tends also to induce greater effort to keep cars on time.

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Traffic Problems in a City of 70,000

A Recent Traffic Analysis Made of the Charleston (S. C.) Electric Railway System Disclosed a Number of Possible Improvements and Economies, Even Though One-Man Cars Were Being Used Almost Exclusively

THE transportation situation in Charleston, S. C., as described in the survey recently made for the company by John A. Beeler, New York, shows a condition which probably has parallels in a number of other cities of like size. In 1910 Charleston had a population of about 59,000 and in 1920 of 68,000. The street railways in the first part of the last decade were fairly prosperous, showing from 1911 to 1914 an operating ratio of from 67 to 69 per cent, with operating revenue in the neighborhood of $400,000. During the next four years the operating ratio increased to from 72.3 to 77.9 per cent, while in the last five years it has been over 90 per cent for every year. For every year except 1920 it was over 97 per cent, and in 1921 and 1923, based on the first five months' operation, it was more than 100 per cent. During the war riding greatly increased because of activity at the Charleston Navy Yard, but since 1920 traffic has gone back to about the trend of the pre-war figures. There is no jitney competition.

The report of the Beeler organization suggests a plan by which the company will be able to make a saving of $148,530, or about 25 per cent of the operating expenses, and still serve the city as well as if not better than with present service, in spite of the fact that operation in Charleston has been largely by one-man cars. Since the completion of the report it has been accepted by both company and city. An abstract of the report follows:

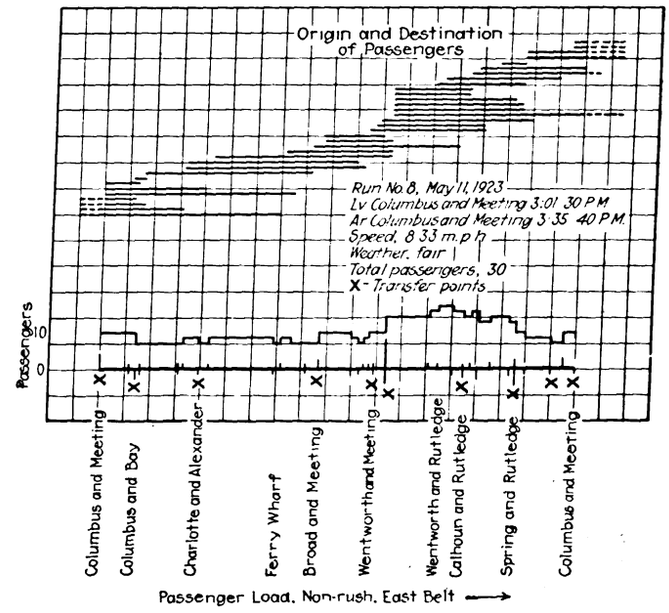
Railway Conditions in Charleston

The Charleston railway operates a total of 39.44 miles of track, of which about 10.7 miles are on the interurban line connecting North Charleston and the Navy Yard with the city. The balance is on the city lines. The service calls for the operation of thirty-four base cars and ten additional during the rush hours, making a total of forty-four cars in daily service. In 1922 the system transported approximately 10,000,000 revenue passengers and had a gross operating revenue of $634,000.

The city of Charleston is one of the oldest in the country, having been founded by the British in 1670. The growth has been slow but steady from the first census in 1790, when it had a population of 16,000, to the present time, with its population of 67,957. This population is fairly evenly divided between whites and blacks, there being 35,585 of the former and 32,372 of the latter. The distribution of races throughout the city is likewise quite even, except for a few localities. The total population, including that of the contiguous territory served by the interurban, is approximately 72,000.

The present incorporated area is approximately 3 miles long and 2 miles wide and is bounded by water on three sides. Fully two-thirds of the people live within one mile of the business center of Charleston. This proximity to the business district encourages walking and tends to a low riding habit. The accompanying maps indicate that there has been a tendency to overtrack the city. There are four lines of tracks running lengthwise and four crosswise.

The revenue rides per capita per annum was about 130 in the period just preceding the war. This figure dropped slightly during the first two years of the war, but after the United States entered the conflict the Navy Yard began increasing its forces and the peak of over 220 rides per capita was reached in 1920. Since then the drop has been precipitous, due to the general industrial depression and the fact that very little work is going on at the Navy Yard. In consequence, the



Typical Graph Showing Passenger Loads During Non-Rush Hours on East Belt Line

rides per capita based on the first five months of 1923 is back to the pre-war figure of 130 per annum. Fluctuations in the total passengers carried by years are shown in one of the charts on page 1086.

In addition to the lessened business activity, the increased use of the automobile has, no doubt, had some effect on the street car riding habit. There are about 4,500 motor vehicles of all classes in the city. However, there is a general increase in the use of the automobile throughout the United States, and in spite of this fact most street railways are showing an increase in passengers carried.

The railway operates six routes, five of which are city lines and one interurban. Comparative financial and operating statistics, by routes, for twelve months' operation based on May, 1923, are given in Table I. As will be seen from the table, every one of the city lines shows a deficit.

The volume of service rendered is remarkably good. Rarely does one find passengers standing even during

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TABLE I—PASSENGER REVENUE AND EXPENSES PER CAR-MILE BY LINES, CHARLESTON

Annual and average, based on operations in May, 1923

Line	Car-Miles	Passenger Revenue	*Operating Expenses	Operating Deficit	Average Cents per Car-Mile, 1923 Passenger Revenue	*Operating Expense	Deficit	Car-Miles per Day
Belt	470,700	$117,240	$121,000	$3,760	24.91	25.7	$0.79	1,284
Broad Street	261,700	50,500	68,040	17,540	19.30	26.0	6.70	719
King Street	194,000	72,975	79,730	6,755	37.62	41.1	3.48	524
Meeting Street	155,700	32,820	39,700	6,880	21.09	25.5	4.41	426
Rutledge Avenue	371,400	96,640	109,190	12,550	26.02	29.4	3.38	1,036
Suburban	488,500	172,810	166,580	†6,230	35.37	34.1	†1.27	1,399
Total	1,942,000	$542,985	$584,240	$41,255	27.96	30.1	2.14	5,388

* The amounts shown for operating expense include taxes. Operating costs have been determined from the system averages and by making allowances for differences in type of equipment and car speeds on the various lines.
† Surplus.

the rush hours. In fact, it is not a question of furnishing seats but more a question of passengers to fill them. The company has made no effort to curtail the service. In fact, it has steadily increased the number of car-miles operated. The rate of fare is the same as last year, viz., 7 cents cash, or four tokens for 25 cents.

A comparison of operations in Charleston with those of street railways elsewhere is given in Table II. In the first column are the latest available figures from reports of the American Electric Railway Association. The second column gives the Charleston railway operations for the same periods as covered by the association reports.

TABLE II—COMPARISON OF CHARLESTON AND OTHER CITIES

	A. E. R. A. Electric Railways	Charleston Railway
Average rate of fare in cents	7.13 (a)	6.02
Annual revenue per capita	$12.70 (b)	$8.81
Operating revenue per mile of single track	$20,292 (b)	$16,080
Operating revenue per car-mile in cents	45.9 (a)	30.8
Operating expenses per car-mile in cents (d)	36.2 (a)	33.1
Operating ratio, per cent (d)	78.97 (a)	107.37
Taxes, per cent of operating revenue	7.13 (a)	9.48
Revenue passengers, per cent (c)	inc. 6.63 (a)	18.05 dec.
Revenue passengers per car-mile	6.2 (a)	4.9

(a) Average of eighty-one urban railways for first four months of 1923.
(b) Average of fifteen cities, 60,000 to 80,000 population, for year 1922.
(c) Increase or decrease compared with same period 1922.
(d) Including taxes.

The average fare is 16 per cent lower than the average elsewhere. The density of business, as represented by the operating revenue per mile of track, is 26 per cent lower in Charleston. Even though the fare were the average rate, viz., 7.13 cents, and there were no change in the riding habit, the volume of business would total only $16,100 per mile of track, or less than 80 per cent of that in the other cities last year. The operating revenue per car-mile in Charleston is less by nearly one-third and the operating expenses per car-mile about 10 per cent less. It is notable that the total receipts per car-mile in Charleston are 15 per cent less than the operating expenses of the average company.

THE SURVEY

To determine what readjustments in service could be made without disturbing the trend of travel, considerable field work was necessary. Traffic counts were taken at all of the principal transfer points, the peak load points and points where there was considerable interchange of traffic—seventeen locations in all. Each point was counted from 6 a.m. until 12 midnight for a two-day period and the results averaged. The counts were taken on weekdays when the weather was fair and other conditions such that normal traffic would be expected. The men stationed at these locations took a record of every car passing, noting the following: Route, destination, direction, car number, time of day and the number of passengers arriving at and leaving the point. The results of these observations were tabulated and charted. Records were also made for a number of typical trips of all stops, the location and volume of the passenger interchange, the time at time points, delays and any features which might influence the movement of the car. On three lines the origin and destination of each passenger were observed as further aids in determining possible readjustments on these routes. Charts were prepared from these rides, and a typical one showing the origin and destination of each passenger is presented on page 1081.

CARS SHOULD BE REROUTED

In Charleston, as in most cities, the greater part of the demand for transportation is from the residence sections to the business section of the city. A considerable amount of the company's business is the result of the demand for service between the city of Charleston and the Navy Yard and North Charleston, which is cared for by the Suburban line. Since the business district is not confined to any one section, there is also a demand for cross-town service as a means of connecting the various civic centers and providing transportation between the hotels and the Union Station. This class of service encourages the use of street cars by the patron who has only a short way to go. Service which caters to the short-haul rider, the patron who enables the company to earn money, must be made as direct, speedy and generally attractive as possible.

The present and proposed routes are shown on page 1085. It is believed the new routing will serve the city better than the present one. It will provide the average patron with faster and more direct service and it will eliminate much of the waste in the present service, especially duplication and operation in unproductive territory.

The routing of the Suburban and Meeting Street lines will remain unchanged. The King Street line will loop back via Calhoun, Meeting, Broad and King Streets, resulting in one-way operation on the congested portion of King Street between Broad and Calhoun. On this portion of the line there is only one track now, because of the narrowness of King Street. The new routing will eliminate the necessity of cars now waiting at turnouts in this single-track section.

On the Rutledge Avenue line the detour to President Street will be eliminated and in the downtown section the cars will loop back via Meeting, Broad and King Streets. This will remove some of the excess service running to the Battery. A complete rearrangement of the Broad Street and Belt lines is recommended which will eliminate most of the present duplication of routes.

The cost of the additional special trackwork required

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to make this rerouting effective should not exceed $12,500.

The co-operation of the city authorities in the matter of regulation of vehicle traffic will be required for best results in obtaining a prompt movement of cars. The fact that costs due to accidents and damages have increased 145 per cent since 1913 illustrates the need of better traffic regulation.

Parking should be minimized on streets which have a large volume of traffic. Secondary streets having little importance as thoroughfares should be used for this purpose. Among other things, automobiles should be required to stand parallel to the curb with the adjacent wheels within 6 in. of the curb. No parking should be permitted opposite a trolley loading space.

Service Readjustments

The company is at present using an up-to-date form of schedule modeled after the A.E.R.A. standard. In making new schedules to conform with the routing changes, the use of this form should be continued. The service readjustments were determined after a careful check of the riding habits on the various lines. Barring irregularities, the proposed schedules will furnish as many seats as passengers during every hour of the day, which is certainly liberal. In fact, such an arrangement is impracticable in many cities. An outline of service changes are summarized in Table III.

All of the proposed headways are more than sufficient to meet the traffic demands and are in equal divisions of an hour, so that cars will pass a given point at the same time after each hour. This is of great value to patrons and tends to increase riding.

The new schedule calls for 8.70 car-miles per car-hour instead of 7.91 as at present. Slow operation tends to discourage riding, waste power and increase accidents. It is also the general experience that schedules which are too slow tend to carelessness on the part of the operator. If the motorman is obliged to keep busy he will be more watchful and fewer accidents will be the result. The reduced congestion on King Street will be a large factor in minimizing the delays on that particular line.

At present all of the lines with the exception of the King Street and Suburban lines are operated with one-man cars. It is the intention of the company to put one-man cars in service on King Street as soon as a sufficient number of the cars are equipped with safety devices. This is in line with the most modern practice.

Expressed in terms of the different types of equipment, the total daily car requirements are as follows:

	Two-Man	One-Man	Trailers
Present	18	25	3
Proposed	9	21	3
Saving	9	4	..

This results in a saving of nine two-man cars and four one-man cars. The saving in the one-man cars will be especially appreciated as a shortage of this type was inevitable with the beginning of one-man operation on King Street under the present system of routing.

General Improvements Desirable

There are a number of factors influencing the quality and cost of service which often can be improved if attention is directed to them. Suggestions particularly applicable in Charleston are enumerated in the following paragraphs:

Some confusion exists at present as to the exact location of passenger stopping places. Stops are made occasionally at a number of short side streets where none is authorized. The far side stop at transfer points was abolished, but this rule is not definitely followed. On the Suburban line, where there are definite stations, they are marked with small enameled signs, but some of these are entirely effaced. To mark definitely the stopping places of cars, the trolley poles at these locations should be painted with a white band about 3 ft. wide at a suitable height bearing the words "Car Stop" in black letters. The use of this type of sign is almost universal throughout the country and has been found very satisfactory wherever tried. It is plainly visible from a distance, and it is cheaper and more permanent than any other device.

The stopping places on the city lines average about fourteen to the mile, while the actual stops made vary from 4.3 per mile on Rutledge to 7.7 per mile on King. The Suburban line, with 8.4 stopping places per mile, averages 3.8 actual stops for the same distance. Most of the stops are made in the delivery area and some are at insignificant alleys or in the middle of the block. These superfluous stopping places should be eliminated, not only for the improvement of the street car service but as an aid to the movement of general traffic on these busy streets. City stopping places should not be closer than eight to the mile in order to secure satisfactory results. To make eight stops per mile requires a stop every forty-five seconds and is all that the most modern equipment and a skilled motorman can do and maintain any schedule worthy of the name.

The present schedules do not provide for a layover or scheduled standing time at line terminals. While the allowed time is sufficient to provide for minor delays, better operation would be obtained if the scheduled time were faster and a short layover provided with the time gained to care for the delays that are bound to occur.

The present practice in Charleston is for a patron to state what transfer he wants when he boards the car. The conductor, however, does not issue the transfer until the patron is leaving. This delays both the

TABLE III—PRESENT AND PROPOSED ROUTES, OPERATING DATA AND WEEKDAY SCHEDULE

Line	Round Trip, Miles		Base Headway (Minutes)		Car-Miles		Car-Hours		Car-Miles per Car-Hour	
	New	Old	New	Old	New	Old	New	Old	New	Old
Belt	4.52	4.74	10	7	1,030	1,284	133	168	7.73	7.64
Broad Street	....	6.44	..	10	....	719	...	97	....	7.42
Columbus-Spring	1.95	....	15	..	140	....	18	...	7.80	....
(a) King Street	5.13	5.62	10	12	555	524	72	76	7.70	6.90
Meeting Street	7.64	7.64	30	20	290	426	38	56	7.64	7.61
(b) Rutledge Avenue	7.87	9.56	10	10	930	1,036	118	132	7.87	7.85
(c) Suburban	18.60	18.60	30	20	1,140	1,399	92	152	12.39	9.21
Totals and averages					4,085	5,388	471	681	8.70	7.91

(a) On King Street before 7 a.m. and after 9 p.m. a twelve-minute headway should be maintained.
(b) In addition to a special trip per morning and evening for colored workers at the fertilizer plant.
(c) For the present demands, six extras should be operated in the morning and eight extras at night. This includes the two-car and three-car train to the Navy Yard at night. The car-hours and car-miles shown include the extras.

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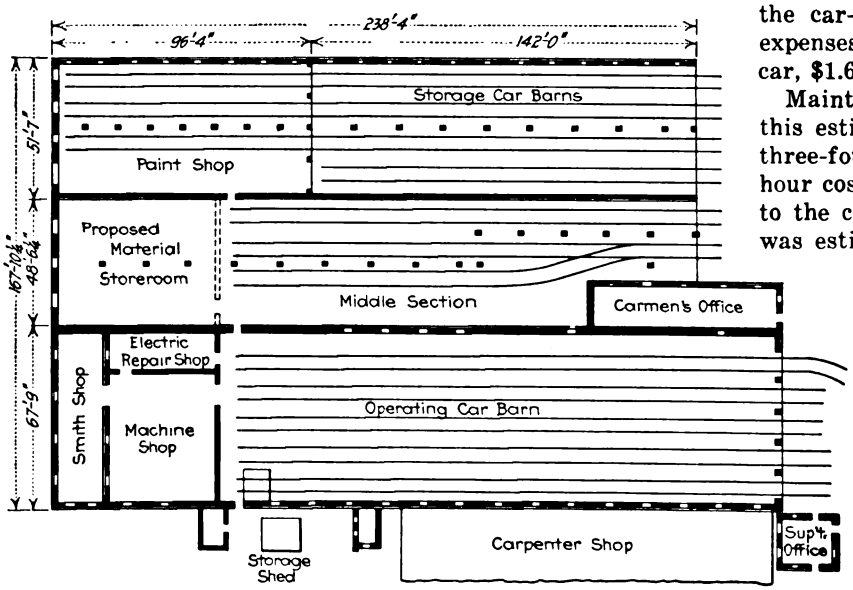
alighting and boarding passengers. It would be much better if the transfers were issued to passengers only when they board the car.

The center-entrance cars are equipped with two doors, but only one of these, the forward one, is used. Keeping this door closed gives a little additional seating space, but it would be better to use both doors as an aid in speeding up and improving the service.

The track switches now in use in Charleston are hand operated, by short switch-irons, which make it necessary for the motorman to leave his post to throw the switch. With one-man cars, this makes serious delay and fare collection becomes more difficult. Electric switches should be used wherever the headways are five minutes or less. Switches not electrically operated should be thrown from the car. Hand switch-irons long enough to permit this operation should be provided.

Observations showed that while there was opportunity for a great deal of coasting, very little was done.



Plan of Carhouse and Shops, Charleston, with Proposed Additions of Storeroom and Carpenter Shop

One of the standard forms of power saving devices should be adopted. Their efficient use reduces power consumption and gives more comfort to the passengers, as it necessitates more uniform acceleration and braking. Probably 10 per cent of the power cost can be saved after the power saving devices are paid for.

Reports from eighty-one electric railway companies in the United States for the first four months of this year show that approximately 7.1 per cent of the operating revenue is paid out in taxes. For the same period, the Charleston railway paid 9.5 per cent of its operating revenue for this purpose. Some substantial relief should be afforded the railway. In addition to the regular taxes the company paves a portion of the streets between and adjacent to the rails. The amount of paving so required has recently been reduced 50 per cent. It should be eliminated entirely.

It has been the policy of the company not to set aside a reserve for renewals and retirements, but to keep the physical plant in condition by charging all current renewals to the maintenance account. Only actual additions to the plant, such as the addition of safety devices to cars, are added to capital account. The generally accepted practice, however, and one which guarantees greater protection of property and minimizes the fluctuations in the operating expense, is to set aside an annual reserve for renewals and retirements and to use it as needed. The company should accrue annually a sum for this purpose.

Savings Possible by Plan

Table IV shows in detail the present operating cost per car-hour of the different types of equipment. An analysis of the savings possible from reducing the car-hours shows that for each hour saved expenses will be reduced as follows: Two-man car, $1.658; one-man car, $1.009; trailer, $1.002.

Maintenance of equipment is not included in this estimate because it is considered later, but three-fourths of the maintenance of way car-hour cost was taken, as the ratio of the car-mile to the car-hour reduction is 3 to 4. No change was estimated for the general expense or taxes, so that the estimated savings should be conservative.

The total annual reduction in expenses that should follow all changes recommended is shown in Table V.

Shops and Carhouse

Maintenance of equipment costs increased steadily until 1921, when the peak was reached. At that time the cost per car-mile was 6.1 cents, or 454 per cent higher than in 1913. The present figure of 5 cents per car-mile is 354 per cent greater than before the war. This indicates either abnormal renewals or need for greater economy in the shops or both.

The general arrangement of the shops is good except that a storeroom should be provided in the rear of the middle portion of the carhouse as a time saver when securing materials. When the time is propitious a carpenter shop should be built in conformity with the rest of the surroundings. The completion of the remodeling of the cars, a more efficient use of labor and the decrease in the number of cars in service due to the new routing proposed will make it possible to reduce the cost of labor and materials as estimated in Table VI.

By reference to chart No. 8 on page 1086 it will be seen that in 1913, which may be taken as a typical pre-war year, 5.3 per cent of the operating revenue

TABLE IV—PRESENT OPERATING COST OF DIFFERENT TYPES OF EQUIPMENT, BASED ON MAY, 1923, EXPENSES

	Present Cost per Car-Hour Two-Man	One-Man	Trailer
Power	$0.281	$0.188	$0.188
Maintenance way and structures	.338	.225	.282
Maintenance equipment	.459	.229	.153
Operation of cars	1.390	.960	.910
Damages	.163	.122	.122
General	.182	.164	.164
Taxes	.194	.146	.146
Total	$3.007	$2.034	$1.965

TABLE V—ANNUAL SAVINGS POSSIBLE BY CHANGES RECOMMENDED

	Annual Saving
138 two-man hours daily at $1.658 each, equals $229 daily x 365 =	$83,600
70 one-man hours daily at $1.009 each, equals $71 daily x 365 =	25,900
2 trailer hours daily at $1.002 each, equals $2 daily x 365 =	730
Due to power saving devices	4,100
Shop readjustments (labor)	14,800
Shop readjustments (material)	12,700
Carhouse readjustments (labor)	6,700
Total	$148,530

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TABLE VI—ESTIMATED ANNUAL SAVINGS AT SHOPS AND CAR HOUSE

Payroll reduction (shops)	$14,800
Payroll reduction (carhouse)	6,700
Saving in materials	12,700
Total annual saving	$34,200

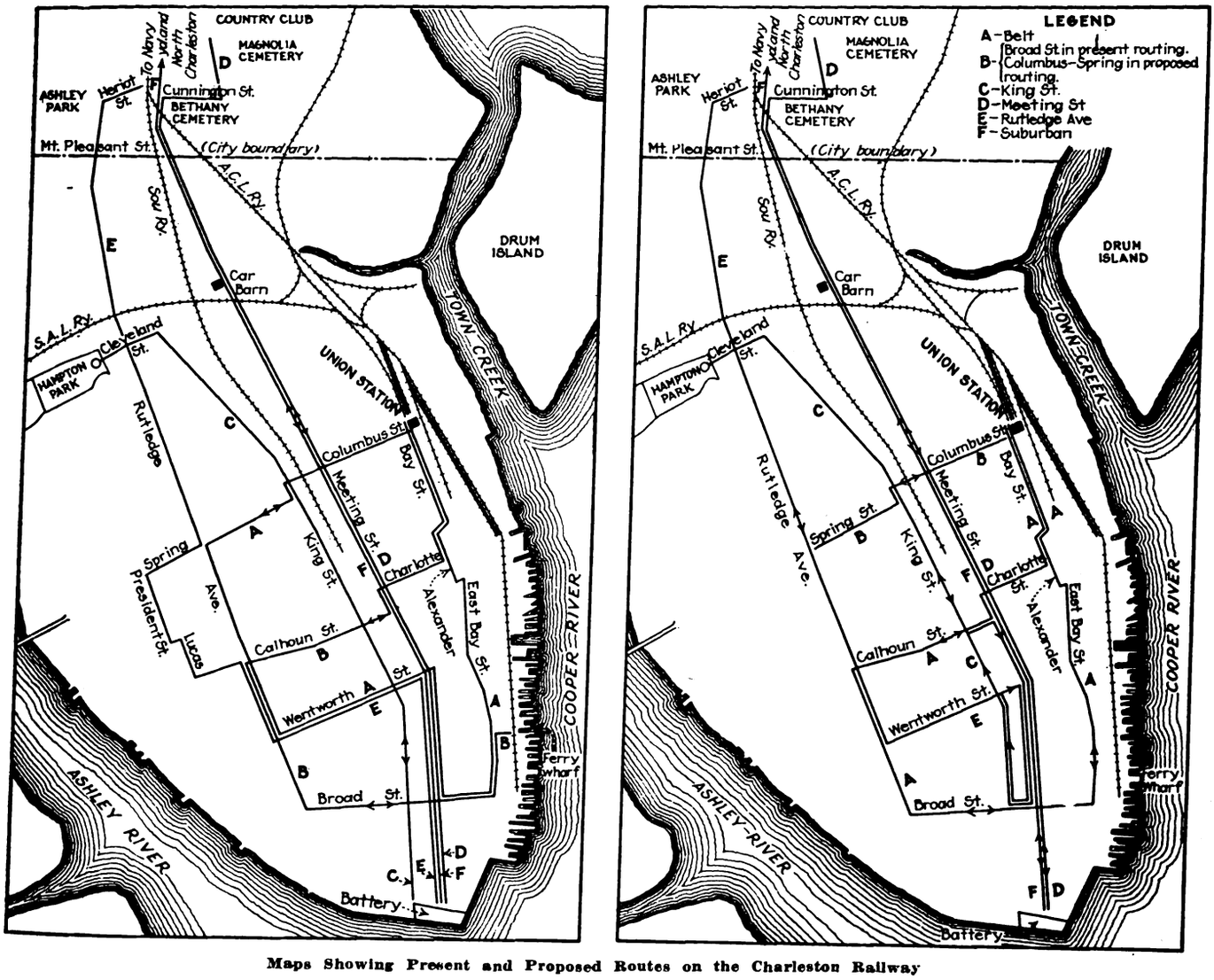
was required to cover maintenance of equipment costs, while for the first five months of 1923 16.5 per cent was required. Similarly, in 1913 these expenditures represented 7.8 per cent of the total operating expense, while now they are 15.5 per cent or double. This account should be normally about the same percentage of the total expense.

A very considerable portion of the increase in recent years is, undoubtedly, due to deferred maintenance. Some of it is due to renewals and betterments to the present rolling stock. As there is no special reserve for renewals of this nature, these costs are being charged directly to operations.

Arrangement of Shops

The general arrangement of the shops is shown in the plan on page 1084. They are well located with respect to the carhouse. The electrical, machine, blacksmith and paint shops are housed in the main brick structure. The carpenter shop, however, is a frame lean-to on the south side of the main building. This frame structure was recently enlarged by addition of a temporary shed to care for the increased work in connection with the remodeling of cars. The present carpenter shop structure will need rebuilding in a few years. By that time the company may expect to be on a better financial basis and a building should be constructed in conformity with the rest of the plant.

The material store house is located in the old power house across the street. This requires a walk of approximately 1,000 ft. when material is required. The rear portion of the middle section of the carhouse is little used except as a place to pile junk. It should be cleared out and used as a store room that will be readily accessible from the shops. The cost of making the store room changes should not be a great deal. The saving in time and labor in routing the materials should soon repay this expense.



Maps Showing Present and Proposed Routes on the Charleston Railway

The machine tools are in good condition and with the remodeling of the cars finished any replacement is hardly justified at the present time. A shaper or a milling machine would be a time saver in turning out light work. A check on the number of operations that would be done on this machine with the normal maintenance work should be made and the cost compared with that of similar work done by present methods. It is probable such an investment would be justified.

A large portion of the woodworking machines were purchased in 1921, so there should be no need for additions at this time.

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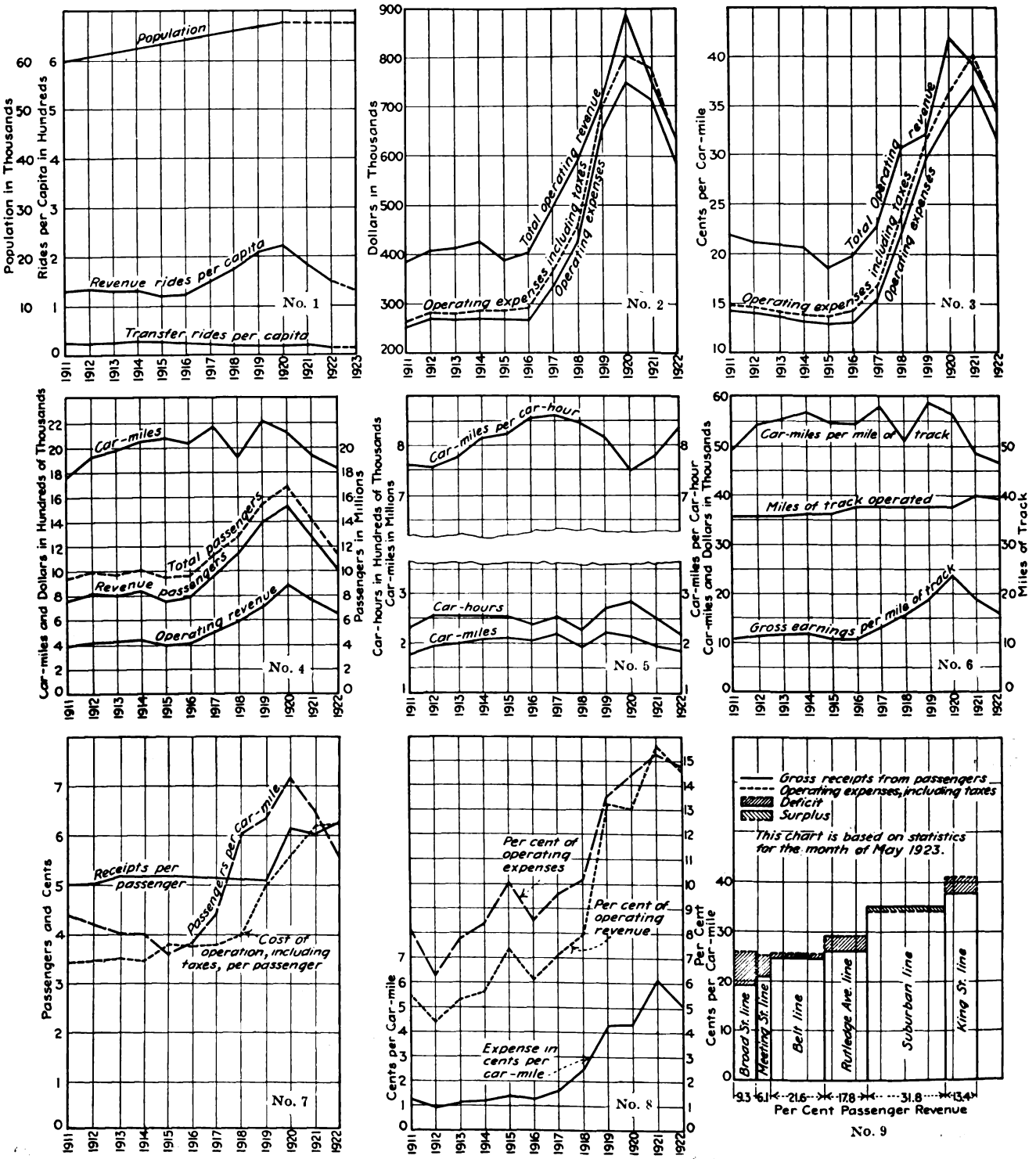
With the remodeling of the cars completed, a reduction in the shop force is contemplated, leaving just enough help to care for the current maintenance. The decrease in the number of cars in service, with the proposed routing in effect, will reduce the labor requirements still further. Fifteen men may be dropped from the payroll, with a weekly saving of $364.50 from the present weekly payroll of $791.10. With a smaller force, administrative duties will be easier and a closer check on the work will be possible.

Based on the five months ended May 31, 1923, the annual cost of materials for equipment maintenance is $52,800. With the recommended routing effective the material costs should be reduced approximately in the same proportion as the number of car-miles operated, or an annual reduction in the material cost of $12,700 may be expected.

The carhouse can also be operated with a smaller force and the weekly payroll reduced at least $129.60.

The adoption of all of the recommendations in this



Statistical Graphs of the Charleston Railway Property

No. 1. Population and rides per capita.
No. 2 Revenue and expenses.
No. 3 Total revenue and expenses per car-mile.
No. 4. Car-miles and number of passengers carried, compared with operating revenue.
No. 5. Car-miles, car-hours and the car-miles per car-hour.
No. 6. Car-miles and gross earnings per mile of track.
No. 7. Passenger statistics.
No. 8. Maintenance of equipment costs in cents per car-mile.
No. 9. Receipts and expenses per car-mile by routes.

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report should be of permanent benefit to both the public and the company. The faster and better distributed service should stimulate business. Reduced congestion will benefit the general public as well as the car rider and the user of the automobile. The merchants and property owners will benefit from the enlarged delivery area and the better distribution of cars through the business district.

The plan will enable the railway to take an important step toward being self-sustaining, as with the plan herein effective a saving of $148,530 in operating expenses can be made. Supplementing these economies, further steps may be taken to improve the net earnings of the railway in three ways: (1) By the people of Charleston patronizing the railway more; (2) by curtailing the proposed service and introducing further economies; or (3) by raising the fares.

The railway deserves more patronage as the low per capita earnings show. An increase of one dollar per capita, or 2 cents per week, would practically wipe out the deficit. The schedules and service proposed in this plan will readily care for 15 to 20 per cent more riders. A 13 per cent increase in the revenue passengers would enable the company to operate without a deficit. This may result from changes in population or from increased riding. If from the latter alone the riding habit must go up from 130 to 147, which, although more nearly what it should be, is a considerable increase over the present.

To curtail the service from that which is proposed is not desirable if any other way out can be obtained. Economies other than those recommended are not desirable from a service standpoint.

At the present time a combination of increased fares and more patronage is a practicable solution. If a straight 7-cent fare for adult city passengers were adopted it is estimated that the railway revenues will be increased $22,500 annually. Possibly the people of Charleston, when they understand this situation, will avail themselves of the service to a greater extent and thus tide over the necessity of either lowering the standard of service or of increasing the rate of fare above 7 cents.

Fares to be equitable must always be based on the cost of rendering service. High costs mean higher fares. As the costs recede the fares should do likewise. At no time, however, can any progressive community prosper with poor car service even though such service is tolerated by the public in order to secure a low rate of fare.

Capitalizing on the Coffin Prize

How the Chicago, North Shore & Milwaukee Railroad Is Turning the Winning of This Award to Good Account—Its Value as a Publicity Asset Is Being Fully Utilized in Newspaper Advertising, Window Displays and Company Publications—The Cover Design of the Prize-Winning Brief Has Been Reproduced on Dining Car Menus and on Attractive Souvenir Calendars

REALIZING the immense value of the Charles A. Coffin prize as a publicity and merchandising asset the management of the Chicago, North Shore & Milwaukee has been quick to apply it. The prize has also been put to use to give an incentive for building up a still greater pride and *esprit de corps* within the organization. The work already done has taken many different forms and still further applications are contemplated for the future.

As the first step in the program, the report of the Charles A. Coffin Prize Committee and the remarks accompanying the presentation of the prize have been made the basis of a series of large advertisements. Weekly insertions are being made in seven Chicago papers, five Milwaukee papers, two papers in Racine and two in Waukegan. In addition, these advertisements are being published in the local papers of Kenosha, Libertyville, Lake Forest, Highland Park, Winnetka, Wilmette, Glencoe and Evanston. This list includes practically all of the larger communities along the line.

A reproduction of the certificate of award was published first. This is being followed up by a series of seven advertisements quoting excerpts from the report of the committee. The seven advertisements are the same in form, the excerpts being inserted as shown in the illustration. Several of the other quotations are given below:

5. Because of improvements in construction practice, which have resulted in reduced first cost, reduced maintenance or greater reliability of service.

"Construction methods which are contributing to the general success of this company include new and better power station equipment; a program of rock-ballasting the entire system is 60 per cent completed; the old light rail is being replaced with 100-lb. rail and concrete and brick platforms are replacing wood at the stations."

—*From Report of Committee on Award.*

6. Because of particular success in conducting a safety program, and actually reducing the number and seriousness of accidents.

"In fostering greater safety in operation, this company has succeeded in reducing injury and damage claims to 1.82 per cent of the gross. The record was one accident per 16,081 car-miles in 1922. Lectures, safety meetings, safety recommendations. 'Safety First Car' and first-aid drill teams are part of the company's notable safety work."

—*From Report of Committee on Award.*

7. Outstanding accomplishments in development of good relations between management and employees.

"The fact that your company has secured the award of the Coffin Foundation is proof positive that the greatest spirit of co-operation must have existed among all men concerned, in the operation of your railway system."

—*Mr. Emmons, Chairman Committee on Award.*

It is expected that this series will be carried still further when the existing program is completed.

Award Also Used in Advertising New Securities

The value of the award as a merchandising asset has also been applied in a campaign conducted for the procurement of new capital. Advertisements for the sale of the company's 7 per cent prior lien stock carry a reproduction of the front and back of the medal with the following statement beneath:

"Awarded October 11, 1923, for distinguished con-

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Why
The North Shore Line
won the first
CHAS. A. COFFIN MEDAL

at the Convention of the American Electric Railway Association, October 11, 1923, Atlantic City, N. J.

1–Because of the particular initiative, skill and enterprise manifested in popularizing electric railway service.

"From the representations of the winning company, the committee finds, that on this property, there has been carried to fruition most of the things that have been talked about for years, as the remedies for various troubles. On this property the remedies have not only been talked about; they have been EXECUTED."

From Report of Committee on Award

CHICAGO NORTH SHORE and MILWAUKEE RAILROAD COMPANY

An Example of General Newspaper Advertising in Which Excerpts from the Committee Report Are Quoted

tribution to the development of electric transportation." These stock advertisements are in addition to the general advertising series and are being run in the same papers in which the general advertising campaign is conducted.

Used in Window Display and Company Publications

Very shortly after the award was made a large scale reproduction of the medal was prepared and was made the center of a window display in the Edison Building, where the company's offices are located. This display created a great deal of comment and interest and has since been moved to the terminal passenger station in Milwaukee.

The company included a description of the award in the "North Shore Bulletin," which is a monthly booklet prepared for circulation among patrons of the line and residents along its route. A similar item was published in the "High Ball," which is a monthly employees' publication, and in the Chicago Elevated Railway's publications, the "Elevated News" and the "High Line." The combined circulation of these papers is approximately 75,000 monthly.

Framed photographic reproductions of the certificate which accompanied the medal have been hung in the various stations along the company's route. Four-color reproductions of the cover of the prize-winning brief have been utilized on the covers of the dining car menus, along with pictures of the front and back of the Coffin medal.

This colored cover design has been further utilized in making up a wall calendar. On each page of the date pad the front and back of the medal are pictured. It is planned to distribute the calendars as souvenirs at the opening of the new Wilson Avenue passenger station just nearing completion. In addition they will be mailed to a selected list of women representating various club and civic activities in the communities along the line of the road.

Bronze watch fob replicas of the medal have been made up. These are being distributed to employees and will also be used by the traffic department for distribution to employees of shippers doing business with the North Shore Line.

The management contemplates further application of the award in its general publicity program. It will probably be used as the basis for some of the posters with which the road has been so successful in the past in creating favorable attention and comment. By extension to its billboard advertising and to car card publicity it is expected that public confidence and good will toward the company can be still further stimulated through this evidence of merit presented by the industry of which it is a part.

How Economy in Current Was Obtained in El Paso*

THE business center of El Paso is very close to the river on the south, and the development of the city has been, therefore, confined to a northward growth. This growth has been made more difficult by reason of the fact that a chain of mountains extends through the northern part of the city, terminating just outside of the business district.

Innumerable hills and curves increase the kilowatt-hour consumption of the cars of the El Paso Electric Railway, as is evidenced by the fact that when an experiment with friction bearings was conducted by the company on the only level line operated, a lower power consumption was experienced with these cars than with the ball-bearing type on other lines. The total mileage of city lines in El Paso is 42.2 on a single track equivalent. Of this amount 22.1 miles is paved.

All of the company's cars are equipped with Economy meters, and a careful record is kept of each man's and each car's performance. An individual inspector is in charge of this phase of operation and keeps comparative records which are posted for the benefit of the men, and which also are published in the company's periodical, "Cactus Points." Where he finds that certain men are using more than the average amount of current, he studies the particular case and usually ascertains and corrects the cause.

The use of these meters by this Texas company, and the system in connection with them, have been instrumental in helping reduce the current consumed. This is shown by the average kilowatt-hours per car-mile for the system, which in 1920 was 1.765; in 1921 was 1.65; in 1922 was 1.52; and in 1923, based upon operation during a period of seven months, the kilowatt-hour consumption was 0.88.

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

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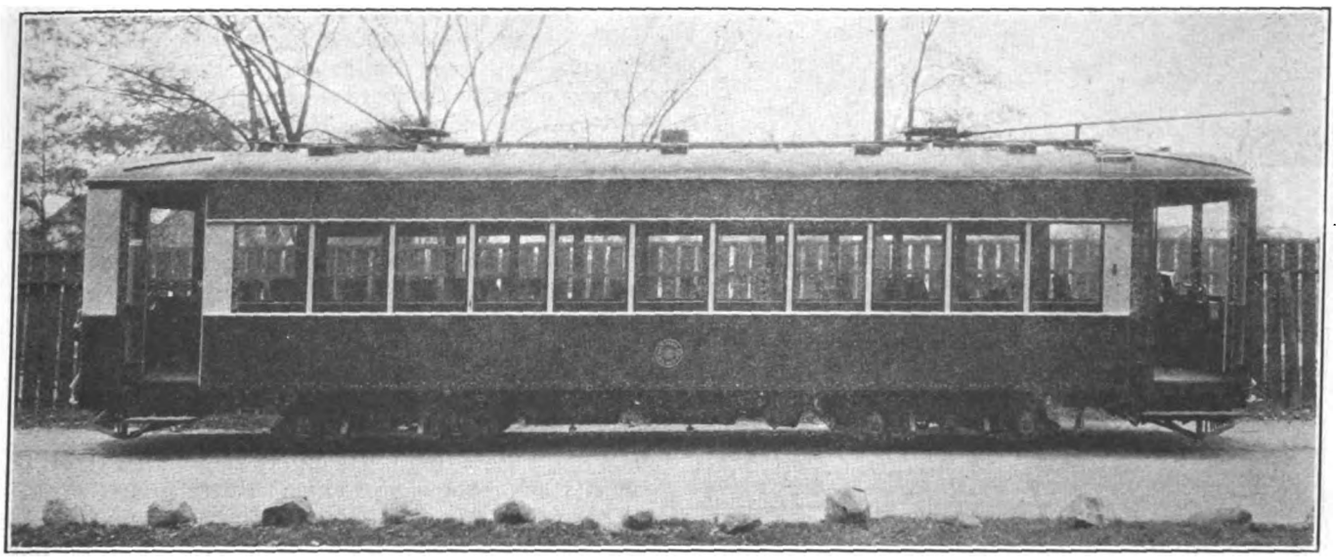


Single Sash Windows of Unusual Height Admit Plenty of Light in the New Cars of the P-O Electric Company

Simplicity of Arrangement Features New P-O Cars

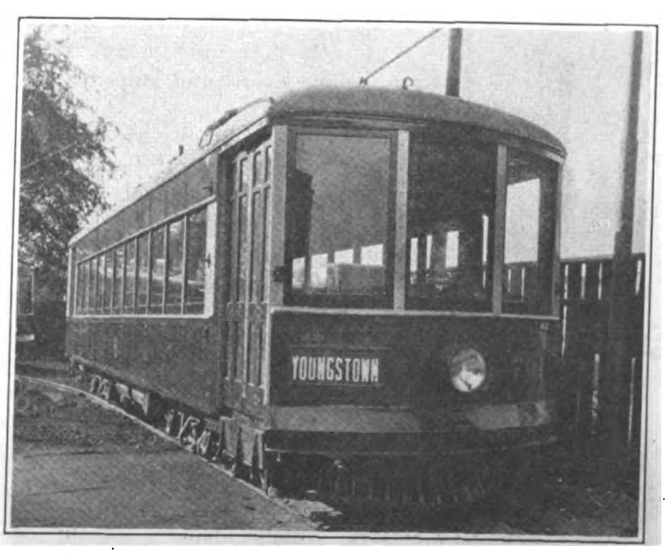
All Pipes, Wires, Switches, Engines, Etc., Are Inclosed in Cabinets —Advertising Cards and Luggage Racks Have Been Eliminated in Order to Improve the Interior Appearance—Woodwork Is of Mahogany

By Richard N. Graham
Manager of Railways Pennsylvania-Ohio Electric Company, Youngstown, Ohio

WITH the idea of creating a car which would bear the same relation to the ordinary interurban electric car that the coaches of the Pennsylvania-Ohio Electric Company bear to the ordinary bus, several departures from conventional practice have been made in the design of the new cars placed in service on Oct. 28. Three principal objects were sought. In the first place, simplicity of arrangement was desired for the purpose of facilitating cleanliness and improving the appearance of the interior. All pipes and machinery were, therefore, inclosed in cabinets. In the second place, the company wished to make the car as comfortable as possible for the passenger. In the third place, it was desired to speed up passenger movement, not only boarding and alighting but also within the cars, and doors and aisle were specially designed for this purpose.

The cars are operated from Youngstown to New Castle, a distance of 20 miles, and from Youngstown to Sharon, a distance of 15 miles. On these routes the headway is thirty minutes throughout the day and evening until midnight. Both lines have comparatively heavy traffic, with considerable passenger interchange. This is particularly true of the Youngstown-Sharon line, where there are a number of very heavy loading points.

The new cars weigh 37,000 lb. and take the place of an older type interurban car weighing approximately 75,000 lb. Each car is equipped with four G. E. No. 265 motors of 35 hp. capacity. Four Westinghouse No. 317, 90-hp. motors constituted the equipment of the cars which are now being retired from service, but it is expected that the new cars will handle the same traffic at the same schedule speed as the cars for which they are being substituted.



Both Entrance and Exit Are Normally by the Front Door, but an Emergency Door at the Rear Is Also Provided

Because of the simplicity of the design and the quality of the material, the interior of the car has an unusually pleasing appearance. No stanchions of any kind are used in the car. Luggage racks and advertising signs have been eliminated. From the tops of the single sash windows up to the roof the sides are finished in genuine mahogany with a simple panel effect. The same finish is used for switch cabinets, controller, and the casing

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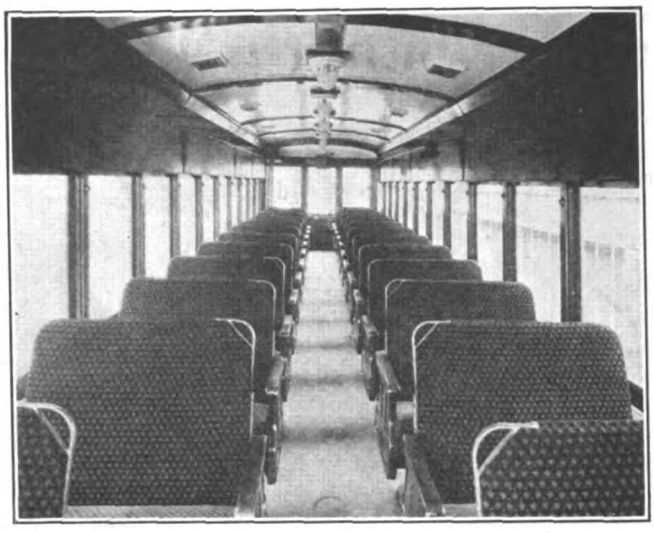
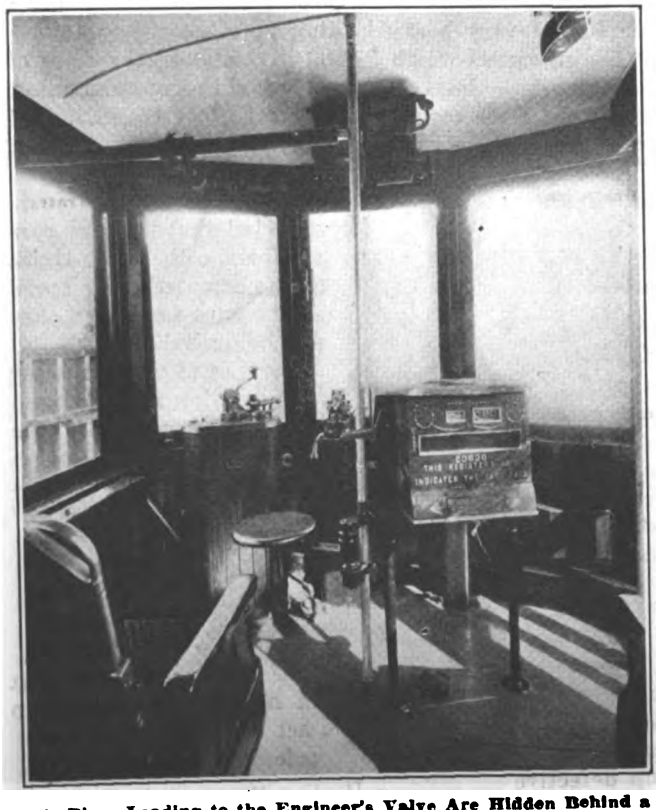


Mohair Velvet Seats Are Permanently Fixed at a Comfortable Angle, and the Interior in General Is Free from All Unsightly Mechanisms

for the engineer's valve. All switches are inclosed in a Detroit switch cabinet, which is painted to conform to the general scheme of decoration. It is placed under the left front window out of the way of the operator or passenger. The unsightly pipes leading to the engineer's valve are inclosed in sheet-steel cover, finished in conformity with the woodwork. Where it was necessary to install conduits inside the car body leading to the control apparatus, they were similarly inclosed. A feature of this car, therefore, is the minimum display of apparatus. The machinery is of no more prominence than in the interior of a well-appointed automobile.

In order to admit plenty of light, the bottom panel of the side frame was made unusually low, so that the lower part of the window sash is just opposite the elbow of a seated passenger. The cars were constructed with single sash windows, so that this sash might have greater height. All windows are plate glass. The bulkheads have been eliminated and the end windows and those opposite the doors were made of the maximum possible width and height. The result is that even on a cloudy day in a region which has an unusually cloudy climate the interior of the car appears bright and cheerful.



Air Pipes Leading to the Engineer's Valve Are Hidden Behind a Sheet-Iron Shield

The elimination of the double sash and of all exposed piping or apparatus of any kind that would furnish a lodging place for dirt has facilitated the work of keeping the car interior clean and sanitary. Special washing facilities for these cars are now being installed in the inspection barn from which they are operated. For this purpose, a vacuum cleaning process will be used. As there is no provision made in the cars for bulletins, signs, notices, advertisements, or any other sort of publicity or propaganda, another fruitful source of dirt and trash has been eliminated. The company believes that the passengers should bring their own reading matter aboard the cars.

Carlines have been inclosed in mahogany cross-beams, while another beam runs longitudinally the full length of the car. Elsewhere the ceiling is finished in ivory white enamel. The ceiling thus has a beamed effect. This effect is carried out into the vestibule by a special sheet-metal vestibule hood, which also is finished in white enamel.

Adequate Lighting and Comfortable Seats

For artificial lighting at night, Brascolite lighting fixtures have been installed along the center of the roof. Each fixture contains a 93-watt light. In combination with the white enameled ceiling, already mentioned, these lights provide effective illumination, so that the passengers can read newspapers with ease at all points in the car.

Maximum comfort for the passenger is provided by the high back seats with deep spring cushions. The cars were arranged for single-end operation with the specific idea in mind of having a stationary seat that would have the proper pitch to be the most comfortable. Arm rests are provided on both sides of each seat. The seats are sufficiently roomy for two large men wearing overcoats to sit side by side in perfect comfort.

The floor is covered with battleship linoleum and the seats are upholstered in Chase mohair velvet of figured design. The color of the upholstery harmonizes with the mahogany trim. The operator's curtain corresponds in color and appearance to the upholstering of the seats.

An Ohmer fare register is installed on a mahogany cabinet containing pigeonholes for transfers and the operator's reports. Space is provided there also for two electric lanterns, one with a red bull's-eye and one with a white bull's-eye, which are used by the operator for signaling purposes instead of oil lights.

Ingress and egress of passengers are accomplished through a large double door at the front end. There is also an emergency door at the rear which can be opened by passengers whenever an emergency stop is made. The aisle is unusually wide, and the farebox is located so as not to interfere in any way with the free movement of passengers.

A single seat just back of the front door was originally included in the design, but this has now been eliminated and the sand box under this seat has been inclosed in a mahogany cabinet.

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Keeping the Cars on Schedule*

Organization and Operation of Dispatching System of Kansas City Railways Is Briefly Told—Effective Check of Car Operation in the Field Has Served to Produce a High Standard of Service—Company Police Department a Great Aid

IN ORDER to correct unavoidable disarrangements of service at their very inception, the Kansas City Railways has developed a dispatching system which has contributed materially to the building up of increased patronage and has resulted in other direct and indirect economies coming from the more efficient utilization of equipment with the accompanying saving in platform expense.

This dispatching system was laid out on a basis that would provide vigilant supervision and prompt action through immediate contact with service by men in the field. Besides endeavoring to make efficient schedules, the company has a system of control through its dispatchers and inspectors which provides forty-five men on the street during rush hours to assist in traffic regulation, proper spacing and prompt action in case of imperfections in the service. Service irregularities have been reduced to a minimum, where prompt action is possible through the speedy transmission of intelligence and dispatching of relief for such troubles as wrecks, trolley breaks and accidents. Incidentally, all emergency trucks and similar equipment carry police sirens.

The dispatching organization comprises a chief dispatcher and three assistant chief dispatchers, located at the main office, who, in three shifts, carry the work continuously through twenty-four hours, and dispatchers, inspectors, company police, motorcycle inspectors, division officials.

Private Telephone System Gives Dispatcher Direct Control

The dispatching desk is connected directly with twenty-six dispatchers' booths located at strategic points over the system. In addition, the dispatcher has direct telephone communication with pole box telephones located at fifty-one intermediate points on all lines of the system. All these telephone connections with the dispatcher's desk are over private wires.

The assistant chief dispatchers keep a record of all the calls from field dispatchers, inspectors, company police, division officials, etc., listing all delays of over five minutes, all accidents and all occurrences pertinent to the operation of the system. These are tabulated and a typewritten report for each day is on the desk of the superintendent of transportation by 7 o'clock the following morning. These men also carry out the dispatching orders of the chief dispatcher, reroute cars, fill in spaces, handle emergencies, dispatch emergency tower wagons, trucks or wreck cars, police or medical aid, and act as the nucleus for transmitting orders and receiving reports for the entire system.

The dispatchers located at the twenty-six booths scattered over the system at strategic points are on duty eighteen hours a day. They check and correct on the street irregularities in headways and schedule distortion. They report to the chief dispatcher all delays or failures of over five minutes. They keep a typewritten record of the time of arrival and the load of every car passing the stations. They observe and report any defects noted in passing equipment to the assistant chief dispatcher, with the result that defective equipment is promptly removed from service. In addition to the duties already mentioned, these men act as public information stations, sell tokens and tickets and are in every respect branch offices of the main office for the convenience of the public.

One of the Twenty-six Dispatchers' Booths Located at Strategic Points on the Kansas City Railways System

These booths are electric lighted and heated and equipped with telephone, schedules of all lines passing the booth, information of the city and the system, and with miscellaneous equipment such as switch bars, spare trolley poles, fuses, replacers, pick-up sticks, jacks and chains, light repair kit and fire extinguishers.

The inspectors, dressed in a uniform which is distinctive from the trainmen's uniform, are stationed at heavy points during the rush hours. They assist in loading and moving cars and act as traffic officers when necessary. They transmit orders to trainmen, check up defective equipment, report violations of rules, assist the public in every way possible and see that cars

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are given preference over vehicular traffic at all intersections. These men are all commissioned police officers and they act in perfect co-operation with the police department, by which they are recognized. During the non-rush hours, the inspectors travel over the lines constantly, looking for improper operation, schedule distortion and keeping in constant touch with the chief dispatcher through the pole telephones.

In addition to the regular inspectors, the company employs four motorcycle inspectors, working in two shifts of ten hours each. Their duties and authority are the same as those of other inspectors. They function particularly in cases of fire, accidents or other emergencies. Their motorcycles are equipped with sidecars so that they can transfer trouble men, division officials and others rapidly and can carry emergency kits. They also assist in handling parades. They are commissioned officers and wear a uniform similar to that of the motorcycle police and their cars are equipped with police sirens.

The Railway Has a Police Department

The Kansas City Railways also has a police department which is said to be unique among street railway companies. It consists of a chief and a day and a night captain and fourteen officers. The police department is on duty twenty-four hours a day. Use is made of a fast automobile equipped with a police siren, and every man in the department is an ex-police department officer, commissioned by the city and given equal authority and rights as regulation police officers. These men answer accident calls, handle crowds, secure names of witnesses, assist in caring for the injured, keep the streets clear. Their police authority renders them invaluable in such emergency cases. They assist in clearing up parades and make arrests of traffic violators or disturbers, if necessary. In times of heavy traffic movement at parks, ball games, parades and other special events, they report to the chief dispatcher and assist in distributing the load, preserving order and in exercising general police authority. These men are also used as guards and watchmen at all points where money is handled.

In addition to the regular company police department, there are 115 police commissions in the transportation department. These were granted by the police commissioner and the railway employees so commissioned are regarded by the police department as regulation officers with power to make arrests, handle traffic and perform other duties of a similar nature.

The entire dispatching organization works in conjunction with the traffic checking department of the railway. The daily reports of car arrival time and loads kept by each dispatcher, combined with the reports of the traffic checking department, give a daily traffic check and survey of every important line. As a result, the superintendent of transportation and the general manager have on their desks each morning the loading check, car receipts, car-mile receipts and total receipts of every important line, together with the platform operating expense of each line. Thus the schedules may be and actually are adjusted daily, as occasion requires.

The results of this comprehensive dispatching system are readily apparent. The company states that in spite of hills, narrow streets and vehicular congestion, it is able to maintain high service standards with delays reduced to a minimum. Train crews are constantly checked, discipline is better enforced, and accidents and emergencies are more expeditiously handled as a result of the dispatching system.

Company Does Paving at Cost for City*

AN INTERESTING example of the way in which an electric railway company, by means of its trained organization, can be of help to a city government is shown by an incident which occurred in Colorado Springs a little more than a year ago. This city of about 40,000 inhabitants decided to put through a considerable job in paving, which the city engineer estimated would cost approximately $1,100,000. Four of the principal streets of the city were involved, and on one of these the Colorado Springs & Interurban Railway maintained a double-track railway about 3 miles in length.

The city advertised for bids, but when they were received they were found to be in excess of the engineer's estimates, except for a small proportion of the work. The specifications for the rest of the work were then changed and new bids were requested, but these also were considered unreasonably high by many of the citizens. The railway company then made the following offer to the city, to wit: If the Council would reject all the present unsatisfactory bids, the company would do the work on that part of the undertaking for $5,000 less than the lowest bid which the city had received up to that time. It agreed also in separate provisos to do the work without profit of any kind, that the cost would not exceed that already mentioned, and finally that while it would have to purchase certain equipment to do the work, this equipment would be considered a part of the cost of doing the work and be turned over by the company to the city at the expiration of the contract.

This offer was accepted, and when the contract was finally completed, which was about Nov. 1, 1922, it was found that the company had saved the city $200,000 in cash and had turned over to the city the equipment which it had purchased at a cost in excess of $96,000.

Incidentally, the company found that the work that it had to do itself in connection with its own track in this repaving undertaking had been done at a cost of some $30,000 less than the lowest bid made by any contractor, and that it had obtained a much better class of work.

Transportation Conference

A CALL for a national conference on transportation, to be held in Washington, Jan. 9, 10 and 11, was issued on Dec. 25 by Julius H. Barnes, president of the Chamber of Commerce of the United States. The discussions at this conference will relate to recent reports of committees of the national chamber on the following phases of the transportation question: (1) Governmental relations to transportation; (2) railroad consolidation; (3) readjustment of relative freight rate schedules; (4) highways and motor transport; (5) co-ordination of rail and water service; (6) taxation of common carriers. Abstracts of the committee reports, 4 and 6, which relate more closely to electric railways than any of the others, were published on pages 903 and 905 of the issue of this paper for Nov. 24, 1923.

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Washable Seat Covers Prove Popular on Interurban Line*

A CAUSE for complaint among patrons of the Northern Texas Traction Company, Fort Worth, with regard to the interurban cars used to be that the leather backs of the car seats in many cases soiled their clothing. To overcome this the company has equipped all the interurban cars in limited service on the Fort Worth-Dallas line with slip-on covers which extend over the seat backs for a distance of 12 in. from the top.

These covers are made of regular automobile seat covering, duck No. 2430. It requires 1 yd. 4 in. of the material at 35 cents per yard to make one cover and the labor and other costs are about 20 cents, making each one cost approximately 59 cents. The average life of a cover is several months, and during the year they have been in use only $30 has been spent for repairs, outside of the regular replacement of worn-out covers.

A contract has been made with a local laundry to wash these covers at 1 cent each and every set is washed once in fifteen days. These covers give a pleasing effect to the car interior as well as prevent dirt being rubbed off the seats onto the clothes of the passengers. Many favorable comments have come from patrons of the line, and the improvement has increased the popularity of the Fort Worth-Dallas limited service with only a very small increase in expense.

Prizes for Helpful Suggestions*

TWO methods of encouraging helpful suggestions from employees for the improvement of the service or more economical operation are being practiced by the Colorado Springs & Interurban Railway. One of these is to offer prizes for the best suggestions of this kind submitted by employees. An offer of this kind, with first prize of $100, second prize of $75, third prize of $50, and fourth prize of $25, was made by this company in 1923. Prizes are awarded at the end of each year by a majority vote of the board of directors. The vote of the directors is taken without knowledge as to who made the suggestions.

All suggestions must be in writing. A number have already been received and some have been adopted and put into force. The men are taking great interest in the plan.

A second method of stimulating interest in improvements in the practice of the company was begun in February, 1923, in the form of monthly luncheons for the superintendents and the foremen with the president of the company. At these luncheons the foremen read papers prepared by themselves upon the work of their respective departments, and this is followed by general discussion, either of the points brought up in the paper or of any other matters that the foremen feel may be of interest to the company. The papers are typewritten, and a copy is delivered to each of the directors of the company. It has been found that the foremen at these meetings will make suggestions for improvement of the service and economies in operation which they might otherwise hesitate to make to the superintendent for fear that such suggestions might be considered as criticisms of his management. Another benefit from the plan is that the directors of the company gain a better understanding of the details of the operation of the system through the reading of these papers than they might otherwise have.

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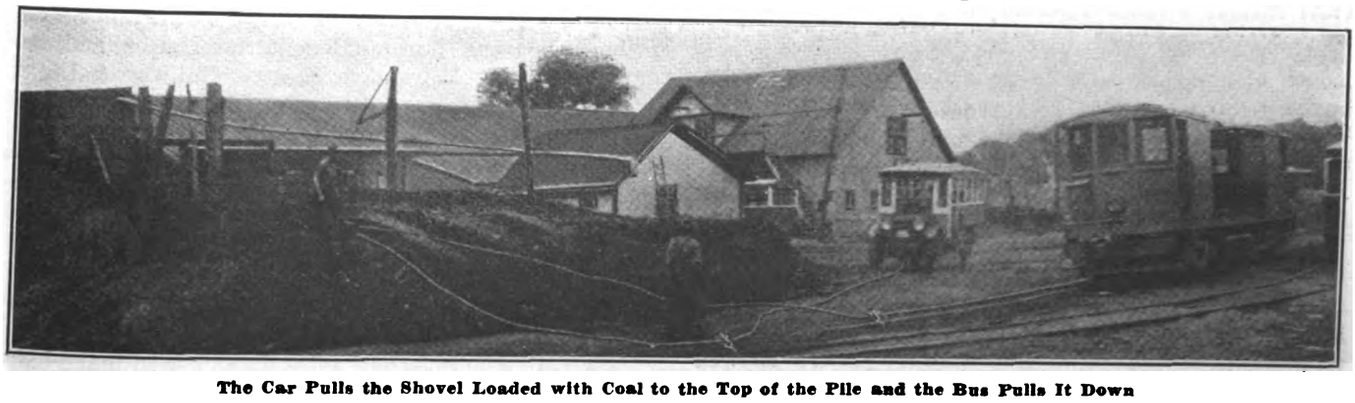
Piling Coal with Bus and Trolley

MOST people who use coal in the Eastern States, whether individuals or company officials, did what they could last summer to have a sufficient supply for this winter. Among other companies, the Connecticut Company put in a quantity of coal for power and heating purposes.

A visit in July to the Mount Vernon Street carshops in Hartford of the Connecticut Company disclosed a novel method of piling the coal purchased for heating purposes in those shops. A supply of from 600 to 700 tons was being put in outside storage, and after being discharged from the coal wagons had to be piled. This might have been done by hand or with a scoop drawn by horses, but a much more rapid and economical way was being followed with a scoop operated by a car and bus. This shovel was connected to a cable which ran over a sheave attached to a pole near the top of the coal pile and then over a sheave near the bottom of the pile. By this cable the scoop could be hauled to the top of the coal pile. Another cable attached to the scoop passed over a sheave near the bottom of the pile. This enabled the scoop to be pulled down. One of these wires was connected to a trolley car and the other to a bus.

The only operators required were one for the trolley car, one for the bus, a man at the bottom of the coal pile to fill the scoop and a man at the top of the coal pile to empty it.

The trolley car by backing would then haul the scoop to the top of the pile, and after it was emptied, the bus would haul it down again.



The Car Pulls the Shovel Loaded with Coal to the Top of the Pile and the Bus Pulls It Down

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Through Trains Out of Indianapolis

TWELVE through passenger routes are now being operated out of the Indianapolis joint terminal. The following table gives these routes, running times and number of trains daily:

Through Trains from Indianapolis to	Miles	Running Time Hours	Minutes	Trains Daily Each Way
Fort Wayne via Anderson, Muncie and Bluffton (Limited)	126	4	50	7
Fort Wayne via Anderson, Muncie and Bluffton (Hoosierland)	126	3	55	1
Fort Wayne via Kokomo, Peru and Wabash (Wabash Valley Flier)	136	4	10	1
Goshen, Ind	160	5	20	1
Louisville, Ky*	117	3	45	7
Terre Haute, Ind	72	2	25	7
Marion, Ind. (Limited—connecting at Anderson)	72	3	30	12
Marion, Ind. (Marion Flier)	72	2	40	1
Lafayette, Ind	70	2	35	7
Richmond, Ind	70	2	35	7
Muncie, Ind. (Limited)	57	2	20	16
Muncie, Ind. (Muncie Meteor)	57	1	50	1
Connersville, Ind	58	2	0	13
Greensburg, Ind	49	1	45	12
Dayton, Ohio (Way)	109	4	15	4
Dayton, Ohio (Limited)	109	3	55	3

*Also six trains connecting at Peru for Goshen.

Automobiles Flatten Traffic Curve

MANY railway managers realize that the large business which they used to do in the summer has gone to the automobile, but all perhaps have not definitely determined the extent to which their traffic has been so affected. The influence on one road, the Eastern Massachusetts Street Railway, is shown by the accompanying chart. This chart gives the traffic for each

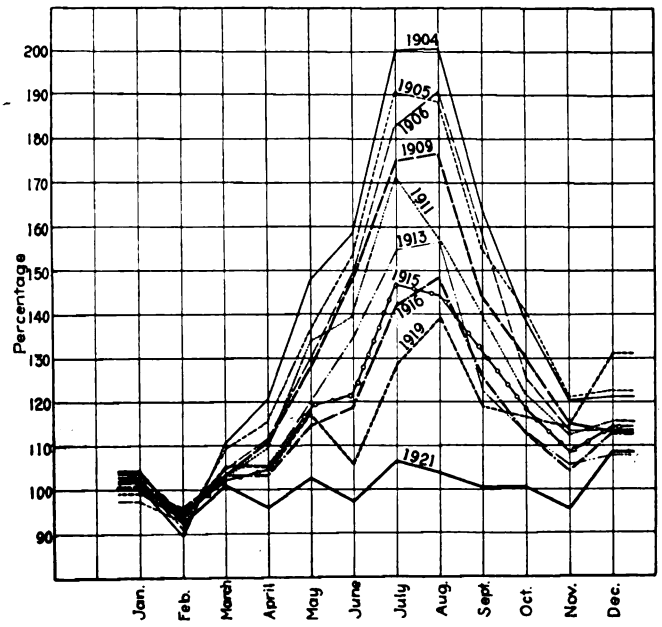

Chart Showing Seasonal Variation for a Number of Years on System of Eastern Massachusetts Street Railway

month of several years, in percentage of the average business during January, February and March of that year, for the company mentioned and for its predecessor, the Bay State Street Railway. The years whose traffic is thus charted are ten in number, selected at intervals from the past eighteen years.

As will be seen, the chart shows a constant decrease in ratio of summer business to winter business. Curves for individual lines naturally would show some variation from the combined curve, as the Eastern Massachusetts system is made up of a number of city lines, as well as suburban lines, but the effect mentioned is shown in practically all of them to some extent. The curve is affected somewhat, of course, by the discontinuance during the past few years by the trustees of the Eastern Massachusetts Street Railway of some 200 miles of track. Probably the summer peaks on these lines has been higher than on the rest of the system.

Education in Milwaukee

Thirty-one Courses Are Offered by the Employees' Benefit Association This Year—Cost of the Work Is Borne by the Association

FOR a number of years the Employees' Mutual Benefit Association of the Milwaukee Electric Railway & Light Company has conducted classes on various topics directly or indirectly connected with electric railways and electric lighting. The courses are under the direction of Prof. H. A. Rowland, educational director of the company.

This year the bulletin announcing these courses showed thirty-one courses altogether, divided as follows:

In mathematics: arithmetic review, advanced arithmetic, shop arithmetic, algebra, trigonometry, calculus and calculating machines.

In electricity: direct and alternating current principles, electrical experiments, electric motors, transformers, rotary converters and rotary condensers, storage batteries, high-voltage problems, electrical instruments, the electrical distribution system, car electrical equipment.

In mechanical subjects: blueprint reading, sketching, lettering and curve drawing, the automobile.

In power plant courses: power plant engineering No. 1, steam engines, steam turbines, power plant engineering No. 2, power plant engineering No. 3.

General: psychology, economics of labor, English for the foreign born, English for engineers, quiz class in accounting.

Most of the lessons are held in the evening, but there are some starting at 12:30 p.m. The class period is usually one and one-half hours.

Any member of the benefit association is eligible to join the classes, but in some of the more advanced work the primary course is required. Certificates are granted to those who complete courses, but to secure a certificate a grade mark of more than 70 per cent and an attendance record of more than 80 per cent of the class periods are required. It is also expected that each student will do a certain amount of home work in addition.

Professor Rowland is assisted by thirteen instructors, almost entirely college graduates who are ambitious to help in this kind of work. All are members of the Employees' Mutual Benefit Association and are employed by the Milwaukee Electric Railway & Light Company in regular operating positions. The cost of carrying on this work is borne by the association.

The pamphlet program announcing these courses for the 1923-24 season carries a number of inspiring slogans, such as:

"Things don't turn up in this world until somebody turns them up."

"A competent employee can't be held down nor an incompetent one held up."

"The man who only half tries doesn't even make half good."

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Maintenance of Equipment

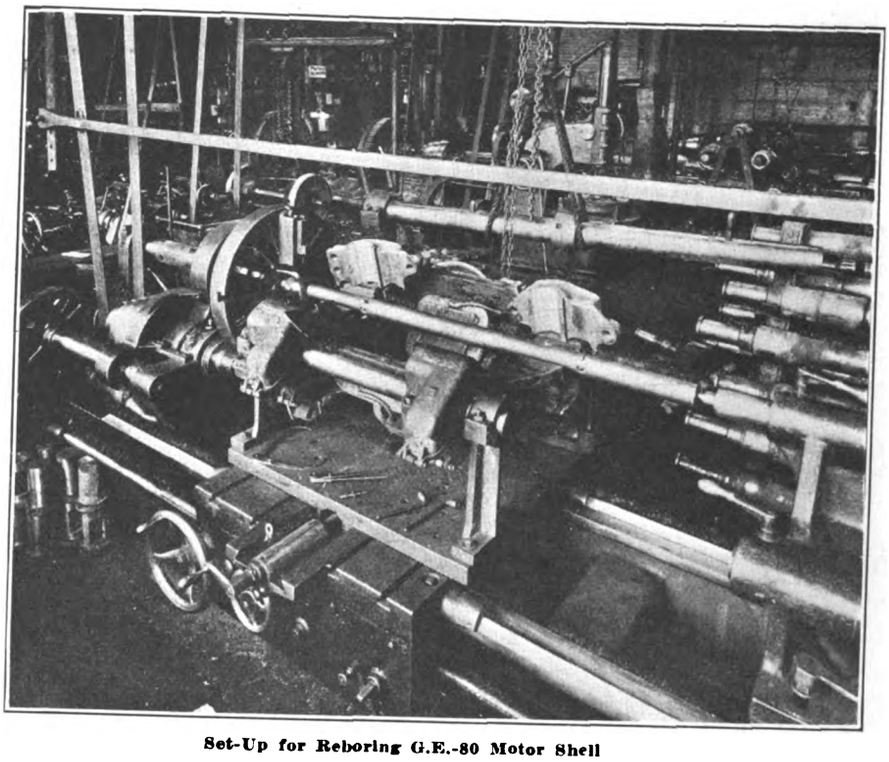
Rehabilitating Motors at Spokane*

AN EXTENSIVE system of rehabilitating motor equipment has been under way at Spokane, Wash., since the consolidation of the two street railway systems in that city. The management determined that the most essential problem was the building of the worn housing fits in motor cases, as most of the bearings required shimming to hold them. The method followed for doing this was by electric welding, an average of about ¼ in. of solid steel being placed in the housing fits.

After this building up is completed, the motor shell is set up in a McCabe 72-in. double spindle lathe. An accompanying illustration shows a G.E.-80 motor in position for machining. The plate on the carriage is part of the equipment of the McCabe lathe. The jigs for holding the axle were manufactured in the company's shops and are bolted to the carriage plate. Perfect alignment is secured by putting a piece of axle in these pillar blocks and then bolting the shell in with the bearings in position.

There are two upright bolts with running threads on the back of the plate. These go through the motor bolt holes in the cases. By using these the casing is brought up to its proper position. A sheet-iron templet is used on the pole pieces in order to obtain proper centering. When the crossfeed of the lathe is locked in proper position, proper gear mesh is assured, as the distance between the center of the axle and the armature shaft is fixed. The boring bar is provided with two high-speed cutters so that both bearing fits are bored out at once.

It requires one man about half an hour to change from the regular lathe equipment to the set-up necessary for boring out motor shells, and in addition it takes another half hour to set up the shell. The top half of the case is set up in the lathe with the bottom half of the bearing bolted to it. After the shell is in position, it requires about two and a half hours to bore a casing.



Set-Up for Reboring G.E.-80 Motor Shell

In the welding particular care is taken to provide a deposit of sufficient metal so as to be sure that a solid clean cut can be taken. About 10 lb. of steel welding rod is used per shell, which makes a total cost, not including the cost of welding current, of about $5.25. This includes the machinist's time for boring. Any additional welding or reboring of bolt holes would be an additional cost. The cost of reboring shells, reinsulating fields and putting other motor equipment in proper condition for G.E.-80 motors runs between $12 and $15 per motor. All bolt holes that show wear are filled up and rebored to standard size.

A heavy boring bar can be seen in a sling at the back of the lathe in the accompanying illustration. This bar is used for boring out Westinghouse 101-B motor shells. The company is standardizing on one size for its bearings, and so the Westinghouse 101-B housings are welded up and the large hole in the end of the case is rebored to a smaller diameter. All loose bolt holes are welded up and rebored. The cost of welding, reboring, overhauling and insulating a Westinghouse 101-B motor, other than work on armatures, is about $32. All lathes are served by jib cranes similar to the one shown in the illustration over the wheel lathe in the background.

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Aluminum Tubing Covers Iron Stanchions*

ALL of the cars of the Northern Texas Traction Company, Fort Worth, have platform stanchions of iron pipe, painted on the outside with a good grade of paint. Nevertheless, in a short time the paint wears away, especially where the passengers continually grab at the same place on the stanchion. After the paint has worn off, the bare pipe presents a dirty appearance in contrast to the painted part. Furthermore, when a woman wearing white gloves boards the car she naturally grabs the stanchion, and the gloves become soiled. This has caused

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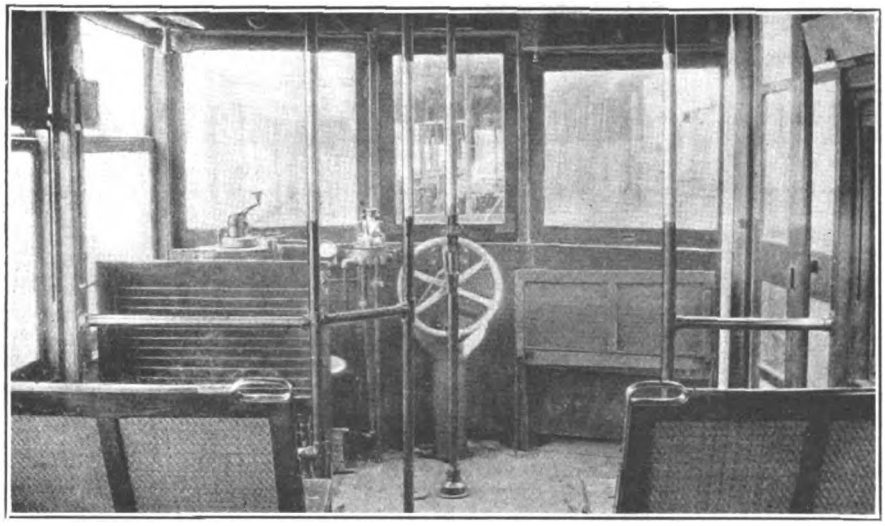


The Iron Pipe Stanchions in the Cars of the North Texas Traction Company Are Covered with Aluminum Tubing

many complaints, which, though they are trivial, the company has sought to eliminate.

Through the co-operation of the Aluminum Company of America, aluminum tubing has been secured which just slips over the outside of the pipe stanchion. Every platform stanchion which the passenger is likely to grab in boarding or leaving the car has been covered with the aluminum tubing for a distance of several inches above and below the common place of taking hold. The result is that the stanchions always present bright clean surfaces, and instead of complaints the company has been receiving a great many commendations from its patrons since the change.

Painting Cost Reduced More than Half

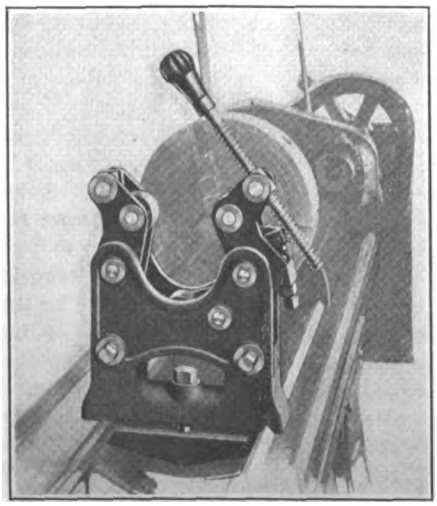
A CHANGE has been made in the painting methods used by the Spokane United Railways, Spokane, Wash. The previous practice was to scrape and remove all loose paint from the car body and then give a coat of primer, after which the surface was puttied and sanded so as to apply a second coat of primer. This was followed by two coats of flat color, a coat of rubbing varnish, and a coat of heavy car body varnish. This method of painting cost about $140 per car.

The enamel process of painting is now used. After the usual method of scraping and removing all loose paint from the car body, a coat of primer is applied. This is then glazed, puttied and sanded, and another coat of primer is put on. This is followed by very light sanding and later with two coats of Fuller's cab enamel. This process costs but $65 per car and is found to be more serviceable than the paint and varnish formerly used.

New Equipment Available

A Steady Rest with New Features

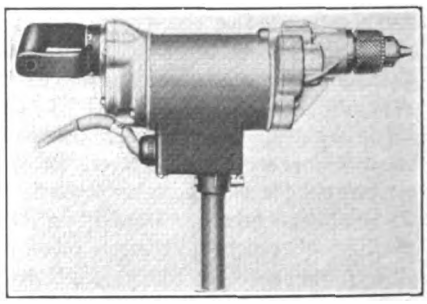
FOR machining operations such as facing, boring and turning, performed on the end of material, a steady rest has been developed by the McCrosky Tool Corporation, Meadville, Pa. The work is held between three rollers running on roller bearings. The rollers move toward the center simultaneously upon closing the jaws, the work having been inserted from the top with the jaws open. The handle end of the screw is dropped into a slot in the front jaw and the device is tightened by turning the screw. The device can be easily attached or removed from the lathe, but when once adjusted for the position of the centers on the lathe on which it is used no readjustment is required. A large range of diameters can be handled and the operator may go from the smallest to the largest diameter without any adjustment except a few turns of the tightening screw.



Machining Operations Are Simplified by Means of This Steady Rest

High-Speed Electric Drill for Small Work

A NEW model electric drill of $\frac{5}{16}$ in. capacity and with side handle construction is being put on the market by the Hisey-Wolf Machine Company, Cincinnati, Ohio. This drill is equipped with a universal motor for operation on either alternating or direct currernt. This is a high-speed machine and is for use in either wood or metal drilling and reaming operations.



A Junction Box at Bottom Facilitates Cable Repairs

A cable junction box is provided on the frame. This is a new feature and permits cable repairs and renewals without dismantling the machine. The operating and controlling switch is conveniently located in the side grip handle.

The machine is provided with ball bearings throughout, and these, together with the gears and other moving parts in the gear end of the machine, are supplied with lubrication from the gear transmission case. The ball bearings on the top head are packed with grease. The machine is furnished with 15-ft. electrical conducting cable, fitted with a suitable attaching plug and Jacobs drill chuck for holding straight round shank drills up to $\frac{5}{16}$ in. diameter. A grinding wheel attachment with $4\frac{1}{2}$-in. x $\frac{1}{2}$-in. wheel can be supplied on order.

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The News of the Industry

Queens Needs Line

Committee to Consider Problem of Meeting Transit Demand of Fast Growing Section

The need for a new four-track main line subway through the "physical" center of Queens Borough was presented to the Transit Commission, on Dec. 18, by a joint committee composed of the transit committee of the Queens Chamber of Commerce and the executive committee of the new Queensboro rapid transit committee. Such a line should in the main follow the line of Queens Boulevard, the several speakers said, through Jamaica, Hollis and Queens Village to the city line.

The principal speakers on behalf of the Queens representatives were: William A. Jones, Jr., chairman of the Queensboro rapid transit committee, and Robert W. Higbie, chairman of the Queens Chamber of Commerce rapid transit committee.

Other Extensions Needed

Chairman McAneny told the visitors that along with construction work now under way must go the new crosstown line and the Washington Heights extension, and after that, if an agreement were reached between the city and the Brooklyn-Manhattan Transit Company, must come the subway extension of the Fourteenth Street-Eastern line, which the company has agreed to operate, if the city constructs. Chairman McAneny said:

> Then there must come the matter of a new entrance to Brooklyn, perhaps via Livingston Street, and also the matter of the solution of the problem in Forty-second Street, Manhattan.
>
> Beyond that program we all feel, I think, that there must come a new entrance to Queens. There are no doubt several lines required in Queens; just what order they are to come in is, of course, something that must be determined. Queens is well up to the front in the new program and it would be well, I think, to fix the sequence which the several projects for Queens shall take.

Recommends Conference

He suggested that the two Queens committees name a committee of engineers to confer with the commission's engineers and experts. This, it was stated, had already been done. The Queens engineering committee is headed by John C. Brackenridge, a well known engineer.

Mr. Higbie stated that whatever form the relief for Queens should take, any new line should be a through one, direct to lower Manhattan. He suggested that Sixth or Eight Avenue, Manhattan, be reserved for a route for a Queens line.

Chairman McAneny pointed out that it would be folly, with the limited number of north and south thoroughfares that there are in Manhattan, to reserve one exclusively for a Queens line, but explained that in the new subway plans provision is made at some points for six and eight tracks, which will provide entrance capacity for Queens and other lines.

In reply to a question of Mr. Higbie as to whether a spur of the Fourteenth Street-Eastern line might not be built to tap Ridgewood, Commissioner Harkness said that the decision to construct the eastern end of the line as a subway opened for discussion the possibility of whether that line might not be routed through Ridgewood.

Los Angeles to Ask Commission to Fix Viaduct Share Cost

The city and county governments of Los Angeles have decided to ask the California State Railroad Commission in the form of an application to establish the equitable rate for the total of the cost of six viaducts to be constructed over the Los Angeles River to be paid by each of the interested and benefited parties. It is proposed that each of the interested parties would pay an equal share of the cost, although the pro rata for each viaduct would be different. For instance, the Los Angeles Railway lines would not use the Aliso Street viaduct and probably would not use the Ninth Street viaduct for years to come. Therefore, it is to be determined whether the Los Angeles Railway would be relieved of a share of the cost of the two proposed structures. The cost of the track relocation work is estimated to be $1,200,000.

The Los Angeles voters on June 5 approved the $2,000,000 bond issue as its share of the expense of constructing these six viaducts over the Los Angeles River to separate the grade of steam road lines operating on the east and west banks of the river and car lines and highway traffic. This improvement was proposed with a view to relieving traffic congestion and extreme traffic delays to riders delayed from fifteen to fifty minutes daily by operations of steam road trains at points of crossing at Los Angeles River bridges.

The City Engineer of Los Angeles estimates the total cost of six viaducts, including the expense of relocating the railroad tracks on both sides of the river, would be between $5,000,000 and $8,000,000, and that each of the interested parties, namely, the city of Los Angeles, county of Los Angeles, Santa Fé Lines, Union Pacific System, Los Angeles Railway Corporation and Pacific Electric Lines are to bear their proportionate expense.

Jitneys Meet Doom

Alabama Supreme Court Hands Down Decision Making Taxicab Operators Liable to Arrest

The City Commissioners of Birmingham, Ala. have won what is believed to be a final victory against the jitneys, in a decision handed down by the Alabama Supreme Court Dec. 22.

For the past few weeks the Birmingham Interurban Taxicab Service Corporation has been operating jitneys under an injunction against the city. The decision of the Supreme Court dissolves this injunction, thus making the operators of automobiles of this company subject to arrest by Birmingham officers.

Some time ago the city of Birmingham enacted an ordinance against jitneys operating within four blocks of a street car line in the downtown section of the city and placing an annual license tax on each jitney of $100. The jitney men asked for an election by the people on this ordinance. The election was granted and the jitneys were defeated.

Licenses Refused

Then the Birmingham Interurban Taxicab Service Corporation was organized by former jitney owners and it applied to the city for taxicab licenses. The cars of this company were inspected by W. B. Cloe, Commissioner of Public Safety, who reported the automobiles unsafe and otherwise unsatisfactory for taxicabs. On the strength of this report licenses were refused. The taxicab company then applied to Judge Roger W. Snyder of the Circuit Court, who granted a temporary injunction. On motion of the city, Judge William M. Walker dissolved this injunction two days after it was granted. Then the taxicab company applied for a reinstatement of the injunction and this was denied. The taxicab people then applied to Judge B. M. Miller of the Supreme Court, who reinstated the injunction pending the appeal to the Supreme Court.

Now the Supreme Court affirms the decree of Judge Walker, which dissolves the injunction and leaves the operators of these so-called taxicabs liable to arrest by the city for doing business without a license.

Another case, in favor of the city and against the Boyles Transit Company, was decided by the Supreme Court also on Dec. 22. In this case the transit company was operating automobile buses to Boyles and Tarrant City. This company asked an injunction against the city from requiring it to give bond for operating these buses. Some time ago an ordinance

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was adopted by the city which was in the nature of an agreement between the city and the Birmingham Railway, Light & Power Company, requiring that interurban buses operating through sections served by street cars be required to give bond. An injunction against the city in favor of the transit company was granted in the Chancery Court. The city appealed to the Supreme Court, and the Supreme Court upheld the city settlement ordinance.

The automobiles operated by the Birmingham Interurban Taxicab Service Corporation all carried the sign "Taxicab for Hire." But they picked up passengers along the streets wherever they could get them, charged a fare of 10 cents, and operated only on certain streets. Thus in reality they were the old jitney, only under the name of "Taxicab."

City officials say, now that the Supreme Court has ruled on these two cases, they will put the law into effect immediately. Thus the jitney in Birmingham seems to have met its doom at last, after more than a year of fighting their battles in the courts and at the polls.

Plan to Raze New York Elevated Approved by City

The Board of Estimate of New York City has ratified the action of its committee of the whole in approving the plan of Borough President Julius Miller of Manhattan to raze the Sixth Avenue elevated railroad structure from Trinity Place to Fifty-third Street and Sixth Avenue and to build a subway to take its place.

Two resolutions presented by Mr. Miller have been adopted formally. One of these directed Corporation Counsel George P. Nicholson to draft a bill for introduction in the Legislature to permit the city to acquire the elevated structure. The other resolution called for a conference with the Transit Commission in regard to plans for the subway.

City Desires Staten Island Lines Despite Promises to Improve

According to John A. Lynch, president of the Borough of Richmond, New York City, electrification of approximately 30 miles of steam railroad in Staten Island has been practically promised to Acting Mayor Murray Hulbert and other members of the Board of Estimate by President Willard of the Baltimore & Ohio Railroad, operating the Staten Island Rapid Transit Railway.

Despite this it is expected that plans will be pushed for the city to buy, electrify and operate the Staten Island lines.

Mr. Lynch, said that Mr. Willard had assured city officials that the railroad also would extend its lines from Arlington to Tottenville, a distance of about 8 miles, and build spurs to industrial plants.

If the city electrified and operated the steam railroads, Mr. Lynch said, a reduced fare would result. He pointed out that on the line from St. George to Arlington, and from St. George to South Beach, a distance of about 9 miles, an 8-cent fare was charged, while on the main line from St. George to Tottenville, a distance of 15 miles, the round trip fare was 79 cents for ordinary passengers and 22 cents for commuters. He said it would be possible for the city to operate the lines on the basis of a 10,-cent fare. He estimated that $10,000,-000 would be the cost of electrification, ventured no estimate of what it would cost to purchase the railroad lines.

He added that he had already requested the Corporation Counsel to prepare an enabling bill for the acquisition of the lines on Staten Island, to be presented early in the next Legislature.

Railway Matters Before Council

Toledo Fares May Go Up—Jitney, Trolley Bus and Maintenance Allowance Metters Present Problems

An increase in fares at Toledo is expected to be announced as a result of deficits which have brought the stabilizing fund of the Community Traction Company, to the low level of $56,868 as of Dec. 1. The raise would be to straight 7-cent fare from 7 cents cash with six tickets for 40 cents.

The deficit for operations in the month of November as reported to the street railway board of control was $9,997 and for the month of October it was $19,256.

Although a surplus will probably be earned in December Commissioner Cann is doubtful about keeping fares at their present level. It will be up to the company to move to change the fare. Some time ago the stabilizing fund fell below $300,000, but the railway officials on advice of Street Railway Commissioner Cann, postponed action. The stabilizing fund was growing monthly until a raise in wages in the spring brought about a return to red figures.

After the first of the New Year a new City Council with members considered to be especially favorable to traction development in accord with the Milner settlement plan will be at the helm in city affairs. In consequence some important developments are expected. Recommendations have already been made looking to the elimination of buses which compete with the railway. There is also strong possibility of the establishment of a trolley bus cross-town line. Equipment of this type has been investigated by the commissioner and some members of Council and all appear to be favorable to the trolley-bus plan. One-man operation may also be resumed as a means of reducing expenses. Furthermore there may be some changes in the allowances for maintenance for 1924 and a revision of power rates.

In November the gross revenue of the railway was $323,510, an increase of $17,325 over the same month a year ago. Operating expenses in November, 1923, were, however, $21,286 greater than for the similar month in 1922 due to higher maintenance charges and increased wages.

The first eighteen days of December showed an increase in revenue of $9,548 over the similar period last December.

For the year soon to end the $640,000 set up for maintenance was overspent by $15,000.

International Wins Suit Against Customs Collector

United States District Judge John R. Hazel in Buffalo has handed down a decision making permanent the temporary injunction granted some time ago in the case of the International Railway, Buffalo, against the United States customs collector at Buffalo, who has supervision over the Niagara Falls and Lewiston bridges of the International between the United States and Canada. The United States customs department threatened to close the two bridges to all traffic Sundays and holidays unless the traction company guaranteed the payment of overtime wages to the United States customs inspectors assigned to duty on these bridges across the Niagara River at the International boundary line.

It was the contention of the International Railway that it is the duty of the United States Treasury Department to pay the inspectors for overtime work. The order of the customs department would force all incoming passengers from Canada via the International Railway to deposit their hand baggage and packages at the customs offices and claim them the day after Sunday or holidays. The International Railway claimed that this would mean the virtual closing of the bridges and would cripple their business with tourists on the busiest days of the year.

A temporary injunction was handed down by Federal Judge Hazel restraining the customs collector at Buffalo from putting the proposed regulations into effect. Further arguments were heard by the court and now the temporary writ has been made permanent.

Increase in Wages for Findlay Employees

Employees of the Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, on January 1 will receive a flat increase of 3 cents an hour in wages. This was provided in a recent pact between employees and the company which gave the men in freight service an increase of 6 cents an hour and those in passenger service a boost of 4 cents an hour from Aug. 16 to Jan. 1, 1924.

The rates provided 47 cents an hour for the first three months service, 49½ cents for the next nine months and 53 cents thereafter in the passenger service. Freight men have a scale of 49, 51½ and 55 cents for like periods of service. The new increases will be added to these amounts.

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News Notes

Will Represent in Legislative Work.—Henry W. Killeen, attorney for the International Railway, Buffalo, has resigned from the law firm of Penney, Killeen & Nye effective Jan. 1, 1924, to become head of a new law firm to be known as Killeen, Sweeney & Kelley. Mr. Killeen will represent the International in legislative work in Albany. Thomas Penny and Judge Nye will continue to represent the International in the trial of negligence cases and many of the smaller cases will be given to other attorneys for trial in the courts.

Men Get Safety Bonus.—One half the amount estimated saved in avoiding accidents during the past three months, aggregating $4,381, has been voted as a bonus to the employees of the Memphis Street Railway. The money represents an increase of $1.76 an hour for each man.

Important Questions Answered.—"The Inside Track," published by the Market Street Railway, San Francisco, devotes a page each month to the solution of perplexing problems that may come up in the course of the day's work. The December issue contains the question: What are the three most important factors which a motorman should consider when operating an electric car? The answers given, arranged in the order of their importance, were: (1) Safety. (2) Comfort of passengers. (3) Maintenance of schedules.

Railway Research Work Encouraged.—To encourage research study in the electric railway field among university students, the executive committee of the Wisconsin Utilities Association authorized an arrangement whereby a fellowship will be granted at the University of Wisconsin in electric railway research work. Under this plan the association pays $500 each year to a senior student in engineering to work on some problem which will be selected by Professor Rood and representatives of the association, and the results presented at railway section meetings.

Extension of Time Allowed.—The local transportation committee of the City Council of Chicago has granted the Chicago, North Shore & Milwaukee Railroad a delay of three more weeks before acting upon the opinion recently delivered to the Council by the corporation counsel holding that the railroad is operating passenger, merchandise dispatch, express and freight service over the elevated lines in the city without legal rights. This matter was referred to at length in the ELECTRIC RAILWAY JOURNAL of Dec. 8, page 985.

Shows Utility Development Through Cinema.—During the 1923 State Fair the Oklahoma Utilities Association, gave a free cinema entertainment in the Liberal Arts Building in Oklahoma City. About 10,000 people saw the production, receiving information on the development of the public utility field in recent years. Among the most popular films were the "Go-Getter," illustrating the benefits of electrically operated labor-saving devices on the farm, and "King of the Rails," showing the history of transportation from the beginning of human relations down to the electrically operated transcontinental railroad.

Seeks Ordinance.—A resolution has been adopted by the Milwaukee Public Safety Commission, urging the Common Council to pass an ordinance requiring buses to stop for passengers at street car safety zones where such safety zones have been designated.

Tests to Solve Engineering Problems.—Power company officials from many points along the Mississippi River will be greatly aided in solving their engineering problems by the results of tests being made by University of Iowa engineers, in co-operation with the Mississippi River Power Company at Keokuk. When completed, the tests will reveal the exact flow of the stream and show its course and flow as far back as 1874. The tests are in charge of Prof. Floyd A. Nagler, director of the university's hydraulic laboratory, and Alrion Davis, hydraulic engineer of the Keokuk company.

Discusses Future of Railroads.—F. H. Hardin, chief engineer of motive power and rolling stock of the New York Central Railroad, in expressing his views recently in an interview in the New York *Times* on the future of the railroads said that the complete electrification of all railroads seemed to lie in the distant future. It was his belief that under present conditions electric power was costly, but that the cost might be cut by the conversion of water power into electricity on a large scale. Following the electrification of railroads in the neighborhood of big cities, these units will gradually be extended until they unite in a general system. He looked to the time when trains would be controlled by automatic devices eliminating the human element. He said that radio promised to play an important part in railroading in the future. It might be used to keep the ends of long freight trains in touch with each other, thus increasing the efficiency of the service.

Foreign News

Sanitation in Turkey

The thick red curtains in the street cars of Constantinople, which have separated the seats occupied by Moslem women from the rest of the car, will be removed, according to the plans of the authorities. This is on the ground that the curtains are carriers of disease. Instead, the two front rows of seats in the car will be reserved for Moslem women. However, a Moslem woman traveling with her husband may sit elsewhere "provided she does not contravene the civil or religious laws."

Bids for Swedish Locomotives Rejected

The Swedish State Railways at Stockholm has rejected all bids for electric locomotives for the line from Stockholm to Göteborg, the electrification of which is under way. Seven Swedish firms and six foreign firms submitted offers. The rejection was partly on account of too high prices and partly on account of inconvenient delivery terms. The cheapest offer was submitted by the Allgemeine Elektricitäts Gesellschaft of Berlin and the Siemens-Schuckert concern, their price being 195,000 Swedish crowns per locomotive. New bids have been asked for.

Address of Union Internationale Tramways Changed.—The headquarters of the Union Internationale Tramways, de Chemins de Fer d'Intérêt Local et de Transports Publics Automobiles has been moved in Brussels, Belgium, from 23 rue d'Arlon, to 15 Avenue de la Toison d'Or.

British Cars for Calcutta.—The English Electric Company, Ltd., Preston, England, is constructing sixty cars for the Calcutta Tramways. This accompanies a scheme of track extension.

American Rails for Glasgow.—A contract for tramway track special work amounting to £8,568 for the Glasgow, Scotland, tramways has been awarded to the United States Steel Products Company by the tramways committee of Glasgow Corporation. This was preferred to the lowest English tender of £9,794.

Street Congestion in Glasgow.—Traffic congestion in the streets still occupies the attention of the Town Council of Glasgow, Scotland. James Dalrymple, general manager of the tramways, in a report on the subject, regards tube or elevated railways impracticable. He recommends the erection of a bridge over the River Clyde at Oswald Street and another one across the river opposite St. Enoch Square.

Turbo-Generator for London Tramways.—London County Council has accepted a tender by Richardson, Westgarth & Company, Newcastle, at £77,467 for the supply of a turbo-alternator of 15,000 kw. capacity for the Greenwich tramway power station. The set will consist of a two-cylinder turbine and condensing plant, with a Parsons alternator. The lowest tender received was £55,769, from a Swiss firm. The reason for adopting the British tender was the low steam consumption.

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Financial and Corporate

Key Route Plan Approved

California Commission Sanctions Cut of $20,000,000 in San Francisco-Oakland Capitalization

The proposed reorganization of the San Francisco-Oakland Terminal Railways, known as the Key Route properties, held under foreclosure and sale in the hands of John S. Drum, Warren Olney, W. I. Brobeck and Hugh Goodfellow, and their associates, with a newly written total capitalization of $28,277,500, has been authorized by the State Railroad Commission. The old capitalization was $48,879,000.

The commission recognizes the unassailable validity of the foreclosure sale, and gives no force to the contentions of the holders of $15,000,000 common stock as presented by Attorney Joseph E. Bien. It leaves open all questions of appraisal for rate-making purposes, and does not rule against the contentions of City Attorney Gray of Oakland in that matter.

The Key Route Transit Company, with a capitalization of $17,750,000 under the approved reorganization, will have complete financial and operative control. Three subsidiary companies receive recognition. These are: Key Route Securities Company, capital stock $2,600,000; East Oakland Railway, capital stock $250,000, and Oakland & Hayward Railway, capital stock $250,000.

As indicated in an article dealing with the proposed plan in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 15, page 424, the actual capital is distributed as follows: First mortgage bonds, $2,500,000; refunding bonds, $9,416,000; preferred stock, $12,829,000; common stock (issued pro rata to holders of preferred), $3,262,500; common stock to holders of "Dividend Note," $250,000; East Oakland Railway, $10,000, and Oakland & Hayward Railway, $10,000.

The commission ruled that all the reorganization expenses reaching back for a period of many months and totaling $500,000 must be paid out of earned moneys available for interest charges and for dividends, and must not be made a capital charge which (through fixing of rates, etc.) would rest ultimately upon the public.

The commission set forth as its principal reason for approval of the reorganization plan the "fact of necessity" and the state of finances of the old company, which had at the beginning of this year no funds with which to meet these four large obligations: Matured notes, $3,200,000; funded debt due, $1,357,000; matured interest $2,706,585 and sinking fund installments due, $2,919,000.

The decision in the Key Route case, brings to a successful culmination the efforts of the past ten years to reorganize and restore these properties to financial stability. It sustains and upholds in every particular the plan of reorganization.

The company defaulted in its bond interest as long ago as 1913. These defaults were occasioned by the over-expansion of its transportation facilities subsequent to the fire of 1906 and the high cost of labor and materials. Spasmodic and unsuccessful efforts have previously been made to rehabilitate the company, but it was not until 1919—when the present committee entered on its duties, that real and substantial progress was made. This committee was finally able this year to bring all the interests into harmony and perfect a plan.

The intricacy of the readjustment negotiations is indicated by the fact that it was necessary to satisfy fifteen sets of security holders, each with a different interest to serve, with conflicting rights and with total investments in excess of $20,000,000. By compromise and readjustment, the fifteen groups were brought to subscribe to the plan with practical unanimity.

At the last moment, however, when the plan was presented, as the law requires, to the Railroad Commission for its approval, a small stockholding interest attempted to block the carrying into effect of the plan. The ruling of the commission sustains completely the work of the reorganization committee.

This plan was the result of the labors of a committee, of which John S. Drum is chairman, and with whom is associated Herbert Fleishhacker, P. E. Bowles, W. W. Garthwaite, Benjamin H. Dibblee, Gavin McNab, A. Crawford Greene, Paul A. Sinsheimer, J. F. Carlston and George Tourney as members. They were assisted by sub-committees representing particular bond issues, of which advisory committees the chairmen were Warren Olney, Jr., L. A. Redman, Robert G. Hooker and Grayson Dutton.

Potomac Merger Approved

The proposed merger of the Potomac Public Service Company with the Potomac Edison Company, Frederick, Md., has been approved by the board of directors of the former company. As was announced previously in the ELECTRIC RAILWAY JOURNAL, this consolidation was expected.

According to indications Emory L. Coblentz, Frederick, former president of the Potomac Public Service Company, successor to the Hagerstown & Frederick Railway, who is now chairman of the board of directors of the former company, will hold the same position in the merged companies. M. F. Riley, president of the Potomac Public Service Company, will be made president of the merged companies, it is understood, and Charles Harris, Henry Holzapfel and Walter S. Finlay, Jr., will be vice-presidents. The other officers, it is said, will be: Raymond E. Town, treasurer; Byron A. Winebrenner and Phillip L. Roth, assistant treasurers; Charles C. Waters, secretary, and Raymond E. Town and William K. Dunbar, assistant secretaries.

The capitalization of the combined companies will approximate $22,000,000, according to Mr. Coblentz.

Columbus Case to Be Appealed

United States Supreme Court to Be Asked to Pass Upon Decision in Stockholder Suit

E. W. Clark & Company, Philadelphia, plans to appeal to the United States Supreme Court from the decision of the Ohio Supreme Court, rendered on Dec. 11, in which the Ohio court refused to hear the appeal of the Clark interests in the case of the Columbus Railway, Power & Light Company against the Clarks as former managers of the utility. It is understood that if the Ohio Supreme Court had consented to consider the appeal for a rehearing the Clarks would have insisted that there was unjust discrimination against them and in favor of local men, and that this denied the Clarks equal protection of the laws. It is on this ground that they now propose to take the case to the United States Supreme Court.

The litigation had its inception in a suit commenced by a stockholder against the directors of the company, including C. M. Clark. E. W. Clark & Company was also joined as defendant. All the defendants were charged jointly with liability upon the several claims presented on behalf of the company, but the Ohio courts released all of the other defendants, residents of Ohio, and held the Clarks alone liable, thus discriminating, the Clarks believe, in favor of local defendants and against non-resident defendants. The contention of the Clarks is that the judgment against them is about five times as large as the amount they received from the company for services rendered to it, and that these services fully justified the payments received.

The position of the Clarks throughout the litigation has been that in their relations with the Columbus company they never took any step that was not fully authorized by the board of directors, most of whom were local people with large holdings of stock and in no way affiliated with the Clarks, and that if there was anything wrong in any action or omission in connection with the business of the company, the responsibility rested upon the directors and not upon the Clarks. The Clarks also maintain that if they are liable the directors are equally, if not primarily, liable.

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Dividends Paid in Stock

Earnings on Common of New Orleans Company to Be Put Back Into Additions to Property

A dividend of 8 per cent on the $8,100,000 of common stock of the Public Service, Inc., New Orleans, for the year ended Sept. 30, 1923, has been declared by the directors of the corporation. This sum, amounting to $648,000, will be returned to the company's treasury and the stockholders of the corporation will be given paid in stock in lieu of cash. With the issuance of the dividends in the form of stock, the common stock of the corporation will be increased to $8,748,000, to be further increased next year, should the company continue to prosper, and a similar dividend be declared hereafter.

According to the agreement reached between the city of New Orleans and the Public Service, Inc., the issuance of paid in common stock must continue for a period of five years before the holders of common stock in the company will be paid cash dividends. They will then, under this plan of procedure, have increased their stock holdings approximately 40 per cent.

In making announcement of the dividend on the common stock, R. S. Hecht, chairman of the board, said:

While the company did not earn its full 7½ per cent return on the rate base to which it is entitled under the settlement ordinance, it did earn a substantial margin over and above the amount required for this dividend. However, the stockholders will not receive the dividend in cash, because under the agreement with the city they are compelled immediately to reinvest the whole amount in the purchase of common stock of the company at par, and the same course must be followed in future years until dividends aggregating 40 per cent have thus been put back into the property.

The board of directors also authorized the increase of the common stock in an amount equivalent to the dividend, so that, as a matter of fact, not a dollar of capital is taken out of the assets of the company by the declaration of the dividend.

The company is in a healthy financial condition, but it emerged from the reorganization with a somewhat unbalanced set-up in that it has a total bonded debt of $42,000,000, whereas the total amount of preferred and common stock outstanding is only $12,000,000, which has always been considered by investment bankers as too small a margin behind the bonds.

The directors believe the present and prospective heavy requirements for new capital can ultimately be met only through the sale from time to time of substantially large amounts of common stock which, by furnishing a proper margin of safety, will in turn permit the sale of additional bonds on a more advantageous basis. As the law of Louisiana requires stock to be sold at par, and as the common stock of the company is and has been selling considerably below par, this program prevents certain practical difficulties, for which, however, it is hoped that some solution can be found in the near future.

The budget and financial program of the company for 1924 have not yet been determined. The board of directors will decide at its January meeting the method which must be adopted to raise the large additional capital required for improvements and extensions in the coming year.

Brooklyn Surface Lines Out of Receivership

At midnight on Dec. 21 the property of the Brooklyn, Queens County & Suburban Railroad passed out of the control of Lindley M. Garrison as receiver and into the control of the company. A decree ordering the transfer was signed a few hours before by Federal Judge Mayer. The company operates surface lines on Reid, Sumner, Metropolitan and Utica Avenues, and on Broadway along with what is known as the Broadway Ferry shuttle.

The lifting of this company out of receivership leaves only two, the Brooklyn Heights and the Coney Island & Brooklyn Railroad Companies still in receivership, but it is expected that they will soon be returned to their owners.

Under the reorganization plan the stockholders of the company are expected to contribute toward meeting the company's liabilities in case the income is not sufficient to meet all of the needs. The receiver has on hand $700,000 in cash and securities, but most of this will be needed by the company as working capital.

The liabilities on July 1 last consisted of defaulted interest on bonds held by the public, claims of unsecured creditors and tort claims, totaling $1,045,497, exclusive of $400,000 of defaulted interest on the $2,000,000 principal amount of first mortgage bonds.

Abandonment Modified

Reasons Stated for Putting Off the Shutting Down of Service on Ohio Line

The Public Utilities Commission of Ohio has issued a modified order authorizing the discontinuance of service and abandonment of facilities by the West End Traction Company, a subsidiary of the Pennsylvania-Ohio Electric Company, Youngstown, at midnight on Feb. 1.

The original order of the commission issued on Dec. 14 had set midnight, Jan. 1, for the end of service on approximately 24 miles of track connecting Youngstown with Girard, Niles, Warren, Mineral Ridge and Leavittsburg, all in Trumbull County, Ohio, west of Youngstown.

The delay in the abandonment was granted by the commission upon petition of the city solicitors of Warren, Niles and Girard and the Trumbull County Commission. The petition followed a meeting of representatives of the governing bodies and civic associations of the committees affected called by the county commissioners when the original order of the Utilities Commission made it plain that street railway and interurban service would cease with the New Year.

The petition asking for delay recited that "the general welfare of the citizens" and "the future growth" of the municipalities would be affected seriously by the abandonment; that "the political subdivisions located along the lines of said railway are now negotiating in good faith and are desirous of continuing to negotiate toward a fare adjustment on the lines affected that will enable the company to continue the operation of its lines."

The company consented to the modification of the abandonment order upon the understanding that earnest efforts would be made by the communities so to adjust fares as to enable it to earn revenues sufficient at least to pay operating costs and taxes.

The crisis on the lines came on Oct. 6 when the application for abandonment was filed by the company. For

Conspectus of Indexes for Dec., 1923

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Dec. 1923 **6.89**	Nov. 1923 **6.95**	Dec. 1922 **6.96**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	Nov. 1923 **158**	Oct. 1923 **161**	Nov. 1922 **174**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages* 1913 = 100	Dec. 1923 **218**	Nov. 1923 **218**	Dec. 1922 **208**	Sept. 1920 **232**	Apr. 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Nov. 30 1923 **4.37**	Oct. 31 1923 **4.67**	Nov. 30 1922 **6.84**	July 31 1920 **11.12**	Feb. 28 1922 **4.14**
U.S. Bank Clearings Outside N. Y. City (Billions)	Nov. 1923 **15.30**	Oct. 1923 **16.18**	Nov. 1922 **14.35**	Mar. 1920 **18.54**	Feb. 1922 **10.65**
Business Failures	Nov. 1923	Oct. 1923	Nov. 1922	Jan. 1922	Sept. 1923
Number	**1,644**	**1,584**	**1,761**	**2,722**	**1,280**
Liabilities (millions)	**67.54**	**74.43**	**84.23**	**186.7**	**27.50**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	Dec. 1923 **217.3**	Nov. 1923 **220.9**	Dec. 1922 **192.6**	June 1920 **273.8**	Mar. 1922 **182.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Nov. 1923 **152**	Oct. 1923 **153**	Nov. 1922 **156**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913 = 9.21	Dec. 1 1923 **13.44**	Nov. 1 1923 **13.14**	Dec. 1 1922 **13.78**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's—Wholesale Commodities 1913 = 120.9	Dec. 1 1923 **190.9**	Nov. 1 1923 **191.8**	Dec. 1 1922 **185.5**	May 1 1920 **283.3**	July 1 1921 **158.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Nov. 1923 **151**	Oct. 1923 **150**	Nov. 1922 **145**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Nov. 1923 **165.3**	Oct. 1923 **164.1**	Nov. 1922 **158.4**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

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some months prior the company had endeavored to secure a fare adjustment, but the definite refusal of the city of Niles to entertain any such remedy for the company's losses in the last four years brought about a situation where the company had no recourse excepting abandonment.

Following the order for abandonment, however, manufacturing and commercial interests of Niles were aroused. At the meeting of representatives of the various communities it was declared that Niles would join the other cities in seeking an arrangement whereby the operation of the lines could be continued. With this declaration the company consented to a month's delay. The negotiations will be conducted by the new city administrations taking office Jan. 1 in all the affected communities.

The present rates of fare are 10 cents cash for zones of approximately 5 miles; fourteen tickets for $1 and 5 cents cash within municipal limits. The rate of fare suggested to permit the lines to continue are 15 cents cash for existing interurban zones; ten tickets for $1; 10 cents cash within municipal limits, with eight tickets for 50 cents.

Commission Approves Sale of Point Pleasant Company

The Board of Public Utility Commissioners of New Jersey has granted the application of the Point Pleasant Traction Company, Point Pleasant, N. J., to sell its property and surrender its franchise. The concern formerly operated a street railway in the boroughs of Point Pleasant and Bay Head, N. J., but it was discontinued in 1919. The company has taken up all its rails and has abandoned its service. The company asked the commission for permission to sell its real estate situated in the two boroughs and also for permission to dispose of all other assets and retire from business and surrender its charter, all of which it has the consent of its shareholders to do. The board found that there was no demand for the operation of the electric railway in and between the two towns to warrant the retention by the company of franchises.

Payment of Kansas City Claims Being Arranged

Kansas City, Mo., will receive $82,207 from the Kansas City Railways as a back payment for street cleaning and in car license taxes on the intercity viaduct. This is the result of an order from Judge Kimbrough Stone of the Federal Court.

J. C. Petherbridge, assistant city counselor, made the application and argued in favor of payment of the claims. Attorneys for the receivers, bondholders, damage suit claimants and for the company discussed the application in Judge Stone's chambers of the Federal building on Dec. 3.

Another application granted was for the payment of about $3,000 to holders of special deferred security certificates issued at the time of the old reorganization of the company in connection with damage suits then pending. A month ago the court ordered about $120,000 of the certificates to be paid. Payment will be made on the basis of 80 per cent of the principal and 80 per cent of the interest.

Mr. Petherbridge said the city was badly in need of money and that the payments would be used in defraying the expenses of the city hospitals.

Note Maturity a Problem

New Haven Railroad Seeks Legislation to Deal with Issue of Trolley Holding Corporation

The New York, New Haven & Hartford Railroad has petitioned the Massachusetts General Court for legislation enabling it to acquire property of the New England Investment & Security Company, or such other legislation pertaining to the road's interest in that company as may be deemed necessary. The railroad directs attention to an interesting situation involving certain electric railways in which it is interested. Broad legislative authority is sought to enable the New Haven to deal with a situation which will arise next year, when $13,115,000 notes of the New England Investment & Security Company come due April 1. All of these notes are owned by the New Haven.

The New England Investment & Security Company is a voluntary association, organized in 1906 by New Haven interests to acquire shares or other securities of electric railway or power companies. It controls through ownership, directly or indirectly, all or a majority of the stocks of the Milford, Attleboro & Woonsocket Street Railway, Springfield Street Railway and Worcester Consolidated Street Railway. The company also holds by assignment dated April 1, 1909, all the interest of the Worcester Consolidated Street Railway in the capital stock of the Worcester & Webster Street Railway and Webster & Dudley Street Railway.

In addition to notes, the New England Investment & Security Company has outstanding $112,100 of 4 per cent cumulative preferred stock and $100,000 common. There was formerly $4,000,000 preferred outstanding upon which New Haven guaranteed the dividends, but practically all of it has been exchanged for first preferred stock of the Worcester Consolidated, thereby relieving the New Haven of its guaranty to that extent.

The notes which the New Haven owns were intended to bear interest at the rate of 3 per cent from date of issue, 4 per cent for the next five years and 5 per cent for the final five years. For several years no interest has been paid. Under the dissolution decree, the New Haven was supposed to dispose of its interest in the New England Investment & Security Company by April 1, 1919, but the date has been extended by the court from time to time.

It is explained that special legislation is necessary if the New Haven is to take over the properties for debt. On the other hand, the properties may be sold for the debt under the hammer.

Service Suspended in Monterey

The Monterey & Pacific Grove Railway, Monterey, Cal., discontinued service in Monterey on Dec. 5, because of the inability of its general manager to pay for its power bill. In spite of great difficulty, J. D. Brown, the local manager, has been sending out his cars for some time, even though the Public Service Commission threatened to close down on operations if he did not render payment to the power company.

The matter came to a head recently when the Coast Valley Gas & Electric Company sent a letter to Mr. Brown, telling him that further delivery of power would be discontinued if the company did not pay its bills before Dec. 1. In addition to this notice, the company also sent a communication to the City Council of Monterey informing it of the intention to close down on the power for the operation of the railway system.

Suspension in Monterey brings to an end one of the longest controversies in that section of the country. The difficulties of the company in its relations with the city of Pacific Grove were reviewed in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 17.

The local manager, J. D. Brown, following the suspension, announced that he had no plans for the immediate future. He said that having no money he could not afford to operate, and he would now await developments.

Auction Sales in New York

At the public auction rooms of A. H. Muller & Sons there were sold the following securities on Dec. 26:

$5,000 Buffalo & Lake Erie Traction Company first and refunding mortgage 5 per cent bonds, 1936, twenty shares Buffalo & Lake Erie Traction Company common 11 per cent.

41 shares New York Railways, $1 lot.

100 shares Brooklyn Rapid Transit Company, old stock, $2 lot; 900 shares Brooklyn Rapid Transit Company common, old stock; 1,300 shares Brooklyn Rapid Transit Company common, old stock; certificates of deposit, $1 lot.

$50,000 Twenty-Third Street Railway refunding and improvement 5s, 50 per cent.

30 shares New York Railways, $2 lot.

100 shares Interborough Metropolitan Company common v. t. c., $5 lot.

100 shares Interborough Consolidated Company, preferred, $8 lot.

$3,500 North Carolina Public Service Company first mortgage, series "B," due April 1, 1934, 66⅔ per cent.

1½ shares Michigan Electric Railway preferred "A," $1 lot.

$125 Michigan Electric Railway first and refunding mortgage "A" bond, due 1948, $20 lot.

Will Discuss Extensions.—At the annual meeting of stockholders of the Buffalo & Lake Erie Traction Company, Inc., operating an interurban line between Buffalo, N. Y., and Erie, Pa., stockholders will consider proposed extensions of service in the vicinity of Erie, Pa.

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$25,100,259 Spent by Boston "L" in Five Years—$10,000,000 More for 1924 and 1925

In a petition filed with the Secretary of State of Massachusetts asking legislative permission to issue bonds to an amount equal to the money paid in for stock of the West End Street Railway, which the Boston Elevated absorbed a year ago, the trustees of the Boston Elevated Railway filed a list of the total expenditures for capital purposes made since the creation of the Board of Trustees, as follows:

EXPENDITURES ON ROAD AND EQUIPMENT JULY 1, 1918, TO OCT. 21, 1923

Elevated structures and appurtenances	$1,073,607
Surface lines	3,344,123
Carhouses and shops	3,072,742
Power houses and transmission of electricity	3,444,375
Cars	10,149,688
Miscellaneous	581,753
Total	a$21,666,289
Expenditures on road and equipment prior to July 1, 1918 for which capital had not been issued on that date	3,433,970
Total obligations for which the board of trustees has had to provide	$25,100,259

The money with which to pay for these replacements and improvements has been obtained from the following sources:

Sale of Cambridge subway	$7,868,000
Preferred stock	2,000,000
Bonds	1,986,000
Insurance and payments account real estate sold, about	1,500,000
Depreciation July 1, 1918-Oct. 1, 1923	10,521,000
Total	$23,875,000

These amounts, it is explained, by no means cover the expenditures which should be made in order to place this transportation system in the condition necessary to give satisfactory and adequate service.

The accompanying table shows expenditures which are needed in order to provide for the proper development of this system. According to the company the items for cars are less than is desirable and should be increased as soon as practicable.

Of the $9,208,032 estimated for the calendar years 1922 and 1923, $8,555,608 has been authorized and approximately $3,765,000 has been paid to date. This leaves approximately $4,790,000 of the 1923 expenditures yet to be financed.

PROPOSED EXPENDITURES FOR ROAD AND EQUIPMENT

	1922	1923	1924	1925	Total
Everett shops	$205,842	$1,190,232	$1,445,518	$2,052,180	$4,893,772
Track betterments	84,924	700,000	700,000	700,000	2,184,924
Surface carhouses—modernising	40,715	500,000	500,000	500,000	1,540,713
Miscellaneous buses, machinery, etc.	35,127	300,000	300,000	300,000	935,127
Power—South Boston power station and conduits	397,314	1,450,000	800,000	1,400,000	4,047,314
Cars	1,715,220	1,710,000	1,000,000	800,000	5,225,220
George Street storehouse	160,000	.....	.....	.....	160,000
Forest Hills signal system	124,010	.....	.....	.....	124,010
Forest Hills extension	122,500	.....	.....	.....	122,500
Neponset terminal	24,350	.....	.....	.....	24,350
East Boston tunnel changes	.....	47,800	.....	.....	447,800
Total	(b) $2,910,000	$6,298,032	$4,745,518	$5,752,180	$19,705,730

(a) These are gross expenditures. Credits for property charged off, property destroyed by fire, property sold, etc., have been eliminated. (b) Appropriations carried over to 1923.

Approves Bond Purchase.—The State Railroad and Public Utilities Commission has approved the application of the Jackson Railway & Light Company for authority to issue $55,000 of 5 per cent gold bonds. The proceeds of the sale will be used to purchase new equipment deemed necessary for the system in Jackson, Tenn.

Extra Dividend on Illinois Traction Common.—The Illinois Traction Company, Peoria, Ill., has declared an extra dividend of $1.50 on the common stock payable on Jan. 2 to stock of record Dec. 20. The last regular dividend of the Illinois Traction on the outstanding common stock was 50 cents a share declared payable on Oct. 1 for the previous quarter. The stock is of $50 par.

Abandonment Allowed. — The Corporation Commission of Virginia granted the petition of the Virginia Railway & Power Company to abandon lines on County Street in Portsmouth. The appeal was favorably received on the grounds that the High Street line parallels it and jitney competition is too keen for its existence, as the jitneys operate on a 5-cent fare, against 6 cents charged by the company.

Abandonment Petition Deferred. — The hearing on the petition of the International Railway for permission to abandon part of its line in the city of Niagara Falls, scheduled for Dec. 17 in Buffalo, was postponed by the commission to a date to be announced after Jan. 1. Corporation Counsel Robert J. Moore of Niagara Falls asked for postponement because of pressing municipal matters.

Gold Notes Offered.—Dillon, Read & Company, New York, are offering at 99¼ and accrued interest, yielding about 6.40 per cent, $3,500,000 of the Philadelphia Rapid Transit Company's two-year 6 per cent secured gold notes. The notes are dated Dec. 1, 1923, and are due Dec. 1, 1925. The notes will be secured by deposit with the trustee of $4,667,000 Philadelphia Rapid Transit Company fifty-year 5 per cent sinking fund gold bonds, due March 1, 1962, the bonds thus being pledged at 75 per cent of their face value. The fifty-year 5 per cent gold bonds, due March 1, 1962, are a direct obligation of the Philadelphia Rapid Transit Company, specifically secured by a first lien on all of the capital stock and the leasehold of the Market Street Elevated Passenger Railway. In addition, payment of the principal and interest of these bonds is guaranteed by the Union Traction Company of Philadelphia.

Sale of Certificates Approved.—The Public Utilities Commission has approved the petition of the Memphis Street Railway, Memphis, Tenn., for permission to issue $344,000 in car trust certificates. The funds secured by the sale of the certificates, together with a $160,000 cash payment, is the purchase price of forty new double-truck cars which will be placed in service at an early date. The specifications of these cars were given in the ELECTRIC RAILWAY JOURNAL, issue of June 2. The certificates will become due and payable in annual installments of $35,000 beginning Dec. 1, 1924.

Sale Declared Legal.—Sale of common stock of the Chicago Elevated Railroad collateral trust, which controls the elevated lines, was recently declared legal by the Illinois Appellate Court. The stock in 1914 was pledged as collateral for a $14,000,000 gold note issue of the trust. The court reversed an order of Circuit Judge Hugo M. Friend. That judge enjoined the proposed sale on the petition of two holders of preferred stock. Those plaintiffs alleged the sale would be the first step in "a conspiracy to place the elevated roads under the control of Samuel Insull and the Commonwealth Edison Company." In view of the decision it is believed immediate steps will be taken to effect the sale, which had been set for Oct. 3 in New York and was stopped by temporary injunction.

Payment of Dividend Rental Deferred.—At a special meeting of the board of directors of the Interborough Rapid Transit Company, New York, N. Y., on Dec. 14 it was determined that payment of the installment of the Manhattan Railway quarterly dividend rental due Jan. 1, 1924, to Manhattan Railway stockholders participating in the plan of readjustment should be deferred. Under the plan, the Manhattan dividend rental at the rate specified in the agreement (4 per cent for the current year) is cumulative, and must be met in full before any dividends can be paid on Interborough stock.

Settlement of Lease Problem Postponed.—Official announcement has been made that it may be found desirable to postpone the question of the lease of the West Jersey & Seashore Railroad, operating steam and electric service from Camden to Atlantic City, to the Pennsylvania Railroad until the future. The Pennsylvania already owns a controlling interest in the West Jersey company. Some minority holders of West Jersey favored a rental, which would provide for a straight 6 per cent dividend, while others favored the capitalization of some part of the surplus through declaration of a stock dividend in such way as would provide a return of not less than 6 per cent on present holdings. The Pennsylvania is reported to have favored a 5 per cent return.

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Traffic and Transportation

Fares Cut in Des Moines

New Rate of Seven Cents Put Into Effect Because Stabilizing Fund Has Reached $150,000

The Des Moines, Iowa, City Railway surprised its patrons at Christmas with the announcement of a reduction in fares from 8 cents to 7 cents. The fare cut was actually announced on Dec. 22. On account of the franchise provision, which requires that five days' notice be given to the City Council of any change in fare, the new rate becomes effective on Dec. 27. The decrease really has come about as a result of the stabilizing fund reaching the $150,000 mark.

As a matter of fact, when the company's books were closed for the month of November the so-called cushion fund, provided under the franchise adopted in November, 1921, had reached $150,902 and immediately upon closing the books F. C. Chambers, president, hastened to keep faith with the public by announcing the reduction. Mr. Chambers gives credit for arriving at the goal to the co-operation of the public and the efficiency of the railway employees. He calls attention to the fact that the reduction is in excess of 12½ per cent, which is noteworthy in the case of a business operating upon such a narrow margin.

Further evidence of the company's desire to keep faith with the public is shown by the fact that coincident with the 7-cent fare becoming effective to city car riders, it will also become operative on the three lines which run outside of the city limits. Since the adoption of the new franchise patrons on the Valley Junction, Fort Des Moines and Urbandale lines have paid an additional 2 cents upon reaching the city limits. In the future 7 cents will cover one complete ride from Des Moines to the end of any of these lines.

In this connection it is also interesting to note that while the franchise entitled the company to charge 16 cents for fares on owl cars and 4 cents for school children, these provisions have never been exacted and the fare on owl cars has been 10 cents and that for school children 2½ cents.

The fare reduction is also more noteworthy when it is considered that during the past eighteen months the company has made very heavy expenditures for reconstruction and has practically completed the new Crocker Street line.

According to the terms of the franchise, if the stabilizing fund should be decreased to $100,000, the fare will revert to 8 cents, but Mr. Chambers has said that every effort will be made by his company and its employees to prevent such a contingency.

At the very time the fare reduction was announced a hearing was being held in the Polk County District Court upon the suit brought by Grant Van Horn for the North Des Moines Improvement League to test the reasonableness of the 8-cent fare provided in the franchise. Van Horn originally attempted to revoke the franchise on the score that it was invalid, but upon losing this case he amended his petition so as to confine his attack to the question of the reasonableness of the fare.

Efforts made by the company since the adoption of the franchise have been so sincere and have produced such improvements in service that the average citizen of Des Moines is taking no interest in the Van Horn case, being satisfied that the franchise is a good bargain.

Jitneys Prohibited in Gadsden

Jitneys have practically been legislated out of Gadsden, Ala. On Dec. 17 the City Council of Gadsden adopted a city ordinance prohibiting the operation of jitneys on streets where street cars of the Alabama Power Company operate. This puts the jitney out of business in Gadsden's downtown section. This ordinance was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 17.

The city ordinance also prohibits the operation of jitneys from Gadsden to Alabama City and Attalla, both connected with Gadsden by electric railway. For some time past numerous jitneys have operated between Gadsden and these two towns. Taxicabs are excepted in the ordinance.

The jitney owners' association of Gadsden threatens to contest the ordinance in the courts.

New Crosstown Service in Indianapolis

Crosstown service in Washington Street, Indianapolis, became a reality on Dec. 16. At intervals from four to eight minutes throughout the day cars of the Indianapolis Street Railway will be run between Irvington and Mount Jackson, straight across Washington Street. All the cars now on the West Washington Street line will make the crosstown run, while several of those now on the East Washington line will make the entire trip. Four-minute service will be given on the crosstown line in the rush hours and from six to eight-minute service at other periods of the day.

The cars on the East Michigan Street and Brightwood lines will be rerouted downtown as a result of the establishment of the crosstown line. A plan of running two cars an hour between Irvington and Mount Jackson was tried by the company last year, but it did not prove a success.

Fare Plea Makes Progress

Council at Atlanta Appoints Committee to Inquire Into Appeal for Ten-Cent Fare

Progress is being made by the Georgia Railway & Power Company, Atlanta, Ga., in connection with its appeal for a 10-cent cash fare and the right to charge 2 cents for a transfer. The Council has appointed a committee, with Councilman Bachman at its head, to audit the company's books, investigate the statements made by the company and call a public hearing on the question.

Following this public hearing the committee will recommend to the council whether or not the petition should be granted in whole or in part. If the report is favorable, the case will be taken up with the Public Utilities Commission of the State. Several months may intervene before the matter is finally settled.

There are several features of the matter that have new angles. In the first place the company has realized the necessity for stating its case to the public fully and frankly. To this end it has opened its books to the public, told the facts in the case, and appealed for a chance to make a fair return on its earnings. In this connection it should be borne in mind that the company is seeking a return of 8 per cent on the money invested so as to establish its earning capacity and permit it to increase its borrowing power. This, in turn, will enable it to secure funds to add new track and equipment and improve its service.

Beginning several months ago the company started putting placards in its cars to show how much money it spent on the various items connected with the railway. Starting with the 7-cent fare, it showed each week how much of that 7 cents went to pay for supplies, for new equipment, for salaries, for repairs and for other purposes. At the end of this series of posters, the fraction of a cent the company actually lost was graphically shown.

The attention of the public was next turned to transfers. The company showed—still by the poster method—how each transfer was issued at a loss of more than 2 cents. It showed why the transfer system was an unfair burden.

From transfers, the advertising was turned to the increase in the cost of maintenance. Item by item, the company showed how the cost had risen in the past five years 100 or 150 or 200 per cent as the case might be. This established the increase in the cost of operation in the public mind beyond a doubt.

Next came a series of total figures—showing the great cost of maintenance and the volume of material needed just to keep the railway in operation without providing new track and new equipment.

Finally the company presented its petition to the City Council. Simul-

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taneously, in every car in the city, there went up this placard.

"What will *you* do with your street railway?"

That is the appeal the Georgia Railway & Power Company has made all the way through on this campaign—the slogan under which it will fight for 10-cent fares and an 8 per cent return on its invested capital. It is an open invitation to the public to help the company solve its problems. In its petition the company said in effect:

We have studied this thing from every angle—and we do not see any other way out of it.

We must get more money—make a larger return in our investment—or we are stopped. We have already borrowed all the money we can. The state will not permit us to issue any more bonds.

Either we must increase our income through an increase in fares—or quit.

But if you, Mr. Commuter and Business Man, know any better method of getting around the situation—sit down and let us know about it.

We need your help.

Immediately after the request was printed, letters began to come into the office of the company. Some were good, some bad, some indifferent. All of them indicated an interest on the part of the public, and many of them expressed a desire to help the company out of its difficulties. In a way, this was the most remarkable feature of the entire campaign.

The petition could have been taken to the Public Utilities Commission direct, but the company desired to explain the matter in advance to the public and thus to win its support by the soundness of its claims.

1,928 Los Angeles Trainmen Receive $90,000 Bonus

The fourth annual Christmas bonus was paid by the Los Angeles Railway to 1,928 trainmen, in checks ranging from $5 to $160 and totaling $90,000. The regular bonus is $60 a year, on a basis of $5 a month. Trainmen come under the bonus system when they have been in service six months. They start with an efficiency record card of 100 per cent and credits and demerits are assessed under the company's merit system, which was described in the ELECTRIC RAILWAY JOURNAL, issue of April 28, 1923, page 721.

For every month that a trainman's record is 100 per cent or better he is credited with a $5 bonus. The ten top motormen and conductors of each division and the ten top men of the safety car list were selected for special prizes running from $10 to $100 in addition to the regular bonus. In selecting these men, officials of the company were governed to a considerable extent by the general attitude and appearance of trainmen as well as by the figures of their record.

Two changes have been announced in the administration of the merit and bonus system for 1924. Demerits for which a trainman might lose some of his bonus will be canceled providing the offense is not repeated in three months. This is intended to make the system more corrective and less disciplinary. The second change is that the special awards which go to 110 men will be in even amounts. The company budget for the year assumes that every trainman participating in the bonus will receive the full amount for the time he has served. Money remaining due to some trainman not receiving full bonus will be divided evenly among the 110 men whether it amounts to $5 or $100 extra.

Saginaw Makes Good Showing

The Saginaw Transit Company, Saginaw, Mich., reported gross earnings for November of $29,646, with net after taxes of $6,044, to meet monthly interest requirements of $2,475. The company carried 465,000 passengers during November. When partial railway service was resumed in Saginaw on Nov. 1 the city had been without railway accommodations for two years. It was not until Dec. 1 that the full measure of service was restored, there.

Working Out Bus Plan in Spartanburg

While the South Carolina Gas & Electric Company, Spartanburg, S. C., is awaiting a decision of the Supreme Court on the petition of the city to make the company renew operation of its cars or forfeit its franchise the City Council and George B. Tripp, president of the company, are getting together and working out a satisfactory system of handling the buses. At a recent conference which was the outgrowth of complaints made to the City Council that buses were stopping in the middle of the city blocks to take on and discharge passengers, Mr. Tripp suggested to the Council that a space of 50 ft. should be set aside on the blocks where the buses must stop to receive and unload passengers. No automobiles would be allowed to park in these areas. Mr. Tripp will prepare a map containing his ideas with reference to handling traffic for the buses and this will be later submitted to the City Council.

Commission Hears Ten-Cent Fare Petition of Kingston Company

A hearing was held before the Public Service Commission on Dec. 11 in the matter of the petition of the Kingston Consolidated Railroad for permission to charge an 8-cent ticket and a 10-cent cash fare in lieu of the 7-cent fare now charged in Kingston, N. Y. Howard Chipp, attorney, and G. B. te Bow, general manager, represented the company.

Mr. te Bow testified as to revenues and expenses covering operations of the Kingston road for several years. He said the operating revenues for the first seven months in 1923 were $169,588. The operating expenses for the same period were $129,026 and the taxes paid by the company amounted to $11,367. Another hearing will be held on Jan. 8.

Los Angeles Urged to Hire Traffic Expert

The Los Angeles Traffic Commission recommended on Dec. 18 to the Los Angeles City Council and the Board of Supervisors of Los Angeles County that a transportation expert be employed with a view to working out a plan for rapid transit both within the city of Los Angeles and to all outlying points. It is reported that Major R. F. Kelker, Jr., Chicago transportation expert, who prepared the plans for the Chicago rapid transit system, would be recommended to work out the proposed Los Angeles metropolitan railway system. The plans of the traffic commission involve the construction of elevated lines, subways and open cuts. One of the difficulties encountered by expert engineers in the past in studying the transit situation in Los Angeles is the lack of existing loop lines and the comparatively few crosstown lines.

The traffic commission outlines in its resolution to the City Council and county officials that it was prompted in making the recommendation for a proposed transportation survey because of the "ever increasing and harassing congestion" in the city, and that for that reason there is a need "for a thorough survey of the entire problem of public transportation in the metropolitan area of Los Angeles."

P.R.T. Plans Ordinances for Bus Development

The Philadelphia Rapid Transit Company plans the early introduction of enabling ordinances for consideration of the incoming city administration in order to meet the growing demand, through the newspapers and otherwise, for a bus line on Broad Street. This service as proposed will provide increased carrying capacity into and out of the delivery district. The universal fare will be 10 cents. Passengers originating at or destined to points away from motor bus lines will continue to use the 3-cent exchange ticket privilege between buses and connecting street cars to complete their ride. Transfers between buses cannot be given, because each passenger is to be supplied with a seat, which serves to limit the maximum carrying capacity of the buses.

Three-Cent Fare for School Children.—Half fare for Oakland school children or a rate of 3 cents went into effect on Dec. 10. The San Francisco-Oakland Terminal Railways placed books of tickets on sale which will not be accepted on Sundays, Saturdays, holidays or during periods of vacation. They will be honored only during such hours as school attendants use the company's service. This is in accordance with the ruling of the State Railroad Commission.

Must Come to Dead Stop.—The Public Service Commission has directed the Hudson Valley Railway to cause all of its cars to come to a full stop before crossing what is known as the Pratt's

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crossing on the Waterville Mechanicville highway in Half Moon, Saratoga County, N. Y. In view of the heavy traffic over the trolley crossing and the frequency of trolley car movements the crossing is of such character as to make it dangerous. In addition the speed of cars has been restricted at the crossing, but the commission holds that as a further need to protect the traveling public all cars must come to a dead stop.

Rochester-Erie Freight Service.—Through freight service will be installed over the Rochester, Lockport & Buffalo Railroad and Buffalo & Lake Erie Traction Company from Rochester, N. Y., to Erie, Pa., according to an announcement at the Rochester, Lockport & Buffalo offices. The institution of this service will permit thirty-six-hour delivery between the two cities and will eliminate trucking charges in Buffalo, through the two companies using the same freight station in Buffalo. The Rochester, Lockport & Buffalo also has opened half-hour passenger service between Rochester and Brockport during eleven hours of the day. It was planned to start the new service on Dec. 29.

Railway Wins Injunction.—An injunction obtained several months ago by the Kansas City Railways, Kansas City, Mo., against the enforcement of an ordinance specifying changes in street car stops at Thirty-first and Main Streets was made permanent Dec. 19 by Judge Stone in the United States Circuit Court. The ordinance came as a result of a protest made by property owners on the north side of Thirty-first Street, who maintained that their business suffered because the cars stopped at a point distant from their stores. The railways held that the stopping of the cars before crossing Thirty-first Street would delay the traffic. According to the ruling of Judge Stone the cars will continue to stop at the present designations.

Parked Automobiles Tagged. — In connection with the recent safety campaign conducted by the motormen and conductors of the Lehigh Valley Transit Company, Allentown, Pa., the members of the Safety Committee went out and tagged all parked automobiles on the Saturday afternoon and evening before Christmas in the various cities and towns along the line with a ticket which is a facsimile of the Police Department tag. One side of the tag shows three automobiles with safety signals for drivers, namely, "Turn to the Right, Stop and Turn to the Left." The other side said: "You are tagged for safety by the General Safety Committee, Transportation Department, Lehigh Valley Transit Company." The tag gave statistics on the number of people killed by automobiles in the United States and asked for the cooperation of the tagged one in stopping accidents. The safety campaign of this company, referred to previously in these pages, was entered into very enthusiastically by the employees and patrons.

Personal Items

Mr. Livers Resigns

Achieved Success with Charlottesville & Albemarle Railway—Active in Local Improvement Projects

John L. Livers has resigned as president of the Charlottesville & Albemarle Railway, Charlottesville, Va., and vice-president of the Virginia Western Power Company, with which the railway and light properties were recently merged. The first week in January he will leave with his family for Florida, and intimates that he plans to pay a long intended visit to Cuba and possibly Mexico. It is understood that Mr. Livers will continue to make Charlottesville his home during the summer and will keep up his interest in the suburban development of the community notwithstanding. He is president and the principal stockholder in the Redland Land Corporation, which is developing the Jefferson Park and the Meadow Brook additions at Charlottesville.

"Johnny" Livers, as Mr. Livers is familiarly known, took over the Charlottesville properties as manager in 1912. Later he was made vice-president as well as manager, and in 1921 he was elected president. He completely rehabilitated the utility properties there and placed them on a dividend paying basis. This was certainly no inconsiderable job, but in carrying it through Mr. Livers resorted to many new and novel ideas. He was quick to realize the value of consumer co-operation, but this is difficult to achieve even in a small community. As a result of his efforts Charlottesville, a city of 7,000 population, has a five minute headway the year round, and a 5-cent fare. Not only this but Mr. Livers has been conspicuous for his uniform and cordial support of every project that would make for the improvement of local conditions and the industrial and civic betterment of the whole section.

The extent to which he endeared himself to the entire community is attested by the editorial "A Model of Civic Conduct," published by the Charlottesville *Daily Progress* in its issue of Dec. 22. In the course of a column editorial expressing its regret at his loss to the community that paper said:

> The most conspicuous trait of Mr. Livers was a remarkable modesty that amounted nearly to self-effacement. He was everything for the cause he had to serve, or object to attain, but next to nothing for himself. And he was indifferent in this way as to his own recognition, without being in the least shrinking or diffident in pushing the cause or interest in which he had faith. He was, however, essentially a man of achievement and vision that amounted to genius, and this community will long miss his far-seeing and sympathetic mind in its future counsels, and wonderful talent for overcoming difficulties in execution.

Mr. Livers was born in Gettysburg, Pa., in 1878. Starting as a lineman at the age of eighteen he worked for several years in various phases of construction work. He then entered the operating and contracting field, and during a period of twelve years constructed more than 100 electric light and power plants. As stated previously he took charge of the Charlottesville property in 1912.

John Kelly has replaced John A. Roach as roadmaster of the East St. Louis Railway, East St. Louis, Ill.

Floyd E. Harper has succeeded H. B. Hurd as secretary of the Dubuque Electric Company. C. B. Zeigler has replaced J. N. McCallum as treasurer.

Harry T. Edgar has assumed the presidency of the Paducah Electric Company, Paducah, Ky. He is also president of the Keokuk Electric Company, Keokuk, Iowa.

J. W. Muir has succeeded J. A. Shepherd as auditor and assistant treasurer of the Alabama Power Company with office in Birmingham.

S. W. Willers has succeeded E. Curtis as chief engineer of the power station of the Fort Smith Light & Traction Company, Fort Smith, Ark.

Charles Dunn has succeeded Hamilton Baluss as general manager of the Susquehanna Traction Company, Lock Haven, Pa.

F. A. Brown, who has been in charge of the statistical department of the Wisconsin-Minnesota Light & Power Company in Eau Claire for more than a year, has been transferred to the Northern States Power Company's office at Minneapolis as head of the company's statistical department.

William Mangold has completed twenty-five years' service with the United Railways & Electric Company, Baltimore. He has served in different capacities from clerk and stenographer until he became chief clerk under the present superintendent.

Scott S. Crane, general manager of the Altoona & Logan Valley Electric Railway, Altoona, Pa., has completed his twenty-eighth anniversary as general manager at Altoona. Mr. Crane entered the Logan Valley service in 1895 following three years in Altoona as a telegraph operator for the Pennsylvania Railroad.

Harry A. Brinkerhoff, consulting engineer, was recently elected the first city manager of Portland, Me., at the organization meeting of the new City Council. He has had large experience in handling important engineering projects in many parts of the United States and Canada. Until two years ago, when he established himself as a consulting engineer, he was for more than twenty years with Westinghouse, Church, Kerr & Company of New York. Mr. Brinkerhoff is a member of the

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American Society of Mechanical Engineers.

John J. K. Caskie, for several years associated with the claims and legal department of Mitten Management in the operation of the Philadelphia Rapid Transit Company, will become general attorney for the International Railway, Buffalo, Jan. 1, 1924, according to an announcement by Herbert G. Tulley, president of the International. Mr. Caskie will have charge of all negligence claims and litigated cases. The appointment of Mr. Caskie does not affect the status of Thomas Penney, who remains general counsel for the International Railway.

Charles H. Quinn, chief electrical engineer of the Norfolk & Western Railway, has resigned. His first railroad experience was on the Southern Pacific at San Antonio, Tex., where he entered the service as machinist's apprentice. In 1901 he went to the Norfolk & Western as a draftsman. One year later he was promoted to electrical foreman, which position he held for five years. In 1906 he was appointed assistant engineer of motive power. Nine years ago Mr. Quinn was promoted to chief electrical engineer of the road, which position he held up to the time of his resignation.

Obituary

Alfred Hare, railroad builder of Oklahoma, died recently in Oklahoma City. He was a prominent factor in the promotion and building of the interurban railway between the cities of Tecumseh and Shawnee.

J. W. Waggener, formerly secretary of the Atchison Railway, Light & Power Company, Atchison, Kan., died on Nov. 23, 1923. Mr. Waggener was general superintendent of the company from 1909 to 1922, at which time he became secretary and C. A. Leland, Jr., became general superintendent. Mr. Waggener belonged to one of the prominent families of Atchison. His death was a distinct loss to the general industrial life of the city.

Stephen C. Mason, president of the National Association of Manufacturers from 1918 to 1921, died recently at his home in Pittsburgh. Since 1896 he was secretary and director of the McConway & Torley Company and was widely known in the railroad field. At the age of nineteen he went to work on the Connecticut & Passumpsie Railroad. Eight years later he joined the Interstate Commerce Commission and here he was in charge of the compilation and publication of the commission's statistics of railways in the United States. He was a member of the National Industrial Conference Board, Pittsburgh Chamber of Commerce, the Railway Club of Pittsburgh and of other prominent associations. He was one of the leading advocates of the open shop as a solution of the labor problem.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Market for Second-Hand Safety Cars

Heavier Traffic Has Caused Substitution of Larger Cars and Safety Cars Are Available at a Low Price

A fairly good market for safety cars is reported by dealers in second-hand railway equipment. At the present time a street railway in one of the larger cities is replacing a number of its single-truck one-man safety cars by larger units. This is being done because the traffic on the line where these cars were formerly used has been built up to a point where the railway feels that cars of larger capacity are needed. As a result of the change there are available a number of one-man Birney cars at a comparatively low price. These cars have been operated for a short period of time only, and they have been well maintained. They are therefore in first class condition.

A considerable saving in first cost might be accomplished by the purchase of such cars. It is pointed out that the operating cost being much lower than that of a heavier double-truck car, railways could save money by the use of safety cars in the off-peak period. The fact that these cars can be purchased at such a reduced price might make it possible for the railway to make such an investment for use only during those hours. Hence, they might be used on a route where traffic was sufficiently heavy to demand two-man cars in the rush hours. Such a proceeding would scarcely be economical if the cars had to be purchased at the original cost at which they were obtained from the builders.

A number of railways have recently purchased second-hand safety cars. In one case this was done because it was desired to increase service slightly on lines where these cars were already in service. In another case they were bought for service on lines with very light traffic, and it was apparently the idea of the railway to purchase rolling stock as cheaply as possible.

The light weight of the safety car is a favorable factor where shipping charges are to be considered.

Railways Buying Auto Sweepers

In preparation for their annual snow-fighting campaign many railways have recently been buying automobile snow-sweeping equipment. The Fox Rotary Snow Broom Company reports that this apparatus is being used to augment the regular snow sweepers on many properties. In one case the railway uses the automobile sweeper to clean out wyes where the rail sweepers operate with difficulty and which were formerly cleaned by hand labor. This apparatus has been found useful also for removing the ridge of snow left by the rail sweepers between the tracks. Another advantage claimed is that an auto sweeper is not tied up by other vehicles stalled on the tracks. They are useful also where storage battery cars are operated and the power is insufficient to climb a steep grade and at the same time operate the brooms.

Dividend to Be Paid in Stock

A plan for taking care of dividends accumulated on the preferred stock since 1913 has been proposed by a committee of stockholders of the Laconia Car Company. It provides for an increase of the present authorized common stock from 10,000 shares to 65,000 shares of no par. In lieu of accumulated dividends on preferred, 10,000 shares of the increased authorized common are to be given preferred stockholders, this to be made convertible into common on the basis of four and a half shares of common for each share of preferred, if converted prior to March 1, 1924, and four shares of common for each share of preferred thereafter.

Record Set by Wire Works

The weekly average production by the Chicago Works of the Western Electric Company during November was 565,795,000 ft. of conductor wire. The total production for the month was 2 263,180,000 ft. In four weeks the Chicago factory almost surpassed the best previous record for a five-week month. Output is stated in "conductor feet" because of the fact that different sizes of cable are made up of a different number of pairs of wire. The conductor foot is a term representing the amount of wire going into cable of all sizes and is a standard unit of measurement for purposes of comparison.

Metal, Coal and Material Prices

Metals—New York	Dec. 26, 1923
Copper, electrolytic, cents per lb.	13.00
Copper wire base, cents per lb.	15.625
Lead, cents per lb.	7.45
Zinc, cents per lb.	6.62
Tin, Straits, cents per lb.	47.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.67
Somerset mine run, Boston, net tons	2.125
Pittsburgh mine run, Pittsburgh, net tons	2.00
Franklin, Ill., screenings, Chicago, net tons	1.95
Central, Ill., screenings, Chicago, net tons	1.575
Kansas screenings, Kansas City, net tons	2.00
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.65
Weatherproof wire base, N. Y., cents per lb.	17.50
Cement, Chicago net prices, without bags	$2.10
Linseed oil (5-bbl. lots), N. Y., per gal.	$0.93
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	11 255
Turpentine, (bbl. lots), N. Y., per gal.	$0.92

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Paving Brick Shipments Remain High

Considering seasonal influences, shipments of vitrified paving brick for November were running above normal, according to a report just made by the National Paving Brick Manufacturers' Association. For the first time since last spring the total number of brick manufactured for the month ran greatly in excess of shipments, indicating that companies are manufacturing for stock in anticipation of late winter and early spring shipments.

Larger Motors Being Installed on Salt Lake City Cars

Installation of larger motors in the equipment used by the Salt Lake & Utah Railroad and the construction of new sidings for accommodating longer trains are now going forward on this line, involving an expenditure of $50,000. The additional sidings are being placed at the towns of Bringhurst and Cutler.

With the installation of the larger motors, fifteen cars of freight can be hauled at one time and double this number of empty cars can be handled by the new locomotives. The electric locomotives will weigh 120,000 lb. and will be equipped with larger axles than the present equipment and also with journal boxes. The new equipment is expected to arrive in time to handle the heavy freight work of the early fall of 1924.

Railroad Tie Producers Will Meet

The sixth annual convention of the National Association of Railroad Tie Producers will be held in Kansas City, Mo., at the Hotel Muehlebach, on Jan. 17-18, 1924. Prominent speakers will discuss subjects of interest to cross-tie producers. A feature of the meeting will be round-table talks, in which the producers themselves will discuss their problems.

Rolling Stock

Des Moines City Railway is expecting to put ten new cars into service early in the new year. Twenty cars were ordered July 1, but there have been numerous delays and no promise of delivery has yet been secured for the second ten. The detailed specifications of the cars follow:

Builder of car body	McGuire-Cummings Manufacturing Company
Type of car	Semi-convertible motor passenger
Seating capacity	48
Weight: Car body	20,000 lb.
Weight: Trucks	10,000 lb.
Weight: Equipment	8,000 lb.
Weight: Total	38,000 lb.
Bolster centers, length	20 ft. 6 in.
Length over all	46 ft. 0 in.
Truck wheelbase	5 ft. 6 in.
Width over all	8 ft. 2 in.
Body	All steel
Interior trim	Light cherry
Headlining	Agasote
Roof	Arch
Air brakes	General Electric
Armature bearings	Sleeve
Axles	Quenched and tempered
Bumpers	Channel
Car signal system	Faraday
Car trimmings	Polished bronze
Center and side bearings	Plain
Control	K 35-JJ
Couplers	Portable
Curtain fixtures	Curtain supply
Curtain material	Pantasote
Destination signs	Keystone
Door-operating mechanism	National Pneumatic
Fenders or wheelguards	H. B.
Gears and pinions	G. E. Grade M
Hand brakes	Peacock
Heater equipment	Consolidated electric
Headlights	Golden Glow
Journal bearings	Plain
Journal boxes	McGuire-Cummings
Lightning arresters	General Electric
Motors	Four G. E. 247-I
Motors	Outside hung
Paint, varnish or enamel	Vitrolite
Registers	International No. 5
Sanders	Des Moines City Railway type
Sash fixtures	Dayton Manufacturing Company
Seats	Wakefield
Seating material	Cane
Springs	Railway spring
Step treads	Kass-Feralun
Trolley base	U. S.-13-E
Trucks	McGuire-Cummings
Ventilators	Utility
Wheels	Rolled steel—26 in.

Track and Line

Long Beach Railway, Long Beach, L. I., has applied to the Public Service Commission for authority to construct and operate the entire street railway in Long Beach as contemplated in the articles of incorporation of the company. The company has constructed and operated a part of the line and it has now asked the necessary state authority to build and operate from Park Street and Minnesota Avenue to Beach Street to New York Avenue and then to Park Street, making a continuous loop in Long Beach's street railway service.

Power Houses, Shops and Buildings

British Columbia Electric Railway, Vancouver, B. C., will shortly award the contract for the building of the new power house which will house a turbine of 25,000 hp. The entire project will cost in the neighborhood of $1,500,000.

Trade Notes

Philip L. Thomson, publicity director of the Western Electric Company, has been elected president of the Association of National Advertisers. His election follows successful service as director and since 1921 as vice-president of the association. Mr. Thomson began his business career in 1903 following his graduation from Union College and from Harvard University. For two years Mr. Thomson was employed in the Chicago office of the Western Electric Company. In 1905 he went to Kansas City. Then he became successively manager of the company's headquarters at Pittsburgh and publicity director, in charge of all publicity activities. In this capacity Mr. Thomson has been identified with the development of Western Electric advertising and publicity in this country, and last spring he spent two months in Europe in connection with the publicity problems of the International Western Electric Company.

Nicholas M. DuChemin has assumed the duties of general superintendent of the West Lynn plant of the General Electric Company following the death of William J. Lloyd. He joined the General Electric apprentice school at the River Works in Lynn and also the engineering school. In addition to this he attended the Suffolk Law School in Boston and took a year's course at the Boston University. During the years 1917 to 1919 he was in the United States navy, enlisting as a seaman and finishing with the commission of lieutenant in charge of construction work for aviation uses. Following his naval service he returned to the Lynn plant of the General Electric Company as a boring mill hand. He soon won promotion and his safety work caused his being put in charge of the Bedeaux point system in the West Lynn plant, the position he occupied when he received his recent appointment as general superintendent.

New Advertising Literature

Combustion Engineering Corporation, New York, N. Y., has published a pamphlet describing the new Frederick stoker. The pamphlet contains a list of a few representative installations of the new Frederick stoker.

Irving Iron Works Company, Long Island City, N. Y., has issued a pamphlet entitled "Safety Under Foot." This pamphlet contains a table of safe loads showing the maximum allowable fiber stress on Irving subways of all types.

Fuller-Lehigh Company, Fullerton, Pa., has issued bulletin No. 900, "Pulverized Coal for Boilers," Fuller-Lehigh Equipment pamphlet and Fuller News, featuring the Fuller-Kinyon conveying system. These three pamphlets, recently released, embody the latest information on pulverized coal as a fuel, both preparation and application.

Carnegie Steel Company, Pittsburgh, Pa., has available to users of steel the ninth edition of the shape book. The new edition is the result of a thorough check and revision of all the sections rolled by the company on its shape, rail, bar and plate mills. While no important changes have been made in the regular sizes of structural and bar mill sizes of beams, channels, angles, tees and zees, numerous changes have been made in the special sections, such as concrete reinforcement bars, window and casement sections, automobile rim sections and other miscellaneous bar mill sections. Certain rails and splice bar sections which have become obsolete since the issue of the preceding edition have been eliminated in the present issue.

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ELECTRIC RAILWAY JOURNAL

A New Year's Announcement

STEEL TWIN TIE TRACK

is renewable

IN the thirteen years since the first installation of Steel Twin Ties was made the outstanding merits of this type of construction have been classified not only by our efforts but by the comments in the technical press of engineers who have installed Twin Tie Track.

That the reasons urged for the use of Twin Ties up to this time have been ample is evidenced by the rapid and consistent adoption of Twin Tie Track. Economical, permanent, adaptable and easy riding track when proved by cost records, years of service, special conditions and by actually riding on it, recommends itself as good construction.

But now, nearly two years after the first test renewal installation was made, it can be positively stated that such track is renewable — that definite details taking into account all engineering requirements have been worked out providing for complete renewal without removing anything but the rail and the paving down to the base of rail.— Further that the cost of renewal is in the neighborhood of Two Dollars and Fifty Cents a track foot exclusive of new rail, joints, new paving and paving labor.

That such a base is renewable brings forward many interesting if somewhat obvious points. To mention a few — this method of renewal would justify charging the permanent steel tie base to capital account and renewal cost to operating, or— over a period of years it will greatly reduce the car mile charge for maintenance of way. Again, it could be urged that municipalities should carry paving costs where such a permanent base were installed.

In this limited space and as this is merely an announcement, no details are covered here. The complete method is described in a circular now on the press— "How the Second Rail Goes In on a Steel Tie Foundation" which will be mailed to you if your name is on our mailing list, if not please ask for it.

THE INTERNATIONAL STEEL TIE COMPANY
CLEVELAND, OHIO

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Welcome 1924!

The Electric Railway Industry can look forward with confidence to prosperity during the coming year.

The extended use of efficient cars and equipment; the expansion of freight haulage service; the use of multiple unit trains for mass transportation; the auto bus where suited; and the continued development of public confidence, mean continued prosperity.

The Westinghouse Electric organization stands ready, as in the past, to assist the industry in solving its 1924 problem.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

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The Volume Index

HAS ALWAYS BEEN a feature of the ELECTRIC RAILWAY JOURNAL. A great deal of care is put on its compilation and a special effort is made by the publishers so that the index will be included in the last number of the volume.

The index of the ELECTRIC RAILWAY JOURNAL has always been much more than an index of titles or even of articles. Where an article treats of a variety of topics, a corresponding number of entries appear in the index, together with supplementary entries under the name of an operating company, if the article relates to or describes the practice of any railway property.

The list of principal key words appearing immediately after the title page was long a unique feature of the ELECTRIC RAILWAY JOURNAL index, though recently some other papers have adopted the same idea. It is designed to aid those who may be uncertain of the exact term under which a certain article is entered. This list of principal key words naturally changes somewhat from year to year with the changes in nomenclature and practice of the industry.

The publisher of the JOURNAL believes the index will be useful to every subscriber, whether he binds his back copies or not. For this reason it does not follow the practice of some papers of requiring subscribers who want a copy of the index to write for one. It binds the index with each copy of the last issue of the volume.

Number of Copies Printed, 5,955

Advertising Index—Alphabetical, 36; Classified, 32, 34; Searchlight Section, 31

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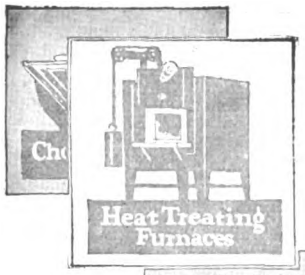

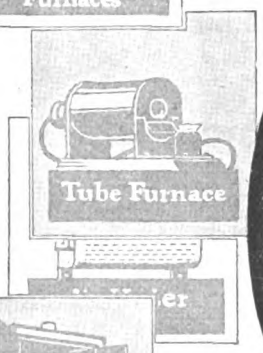

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An occasional publication containing accounts of heating installations of interest to every executive. We will be glad to put you on the mailing list. Write for a copy today.

Electric heat has many uses. A few of these applications are suggested by the small sketches. Electric heat can be used in your business.

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Your watchman is human, and like others, he cannot work efficiently when cold. Two or three space heaters in the sentry house will keep him warm in the coldest weather, at a surprisingly low cost, and without danger of fire.

The duties of a crane man require that he be ready to promptly respond to exacting responsibility at any time. If his crane cab is chilly, if his fingers are stiff, he will not be able to properly control his crane. Westinghouse space heaters will increase the efficiency of your crane man by keeping him warm.

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Get in touch with the nearest Westinghouse sales office today. The office representative will gladly give you data on the various sizes.

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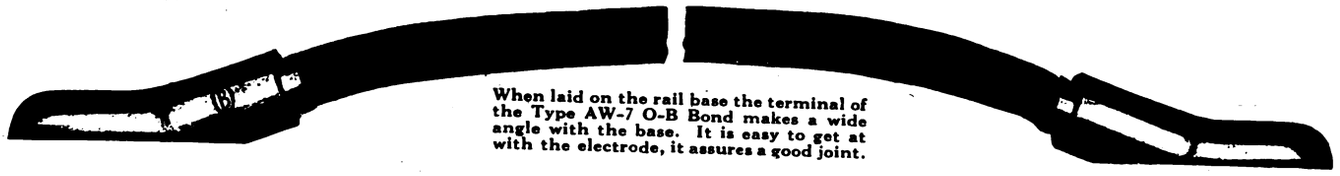


When laid on the rail base the terminal of the Type AW-7 O-B Bond makes a wide angle with the base. It is easy to get at with the electrode, it assures a good joint.

Welding Steel to Steel with Steel

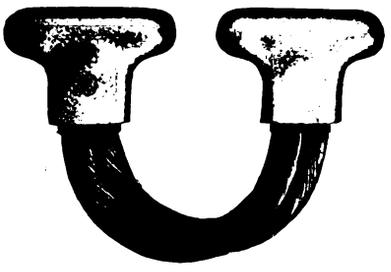
Welding steel to steel with steel is the easiest method of welding. It will result in a better average of thorough work.

The average welding operator is surer in his work with all steel—the chance of incomplete fusion—of one poorly bonded joint offsetting the value of other good ones—is less.

Welding steel to steel with steel will prove itself out on the job where welding conditions vary—where results must be in the highest average of good joints.

O-B Type AW Arc Weld Bonds are steel terminal bonds. The cable strands are welded into the steel terminals. They offer excellent inducement to 100% bonding, because the terminals are shaped for easy welding—because they provide for on-the-job welding of steel to steel with steel.

The cable strands are welded into the terminals of O-B AW Bonds.



The AW-8 Bond, like the AW-7 shown at top of the page, has steel terminals shaped for easy welding. This ball-of-rail bond can be installed without disturbing paving or any built-up roadway.

O-B Bonds provide a better circuit because they make good welding easy.

Publication 502 has interesting facts on Bonding—*Write for copy*

THE OHIO BRASS CO.
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Grind Every Day Keep Wear Away

The time to do your rail grinding is all the time. There's always some spot that shows corrugations or wear, some joints that need building up, welding and grinding.

Don't wait until you simply have to do it. Look for chances to use your rail welders and grinders. That's the secret of economical track maintenance. Only smooth track satisfies the public, saves the rolling stock, makes speed safe and prolongs the life of the whole track structure. Plenty of grinders and plenty of grinding are true economy.

Have you enough grinders? Are you doing enough with them?

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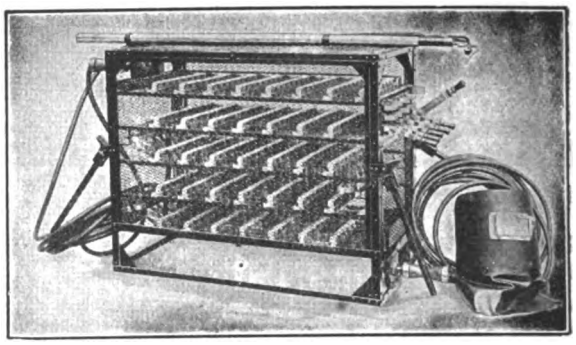
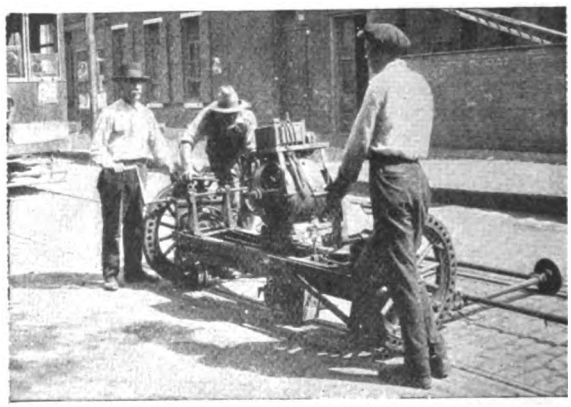
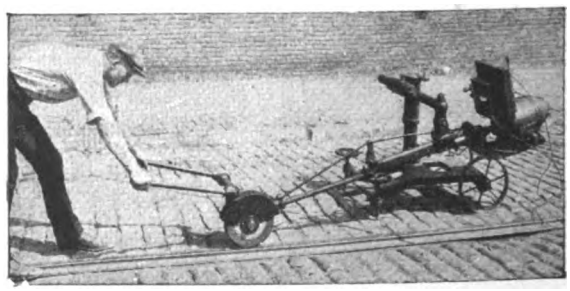


"Ajax" Electric Arc Welder

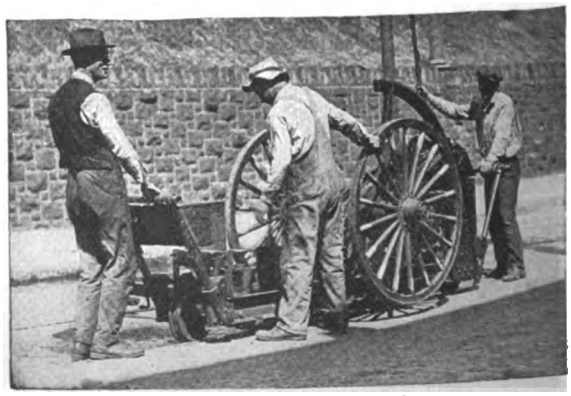


"Universal" Rotary Track Grinder

"Atlas" Rail Grinder



"Hercule" Rail Grinder



"Reciprocating" Track Grinder

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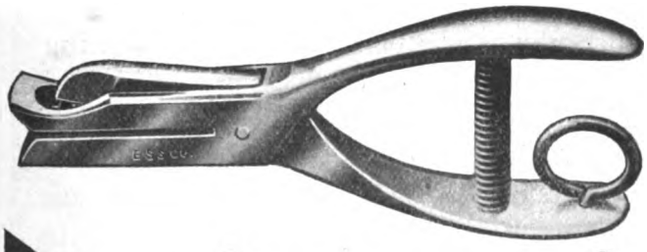
KEYSTONE

Equipment for Employees

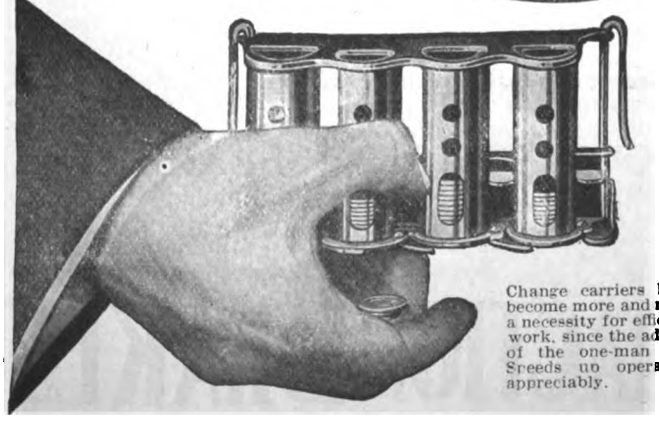
Uniform Caps
Badges
Punches
Change Carriers
Uniform Buttons
Insignia
Whistles
Signal Lanterns

Neatly embroidered, dignified-looking uniform insignia is a self-respect builder for any group of employees. This idea is being adopted by many of the leading steam and electric railways. Furnished in various styles in gold, silver or gilt. Sewed directly to the uniform.

Enameled badges for employees' caps and coats furnished in a wide variety of styles. Well-made and neat, with lettering of utmost legibility.



High-grade punches, with widest choice of die shapes where distinctive characters are desired. The well-known "Utility" type punch and also the "Standard" line.



Change carriers have become more and more a necessity for efficient work, since the advent of the one-man car. Speeds uo operation appreciably.

See Catalog No. 7

for full details and numerous illustrations of employee equipment. Shown in various styles and types which will help you in choosing the right equipment for your requirements.

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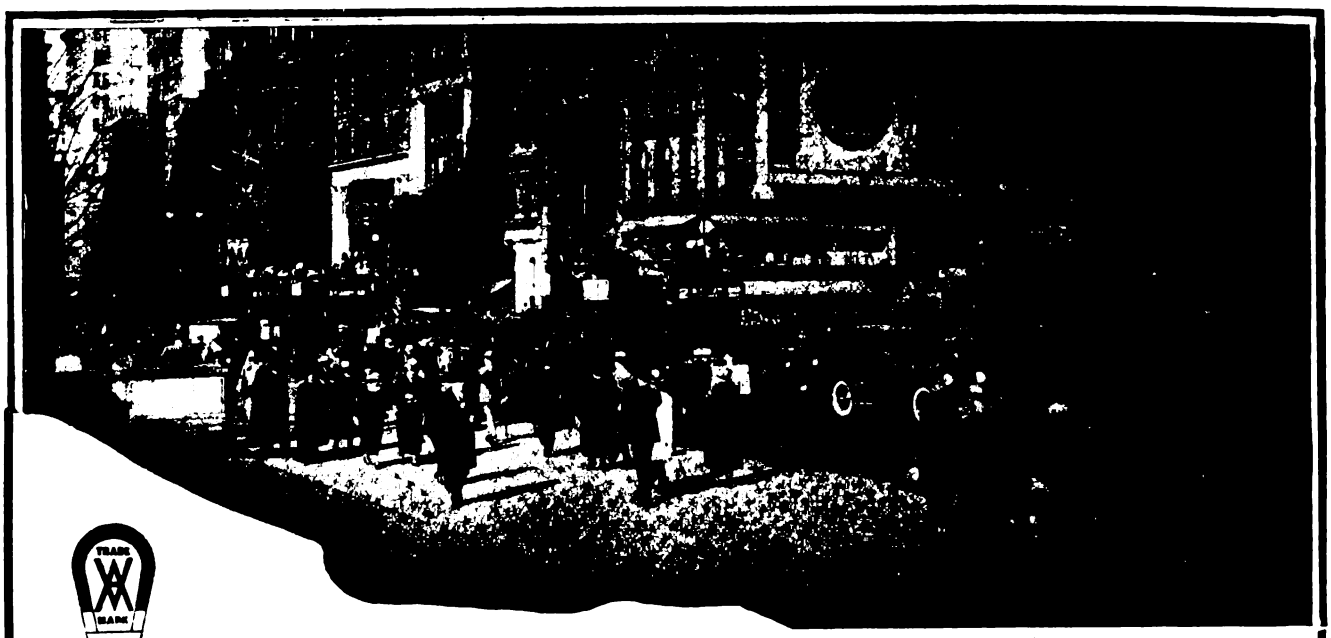
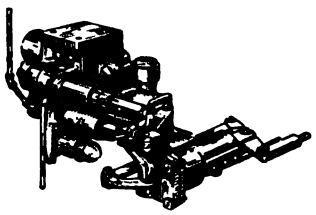


There Is Keen Competition for the Use of City Streets



THE VARIABLE LOAD BRAKE

The Westinghouse Variable Load Brake has been developed to solve the problem of controlling cars under widely varying load conditions. It is an attachment which may be added to any straight air or semi-automatic equipment whereby the braking force is automatically adjusted to suit the weight on the car, by regulating the brake cylinder pressure as the weight changes.

The adjusting mechanism is thrown into engagement by the opening of the car doors. While the doors are open, passengers are leaving and entering the car, and when the doors are closed again, the condition of loading will be that under which brake operation will take place for the next stop, or a slow-down, as the occasion may demand.

The use of the Brake insures stopping within a uniform distance regardless of whether the car is empty or loaded.

CITY streets have become so crowded that there is constant competition between the various elements of traffic for the right of way—a natural desire on the part of each "to get there first."

In order to meet this condition and hold their own in the general traffic movement—to maintain satisfactory schedules—street cars must be as mobile as other conveyances which use the streets.

The Variable Load Brake is an effective means of increasing car mobility. By making it practicable to use additional motors for the purpose of higher acceleration, by reducing the average time required for stopping, and by cutting down the running time between stops by allowing longer periods of peak-speed operation, a general speeding-up of service results.

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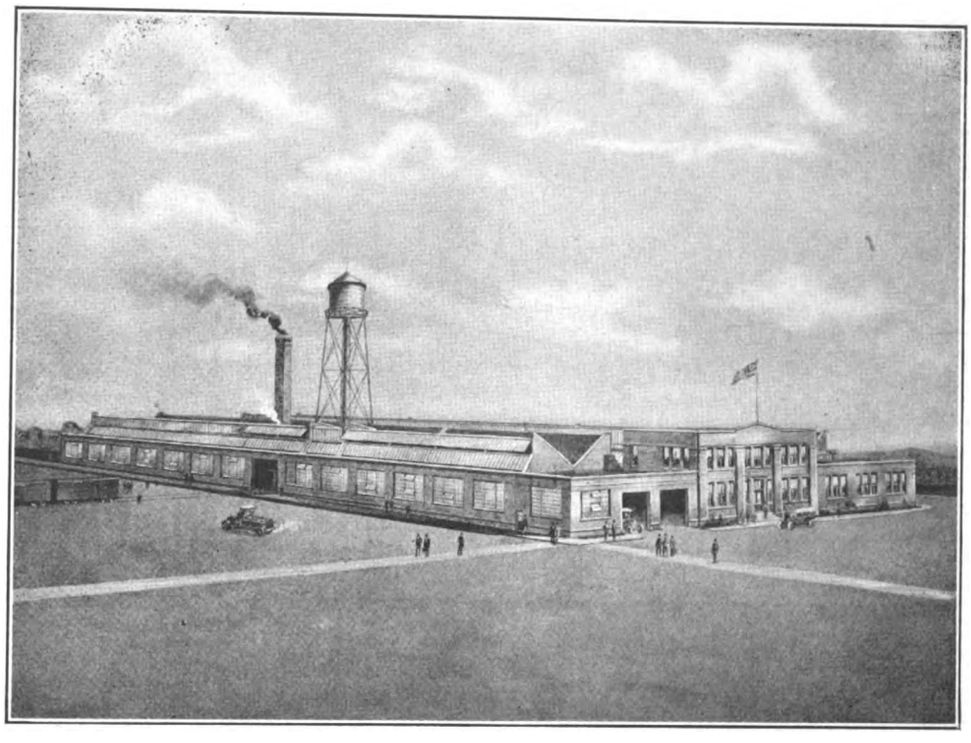

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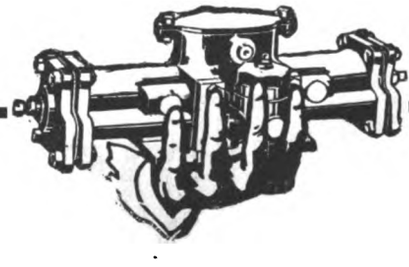

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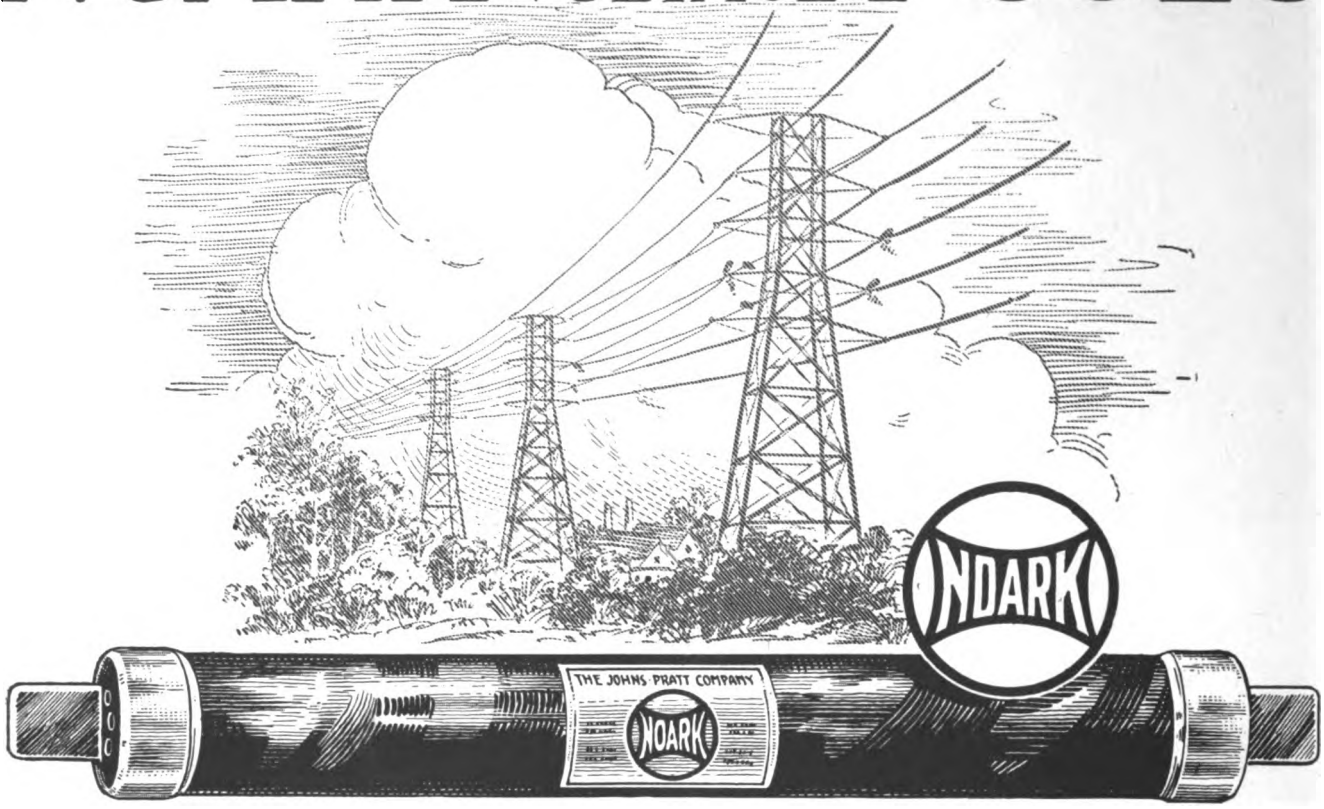
NOARK HIGH VOLTAGE FUSES



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A complete line of high tension primary fuse protective devices for transformers and branch circuits, etc. Covers standard ampere and voltage requirements at 2500 volts, 4400 volts, 6600 volts, 13200 volts, 22000 volts and all intermediate voltages.

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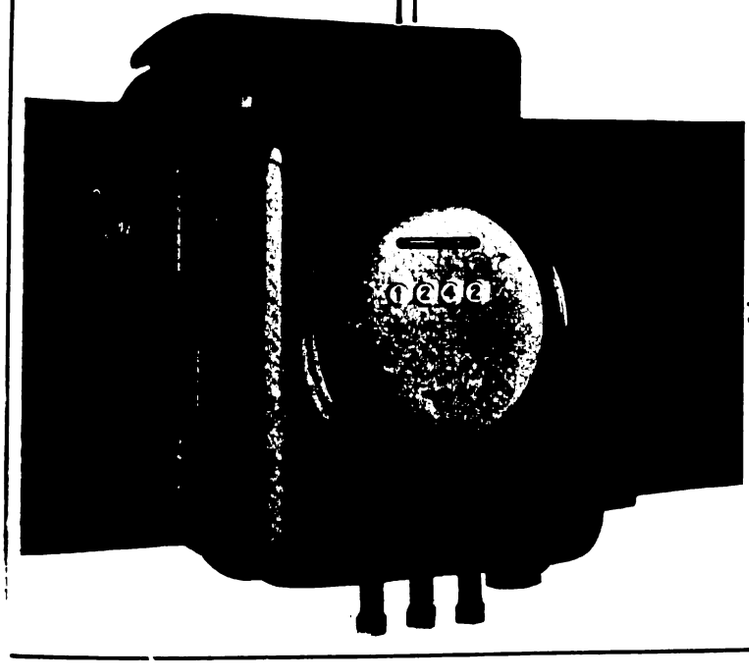

METER THE ENERGY
That's What You Want To Save.

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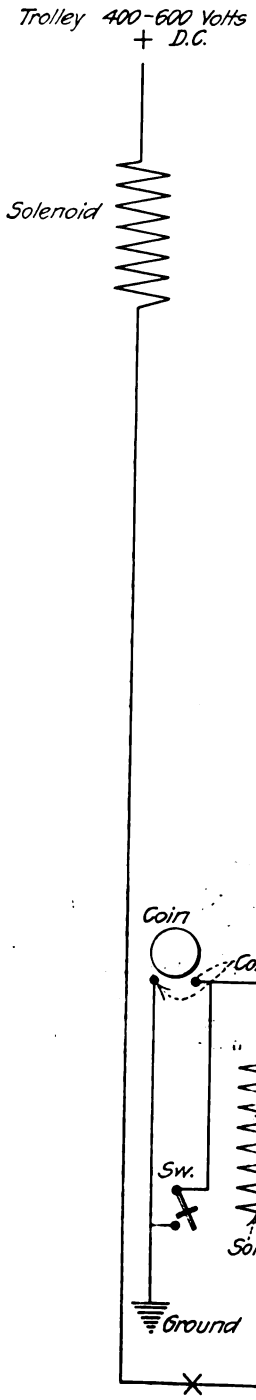

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Instantaneous Registration!!

Our new system adapted to fare collection where the basic fare is either 5 or 10 cents.

Passenger depositing ***fare*** in slot ***instantaneously registers*** on overhead fare payment—the coin ***automatically*** does this electrically.

Conductor makes observation at slot or at inspection plate ***of coin deposited.***

Company earnings shown on ***overhead*** register.

Inspection both ***visible*** and ***audible*** are part of this system occurring immediately with coin depositation.

COIN

The units are connected in series tapped into the trolley circuit; positive mechanism and electrical insulation assures the correct registration and safety of these devices—the conductor's work is reduced to a minimum—he has access to the coin after registration for change making and car accounting is made at the source.

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Electric Railway Lubrication

As 1 to 100

With an electric railway using the best lubricants obtainable, the entire cost of the annual oil bill amounts approximately to but one per cent of total maintenance expense.

In a years time, the aggregate amount of money represented by the difference in cost of high grade and lower priced lubricants, is at most, a fraction of this one per cent.

In lubrication history, there has never been an instance where the use of inferior lubricants did not result in increased maintenance expenses. In depreciation alone, the increase will more than offset the initial saving in purchase price.

On electric railway equipment, good lubrication is not a luxury but a necessity—not an extra expense but an economical investment. One that returns large dividends in improved operating efficiency and lower maintenance costs.

Galena Oils and Galena Service constitute a lubrication "buy" that has never failed to register its economic value to the electric railway. Their proven ability to effect savings in "that 99 per cent" of maintenance costs makes Galena lubrication the logical choice for selection.

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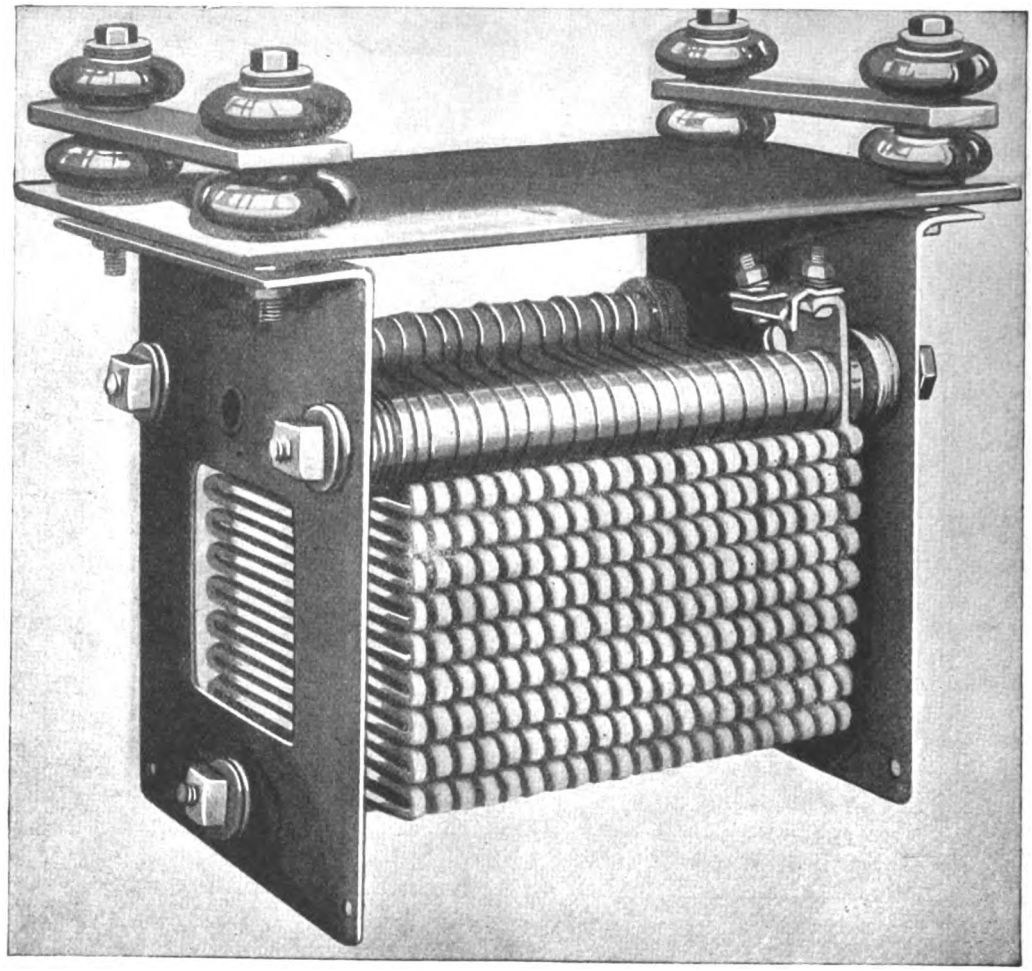
Another step in Standardization



An improved Resistor without new repair parts

This new BG Resistor combines the advantages of the well-known CG type and the rigid grid construction of the RG type. At the same time it minimizes your stock of resistor parts because it is interchangeable, both electrically and mechanically, with other resistors on the market.

Let our railway engineering specialists explain fully.

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Another lot of 100 double-truck Peter Witt cars to be equipped with

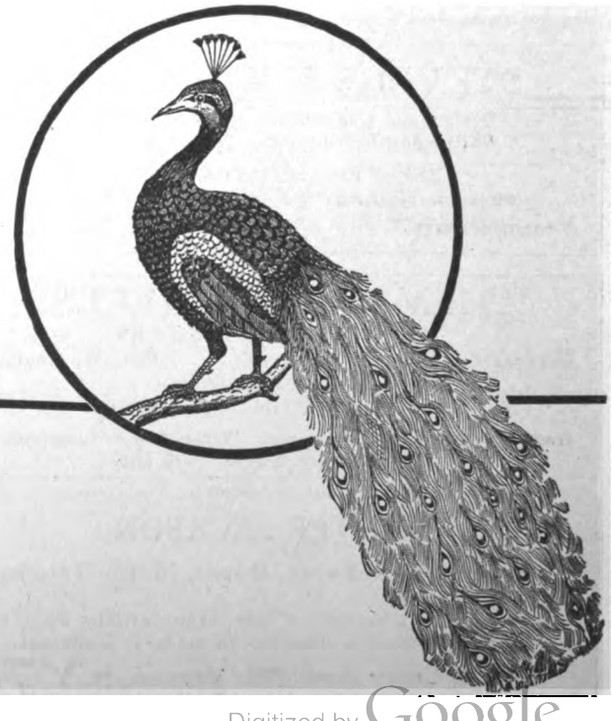
Peacock Staffless Brakes

the choice of Detroit Municipal Railway

Safety first is a mighty important matter in the eyes of those who are responsible for operating the City's transportation system in Detroit. So they specify "Peacock Staffless Brakes" for all new cars. Why? Because, both in theory and in practice, this equipment proves its reliability, its high braking power and its quick, positive action in emergency.

Remember these features:—

Lightest weight
Least platform space
Maximum braking power
Ample chain winding capacity
Unfailing reliability
Least maintenance



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The following is an excerpt from the record in a recent court proceeding:

Q. Have you some figures taken from the ELECTRIC RAILWAY JOURNAL?

A. I have.

Q. What is the ELECTRIC RAILWAY JOURNAL?

A. **It is a publication generally recognized as an authority on street railway operation.**

Q. Have you the figures shown by the ELECTRIC RAILWAY JOURNAL of the cars ordered by city railways within the United States during the eleven years past?

A. I have.

Q. How many cars have been ordered during the past eleven years in the United States?

A. 28,417.

Q. Of that number, how many were open cars?

A. 342.

Q. Have there been any open cars ordered within the United States, according to the articles of the ELECTRIC RAILWAY JOURNAL, since 1916?

A. No.

Q. In 1916 how many cars were ordered?

A. 3,046.

Q. How many of these were open cars?

A. 131 were open cars, or 4.31 per cent.

Q. As you state, no open cars have been ordered since 1916. Is that correct?

A. That is correct.

Q. What was the total number of cars ordered in 1917?

A. 1,998.

Q. In 1918?

A. 1,842.

Q. In 1919?

A. 2,129.

Q. And the following year?

A. 2,889.

Q. And in 1921?

A. 1,059. I might add that these figures cover cars for city service only.

Tie-up with this!

Testimony, like that reprinted at the left, indicates the reliance placed on the Statistical Issue of ELECTRIC RAILWAY JOURNAL.

We repeat—the Annual Statistical Issue is depended upon — used — re-used and kept for reference.

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JANUARY 5, 1924
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The Annual Statistical and Review Number

ELECTRIC RAILWAY JOURNAL
Tenth Avenue at Thirty-sixth Street, New York

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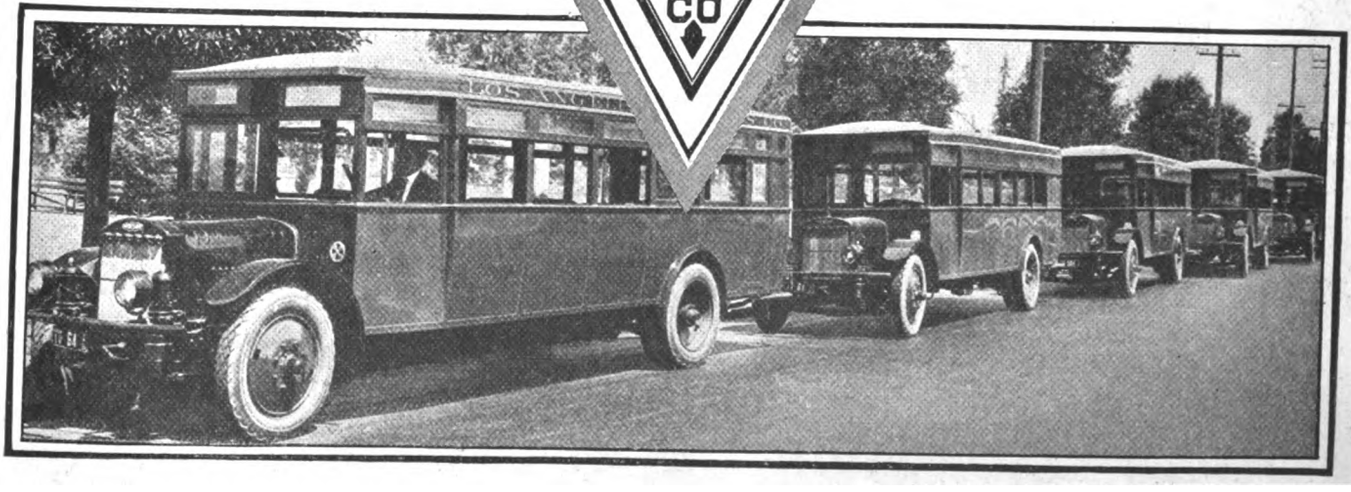

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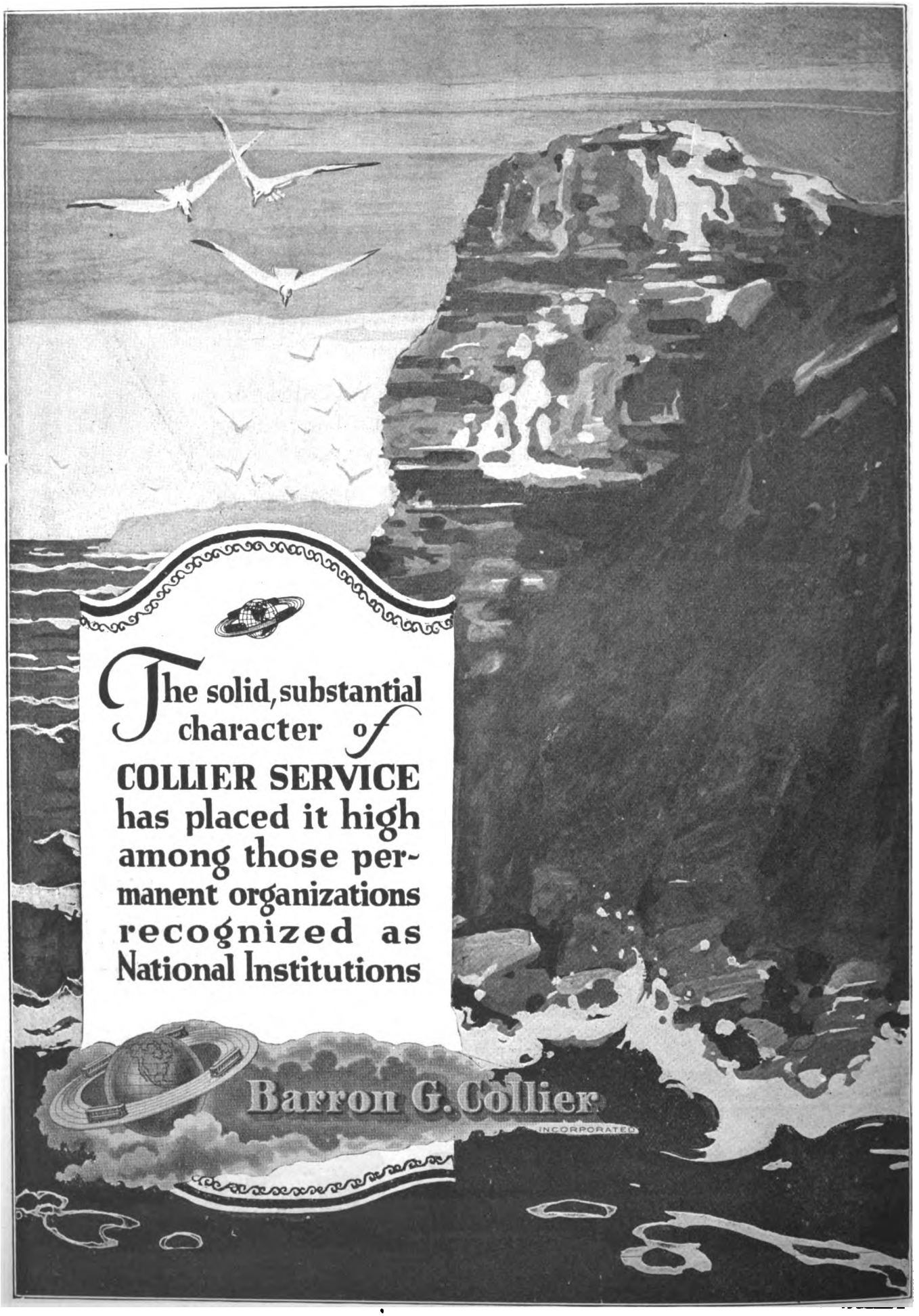

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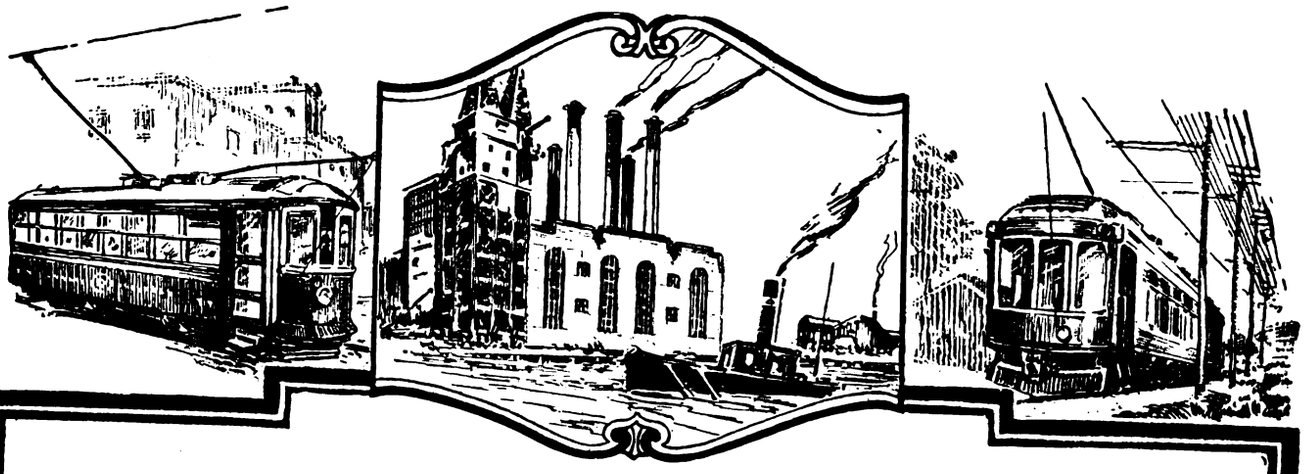

JANVS

the Roman God, after whom January was named, was shown on ancient coins as having two faces—one looking forward, one looking back.

This time of the year is a good time to look back on 1923 and to look forward into 1924.

1923 was a wonderful year for us. More and more Electric Railways came to us for help in conserving Equipment and Power through correct and scientific lubrication.

They have shown their appreciation of Texaco Service (the right oil in the right place in the right amount—and the co-operation of Texaco Engineers) by renewing their contracts.

From where we stand now, 1924 gives every promise of being a mighty fine year for us and a year of satisfaction to numbers of roads who acknowledge the correctness of the Texaco Policy by the pleasant continuation of their patronage.

We thank them.

For 1924 our Engineering forces have been augmented and our deliveries for service have been expanded to take on all the new business the year will bring us.

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We will thank you for the opportunity—and you will thank us for the *results*.

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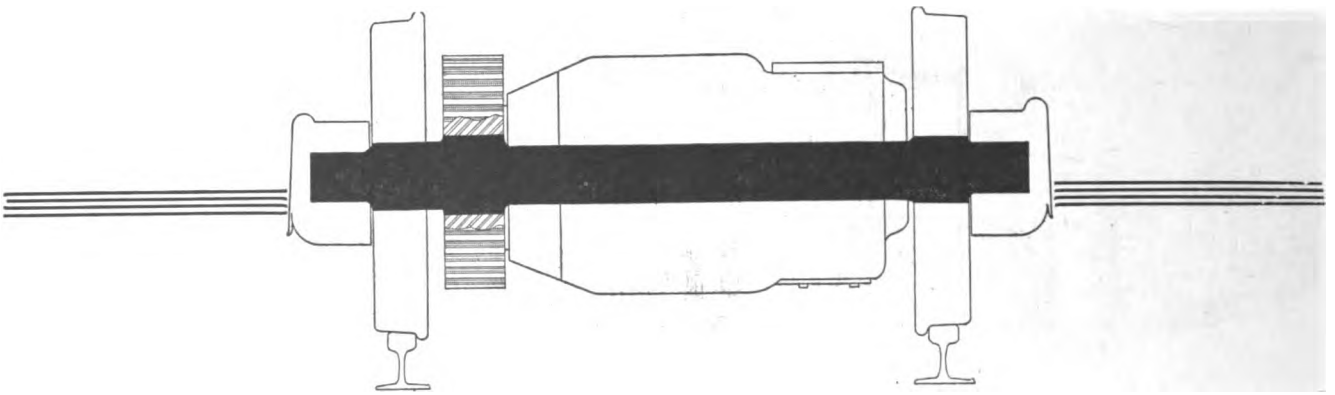

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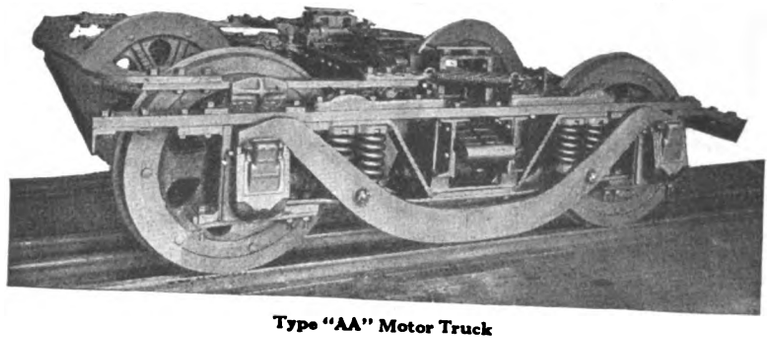

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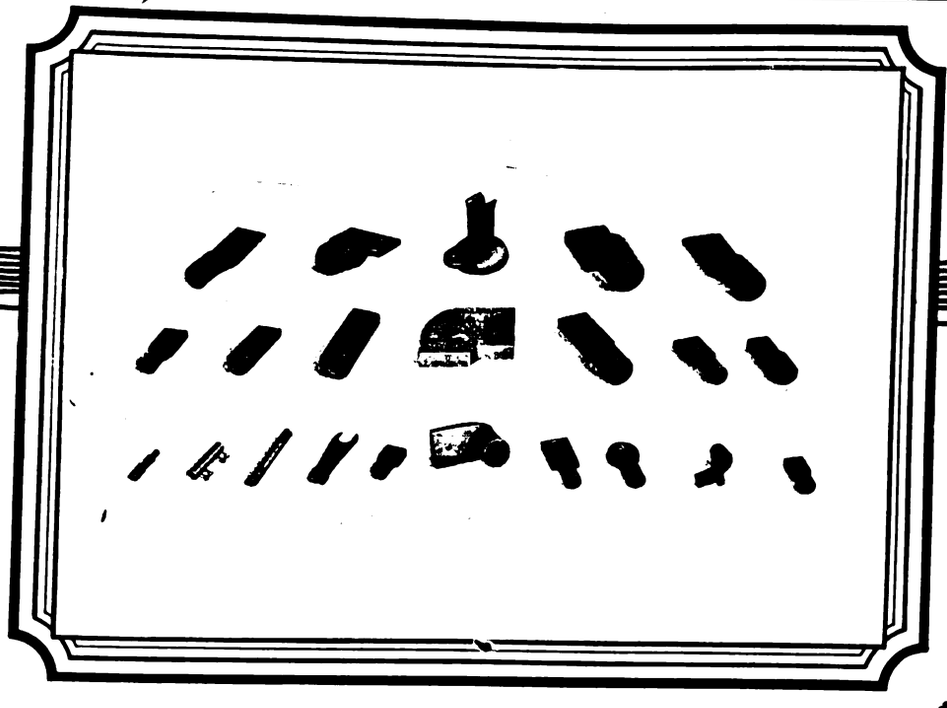

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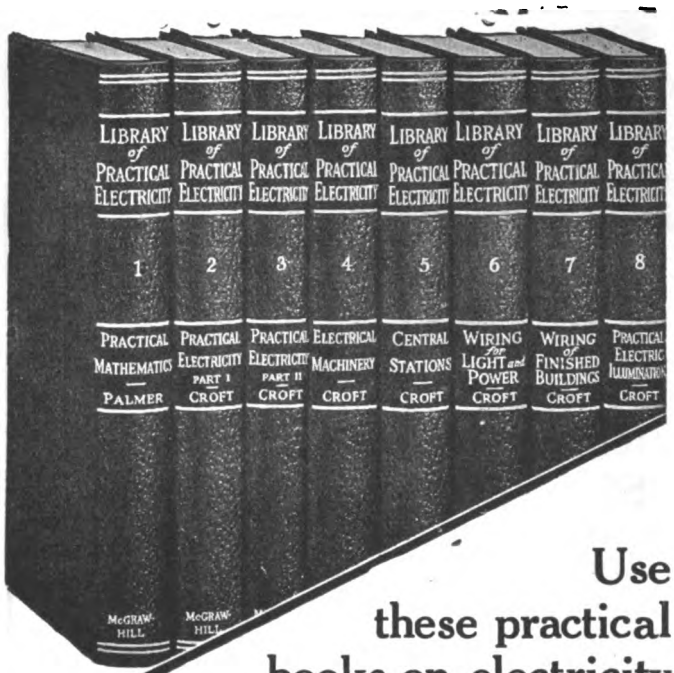

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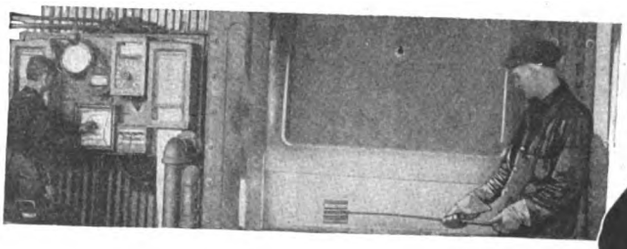

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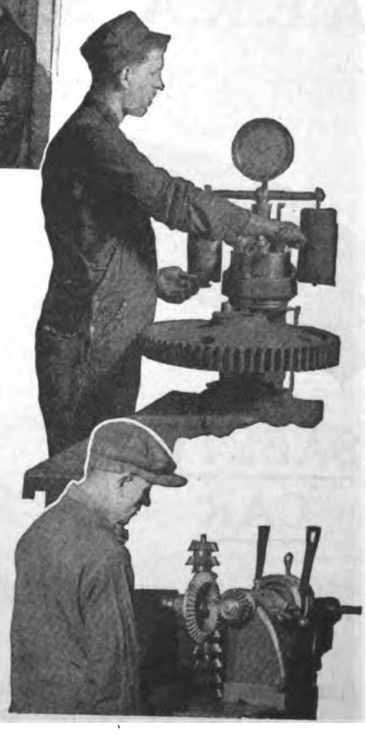

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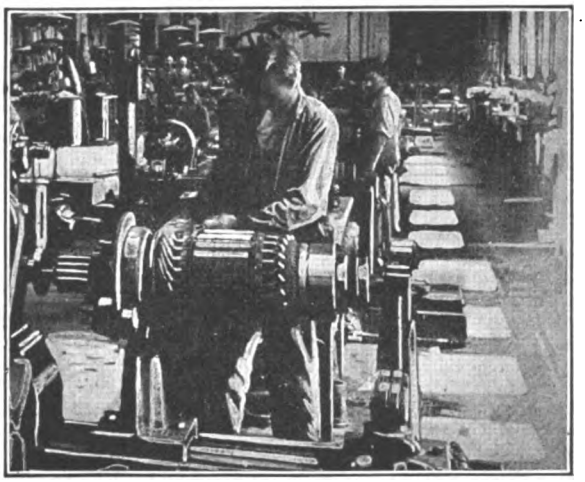

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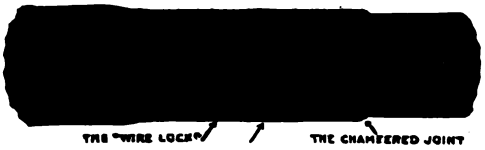

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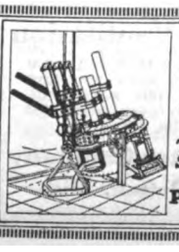

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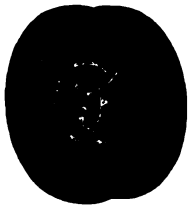

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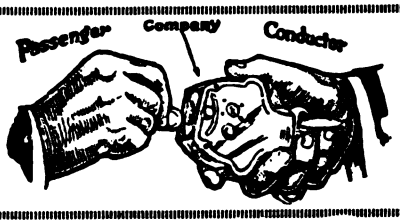

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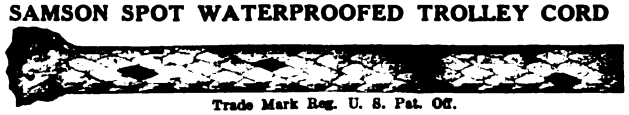

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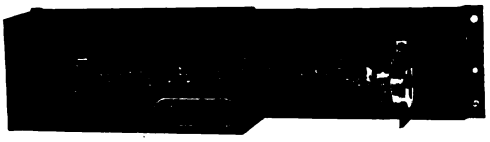

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Ingersoll-Rand Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

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Ramapo Ajax Corp.

Automatic Safety Switch Stands
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Brill Co., The J. G.
Carnegie Steel Co.
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Ajax Metal Co.

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International Register Co., The

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Westinghouse E. & M. Co.

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Baldwin Locomotive Works
Stucki Co., A.

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Ohio Brass Co.
Railway Track-work Co.

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General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Westinghouse E. & M. Co.

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National Ry. Appliance Co
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Brill Co., The J. G.
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Le Carbone Co.
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Transit Equipment Co.

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Johnson Fare Box Co.

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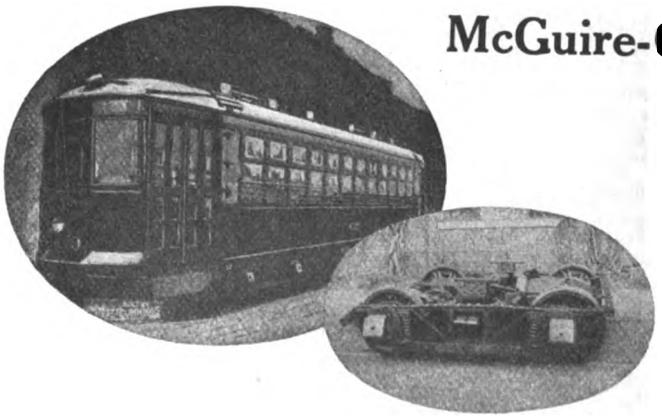

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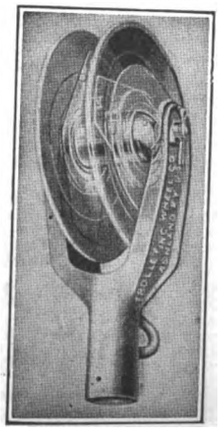

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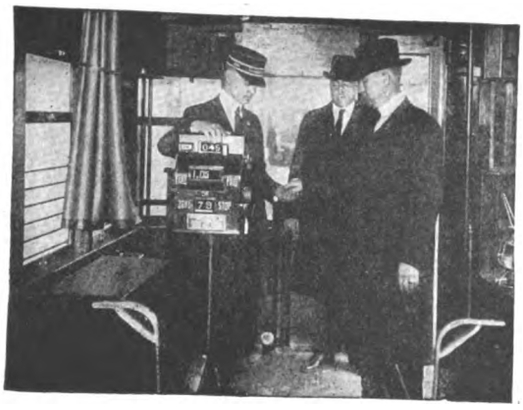

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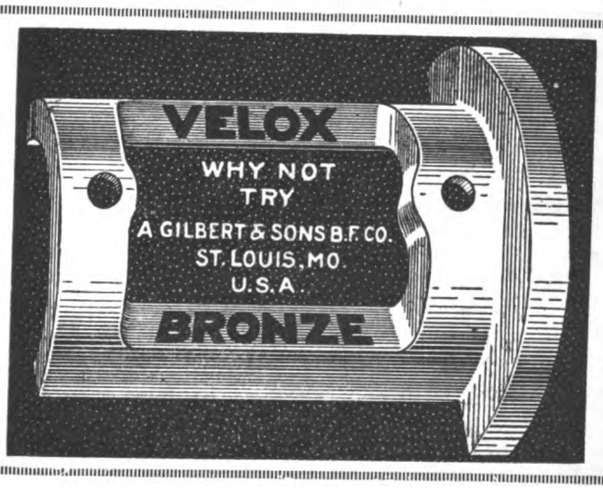

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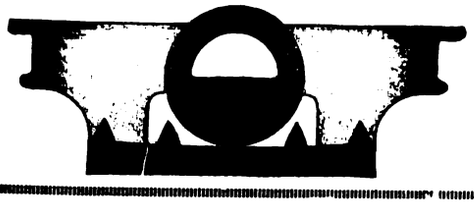

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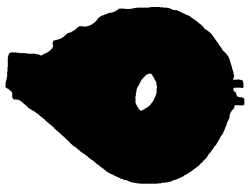
We guarantee
all grades of poles; also any butt-treating specifications
BELL LUMBER COMPANY
Minneapolis, Minn.

PROVIDENCE FENDERS
H-B LIFE GUARDS
The Consolidated Car Fender Co., Providence, R. I.
Wendell & MacDuffie Co., 110 E. 42nd St., New York
General Sales Agents



CHILLINGWORTH
One-Piece Gear Cases
Seamless—Rivetless—Light Weight
Best for Service—Durability and Economy. *Write Us.*
Chillingworth Mfg. Co.
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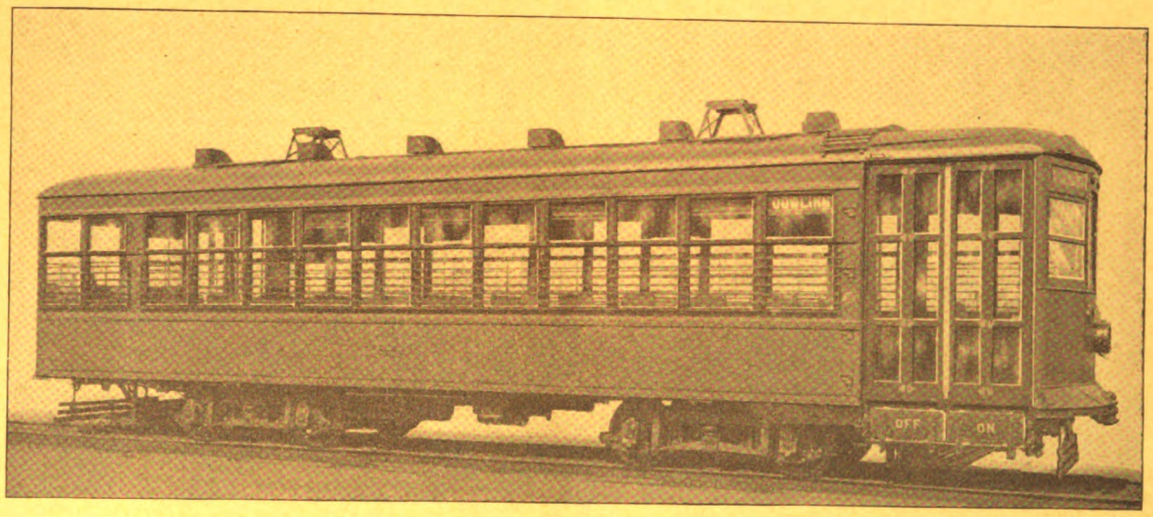
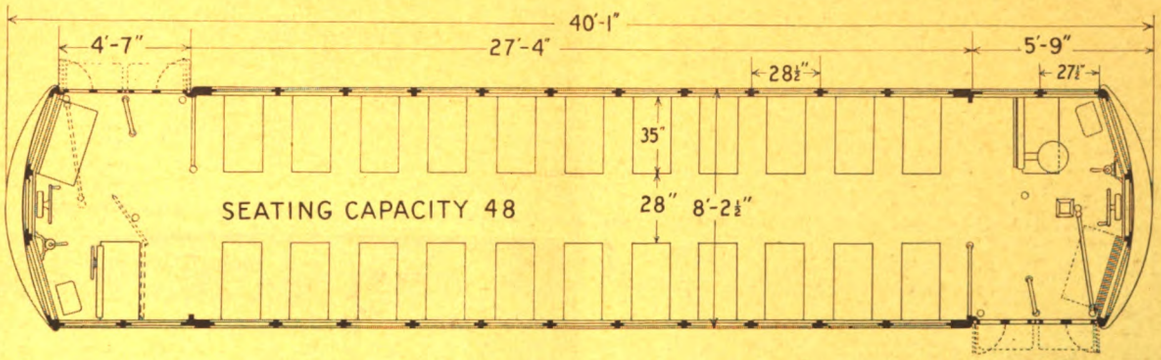
Stone and Webster Light-Weight Cars for Texas Properties





American Car Company furnishes Double-end Double-Truck Safety Cars for Beaumont, Fort Worth and Houston Lines

Twenty-seven cars of this type with separate entrance and exit doors to the operator's right on each platform at diagonally opposite corners and having an aisle width of 28 inches, were built recently by the American Car Company for the Stone & Webster Properties in Texas.

While of larger proportions and arranged to handle larger passenger loads, these cars are constructed in accordance with general safety-car practice, insuring light weight and operating economies as well as being of sufficient strength to meet the transportation requirements.

They are mounted on Brill 77-E-1 Low-Level Trucks.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

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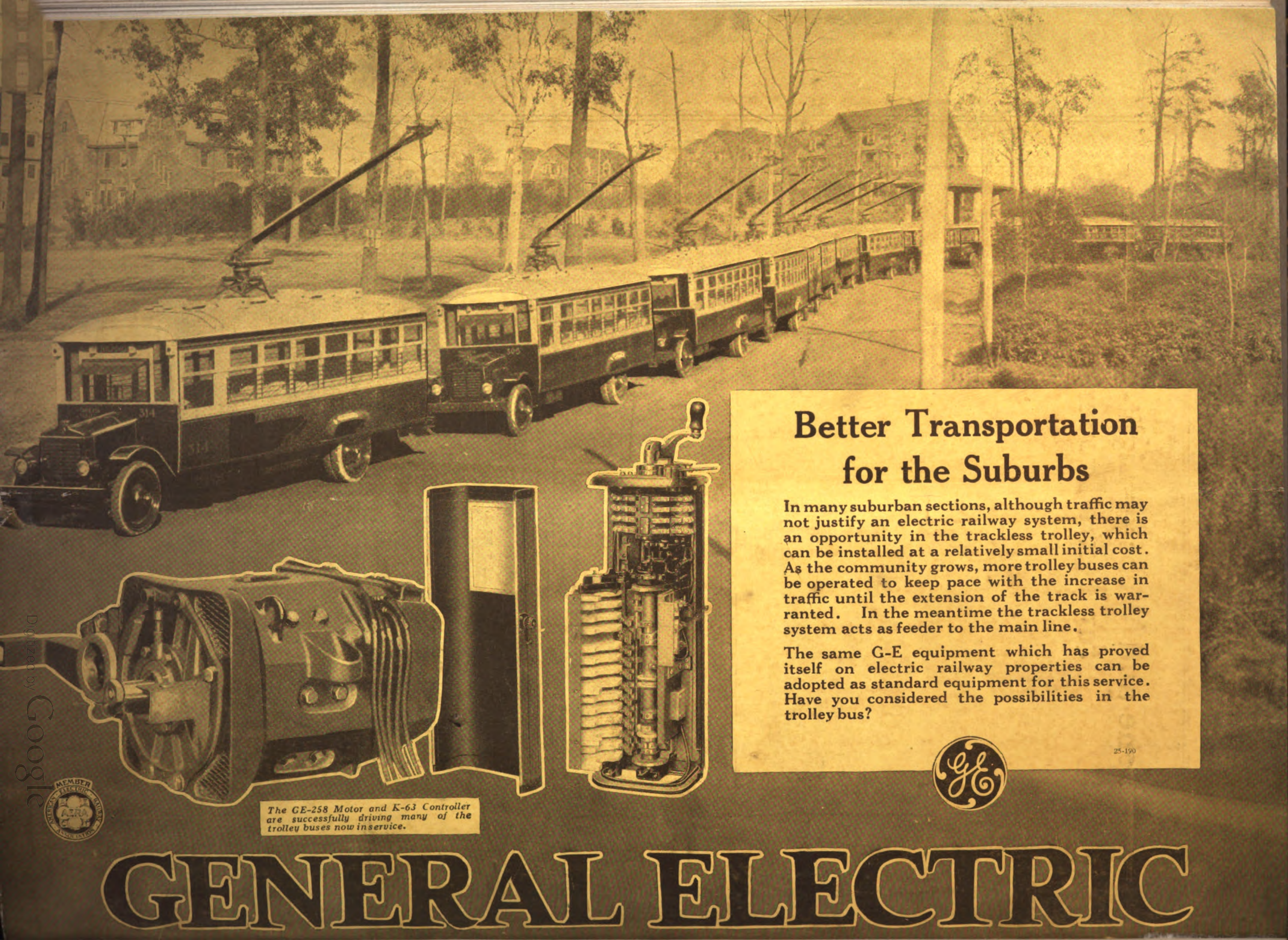

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